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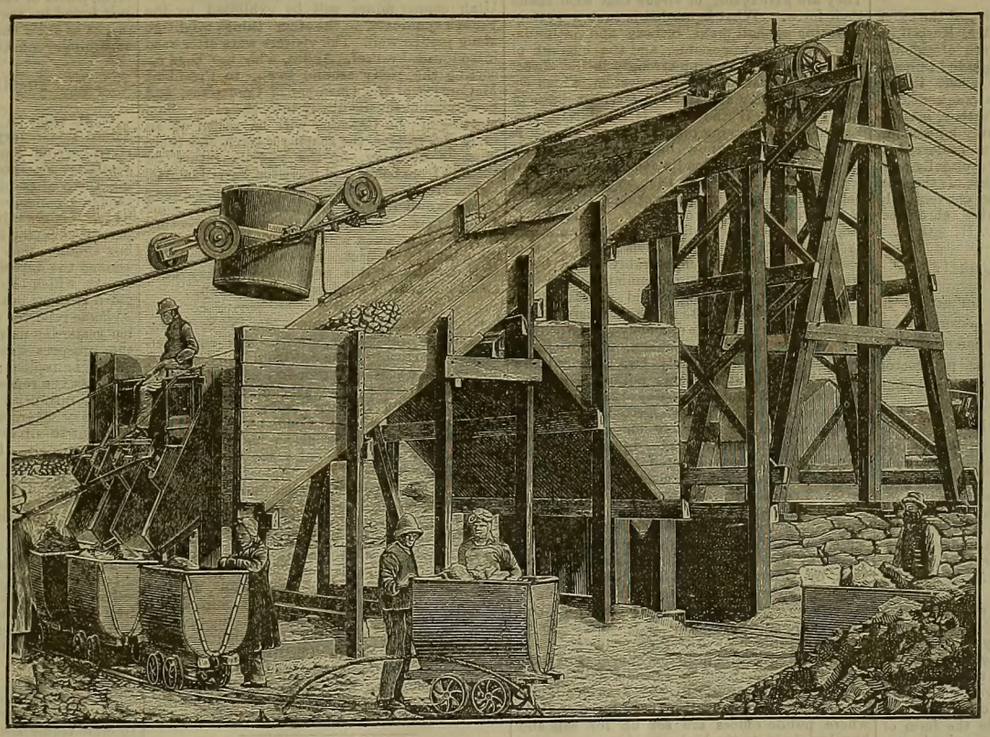
SAN FRANCISCO, SATURDAY, JANUARY 5, 1889.

VOLUME LVII Number 1.

The Pig-Iron Market.

From all present obtainable information, there can be no doubt but the consumption of pig iron on this coast this year will be largely in excess of any former year, but notwithstanding this, it is claimed that large consumers are not contracting to any great extent so as to meet their expected requirements. This course is evidently dictated by a spirit of conservatism and also a belief with some that lower values will obtain before the close of 1889. So far as present advices go, there is nothing to warrant, at least the first half of the year, the looking for lower prices in the primary markets, but there is ground for the belief that lower freights will obtain to this coast from ports from whence pig iron can be drawn. If this proves to be correct, then consumers are justified in holding off in anticipating to any large extent their wants. English advices report a strong iron market with the outlook favorable for a continuance well into the last half of the year, so that from that quarter only cheaper freights will induce lower prices being named for prompt shipment. While this is the case from our main source of supply, yet there is an important factor at work at the East that may bring about quite a revolution in prices there and lead to lower values here; this is no more nor less than the growing strength of the iron-mining districts in some of the Southern States. The prejudice entertained against Southern iron, but more particularly against the output of the furnaces in Alabama and Tennessee, is giving way in the Western, Middle and more Northern States, as the production of the first two named States becomes better known. Already are the representatives of the leading furnaces in Alabama and Tennessee successfully working into fields that have been controlled almost, if not entirely, by the Pennsylvania furnaces. This branching out may lead to still stronger competition between the Southern and Northern iron companies, and result in a gradual settling in values. Lower prices there under sharpened competition ought naturally to have an effect on our market. There is an undue degree of secrecy at the East about prices, which justifies the conclusion that some cutting in prices is being made, and Eastern authority on the iron market states that competition is sharper on mill grades, and is also keen on low-grade foundry, but even on these qualities prices have been shaded to a slight degree only. More favorable railroad freight rates for this year will be an important factor to aid in more thoroughly introducing Southern iron, thereby bringing about a still sharper selling competition. An official of one of the largest Southern companies—a company that has ten furnaces that turn out 290,000 tons of pig iron a year—states that his company has already enlarged its contracts for 1889 over those for 1888, through introduction into new territory, 90,000 tons. According to the monthly furnace statement prepared by the *American Manufacturer*, there were on December 1, 1888, in Alabama, Tennessee and the Virginias 29 furnaces with a weekly capacity of 17,000 tons (884,000 tons a year), using coke fuel, and 24 furnaces with 8000 tons (416,000 tons a year) a week, using charcoal. This showing attests the growth of the iron industry of the South and its important bearing on future prices, particularly as it is said the iron can be turned out much cheaper than is the Pennsylvania iron. Not only is the Southern iron making sad inroads into the trade heretofore enjoyed by the Lehigh product, but the American Scotch, a high-grade Southern iron, is steadily supplanting the imported article, the former being superior to the best Scotch, besides being from five to ten per cent cheaper.



ARRANGEMENT OF TERMINAL FOR DOUBLE-CABLE SUSPENSION HOIST FOR MINING OPERATIONS.

PROF. J. E. CLAYTON, the well-known mining engineer, has gone to New Mexico to examine and report on the Carlisle mines, about 12 miles from Silver City, New Mexico, and expects to return in about a month. Prof. Clayton has been for some years in Utah, Montana, Idaho and Oregon. He made the editors of the PRESS a pleasant call as he passed through San Francisco, and we expect to have a fuller opportunity to interview him on his return, especially on some ideas he has concerning gold deposits and formations.

THE prices of coals are being reduced, and it is said that by spring they will be considerably lower.

Aerial Planes in Mining Operations.

Where the character of the ground renders the construction of surface planes a matter of difficulty, the apparatus of aerial planes has peculiar advantages in transporting ore, etc., by wire rope. These planes consist of wire rope extending between points of desired communication. There are several systems in use, all with the same general principles, but varying in detail. The single-rope system is specially adapted to quarry-work, where the loading-point is continually shifting. In this system, the incline consists of a single wire rope, one end of which is made fast at the bottom of the quarry, while the other end passes through the head of a derrick or mast to an anchorage on the bank beyond. The hauling rope being fastened to one side of the carriage, passes downward around the hoisting-blocks and up again to the carriage, from whence it continues on to the hoisting engine.

Where the grades are excessively steep, and a large output is required, the double-rope system is very serviceable. The governing principles are similar to those of surface inclines, the two ropes serving instead of the surface track. This system is applied at the South African diamond mines. We give an engraving on this page of the arrangement of terminal for a double-cable suspension hoist, which we take from a paper on "Wire-Rope Haulage and Its Application to Mining," read before the American Institute of Mining Engineers by Frank C. Roberts of Philadelphia.

THREE veins of coal have been discovered in the Fresno county hills.

A New Concentrator.

John A. Jones of Tuscarora, Nev., has patented through the MINING AND SCIENTIFIC PRESS Patent Agency a simple and peculiar form of concentrator for sulphurets, fine placer gold, tailings, etc. It consists of a semi-cylindrical case or bottom looking like a large water pipe, cut in two lengthwise with the sides or edges turned inwardly to prevent the escape of the contents when the cylinder is rocked from side to side. The ends of the cylinder are in the form of circular disks. The apparatus is placed on a table-like base or support on any surface on which it may be rocked back and forth. The support, near the receiving end, is sufficiently higher than the one near the discharge end to retain the apparatus in an inclined position, so the material will gradually pass through. Pins attached to the bottom of the cylinder enter holes in the transverse supports, moving loosely in the holes so they will not impede the rocking motion, but will keep the cylinder in place.

The material to be concentrated is delivered into the circular opening of the disk at the upper end from a sluice, so it will fall in without producing any current. The rocking motion will break up and interrupt any current which may be produced by the inclination of the apparatus and will separate the lighter sand or material from that which is heavier, so that the latter will settle to the bottom and sides, being prevented from passing over the sides by their hight or by the inwardly-turned flanges.

Silvered copper plates are made in sections and fitted into the trough or cylinder when the machine is used for catching quicksilver or gold. The disk in the lower end has an opening made in it which is formed of two segments of circles of large diameter placed together so as to form a lenticular slit or opening having its shortest diameter in a vertical line and its longest in a horizontal line. Through this opening the lighter material will gradually escape, leaving the heavier in the apparatus. The device is simple and inexpensive.

FREEMAN'S DRY PROCESS.—Mr. James B. Freeman, the inventor of a "dry-process separator" for gold ores, whose address several people have written for, is a resident of Los Angeles. We shall shortly give an illustrated description of the machine.

SOME gold ore is said to have been found among the Buckland Hills, in Franklin county Mass., and there is quite a local excitement.

THE annual election of the California Academy of Sciences occurs on Monday next. There are two tickets in the field.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Lixiviation of Silver Ores With Hyposulphite Solutions.

CONCLUSION.

EDITORS PRESS:—Concluding for the present my remarks on the above subject, I wish to say that the suggestion with which my second article closes was not intended to imply, as some have supposed, any doubt of the utility of Mr. Russell's process in those cases in which the "old process" fails of extracting a high percentage of the value of the ore. By the "old process" I do not mean, as some writers on the Russell process do, the Patera process with sodium polysulphide containing caustic soda, nor do I refer to cases of manifestly and needlessly imperfect roasting, like some of those with which comparison has been made in favor of the Russell process.

I believe it is admitted, as it must be true, that where the conditions admit of such roasting as will convert nearly all of the silver into chloride, sulphate, arsenate or antimonate, the extra solution can do but little good. I have shown that in the Kiss process, which is the real "old process" of this coast, the leaching solution is not likely to become caustic unless in the case of a calcareous ore containing caustic lime. The Russell process certainly costs more than the other, and my intention was simply to call attention to the facts and to hint that the application of that process should not be indiscriminating. At the same time Mr. Russell's discovery of the action of the cuprous hypo is interesting, and that it is also useful, we have, I think, sufficient evidence after making all proper allowance for bias, and for Mr. Russell's superior skill in roasting as shown by his recent results, which were certainly not wholly due to the special merits of his leaching process.

As to the apparent compatibility of the extra solution with the Kiss process, Mr. Russell informs me that, in general, the use of calcium sulphide instead of sodium sulphide has made no difference in his results, but where it has made a difference that difference was considerable. I think this should be further investigated, because there will probably be cases in which the Kiss process will be preferred if equal results can be obtained, especially as it has been shown that the separation of the lead from the calcium hypo may be conveniently effected by means of a soluble chromate. (Patent applied for.) C. H. AARON.

Honey-Comb Rusty Quartz.

EDITORS PRESS:—In reading an article in "Le Conte's" work on Geology I came across an answer to a conundrum which had often puzzled me, and, as some other young prospector may want to know the same, I will call your attention to it.

In an article on fissure veins "Le Conte" explains why we find frequently in surface quartz free gold, but upon prospecting the vein to a depth of 50 to 100 feet we lose the free gold but find sulphate of iron or pyrites instead.

His reasoning is something like this: That when such a vein (fissure vein) is exposed to meteoric influences the pyrites are oxidized partly as soluble sulphate and carried away and partly as *insoluble reddish peroxide*, which remains.

The quartz is therefore left in a honey-comb condition by the removal of the pyrites, more commonly stained a rusty color by the peroxide.

Among the cells of the rusty honey-comb quartz the gold may be found in minute particles. Hence, in some quartz veins the gold may be found free along the "croppings" to from 30 to 60 feet; below that, in the form of sulphate of iron. This seems a reasonable explanation and is sustained by the fact of this honey-comb rusty quartz being so sought by the old prospector. CHAS. POST.

MELBOURNE EXHIBITION.—A letter concerning the Melbourne Exhibition says: The California mining machinery in the American annex has suffered for the want of proper steam-power. When that boiler was first put in, I told John Blythe, superintendent of machinery for the entire building, that it was insufficient to run the machinery of either Parke & Lacy, Ward & Co., H. P. Gregory & Co., or the Risdon Iron Works. All the satisfaction I could get was the stolid answer that there would be power enough, but there has not been nor will not be. Hence I deem it but an honest statement to say that American exhibitors of mining machinery have had no fair chance. Perhaps the Melbourne foundries are at the bottom of it.

THREE men have been arrested at Nevada City for selling bogus nuggets and quartz specimens to Chinese merchants. The nuggets were made of brass and were gold plated, so as to resist acid. Small particles of quartz were imbedded in them. The quartz specimens have brass filings sprinkled in them and fastened in the crevices. The imitations are very good and would easily deceive any one but an expert.

King Boodle.

The New York *World* has recently taken the pains to collect and publish a large and startling amount of proof that money was lavishly used for the purpose of corrupting voters at the late national election in many States. The investigation was no one-sided partisan affair. It shows conclusively that a corruption fund was prepared and employed by both sides; that the evil is not a Democratic nor a Republican evil, but a national evil; that human nature is all off the same piece, and the average politician of all parties under the same pressure of circumstances will do pretty much the same thing; that party leaders cannot cast stones at each other, but all are dominated by the greed of loot and plunder. The boodle dynasty is everywhere. Right here in this city there is a vast amount of discontent and muttering at the way the polls are conducted. Our best citizens, business men who are largely interested in the fair fame and prosperity of the city, are awakening up to the fact that our municipal government has largely fallen into the hands of scoundrels and thieves; that the spoliation of the ballot-box has become an art, and the frustration of the will of the people, the most sacred prerogative they possess, has become a trade; that tricksters, political bandits, and, in short, the criminal classes have got the possession of the political helm.

This evil has become so extensive that patriotic men of all parties are aroused to the necessity of rescuing the ballot-box from the control of King Boodle. Whether the Republicans buy votes in Indiana or the Democrats buy votes in New York, or the bosses in this or other cities combine to bribe and intimidate and tamper with the elective franchise, the crime against the people and good government is the same.

And now what is the remedy? Independent movements, citizens' tickets and the like have all been tried with merely a temporary success. They are paroxysms of virtue that soon spend their force. What is needed is such a system of voting as shall make bribery and intimidation absolutely impossible, and the current of public opinion is tending strongly in the direction of the Australian ballot system, which we quite elaborately explained in a recent issue of the PRESS. If the voter is absolutely prevented from showing his ballot and no one is able to certainly know how he voted, it is apparent that King Boodle can have no guarantee that the goods he has bought will be delivered. The system is perhaps susceptible of receiving many improvements. In England, where corruption was formerly more rampant at elections than it has ever been in this country, the evil was measurably cured by a law compelling campaign committees to file accounts of their expenses, and unseating by the courts any candidate in whose interest any illegitimate expenditure of money can be proved to have been made. In Canada, in addition to the Australian method, only two hundred are allowed to vote at any one polling-place, and we were told the other day that this plan works well. It has been suggested that registration should imperatively close sixty days before election, and that the precinct election officers should be appointed by the Superior Judge from our leading citizens, giving each party an equal representation.

Our Legislature soon to assemble should study the law passed in Massachusetts last year, which many think is far better than the bill passed by the New York Legislature and vetoed by Governor Hill. The Kentucky Act passed as an experiment and made applicable to the city of Louisville may be profitably studied by our municipal officials. It is claimed to be a great improvement in city government.

At all events, it is quite certain that in some way or other the American people will sternly demand that King Boodle be dethroned and that their elections shall not be mere auctions where public offices are set up for sale and knocked down to the highest bidder.

SALT DEPOSIT LANDS.—The Secretary of the Interior has rendered a decision rejecting the application of Elias Crane, E. W. Crane and F. Oliver, for a patent under the Mineral Act of May 10, 1872, for the Salt Bluff Placer mine, located in the Salt Lake, Utah, land district. The secretary holds that no authority exists for the disposal of saline lands or salt springs belonging to the United States except under the provisions of the Act of Jan. 12, 1877, which does not apply to the Territory of Utah, and that the policy of the Government is and has been from the earliest date to reserve all saline lands, and to dispose of them only by specific Acts of Congress. This is said to be the first instance in which an application has been made to enter Government salt deposit lands to be worked as placers.

NEWS comes from Unionville, Nev., that R. S. Fielding and James Harvey are working placer mines in Spring Valley with good success. The great drawback is scarcity of water, and the gravel has to be worked with rockers.

THE total assessments levied by the Comstock mining companies during the current year aggregate $2,254,700. The bullion product of the mines during the same period will exceed $5,000,000.

The Beaver Copper Mines.

Comte d'Adhemar and MM. Sallandrouze and Sebillot leave to-day for Frisco, says the Salt Lake *Tribune*, where they will give the Comet and Cactus copper mines a careful examination upon which they will make a report to the French syndicate which has sent them over here. As this syndicate is said to represent 30,000,000 francs, the chances of a good slice of this finding its way into Utah bodes great good to this Territory. A recent number of *Le Figaro* says of the first two parties: "The Normanay sailed Saturday from Havre for New York, bearing on board the Comte d'Adhemar, president of the society of the Comet mines, accompanied by M. Sallandrouze, delegated by the Banque d'Escompte to take charge of the Cactus mines acquired by this society. These gentlemen will assist, at the same time, in the inauguration of the Comet smelter plant at Frisco, Utah, erected for the treatment of the minerals of the Comet, Cactus, and Foggi mines. Bon voyage and prompt return to our esteemed compatriots." In conversation yesterday with a *Tribune* reporter, the Count said he was agreeably surprised and highly pleased with Utah. Over in Paris the idea seems to prevail that the Territory is peopled by savages, and when the distinguished visitors reached Salt Lake they were astonished to find the savages using telephones and electric lights, and the makings here of a great city. They believe now that Zion will arise and shine ere long, and that a great future is in store for her as well as for the Territory. Count Adhemar, a man of wealth and polish, spoke of the coming Paris Exposition, and urged the necessity of Utah's being represented there with a full line of samples and specimens covering every resource and industry within her borders; and said he would gladly take charge of these samples and specimens free of cost to the Territory, and exhibit them in the Exposition, the Chamber of Commerce or other parties interested paying only transportation and other necessary expenses. Specimens from the Utah copper mines will be exhibited by the French syndicate, so the other things might go along just as well. The visitors were afterward introduced by Prof. Andre, who has been escorting the party around town, to President McCornick of the Chamber of Commerce, and he entered enthusiastically into the plan. So a meeting of the Chamber will be called at an early day to give the scheme a start, and there must be no delay, for the visitors return on the 23d from below and leave for Paris Jan. 1st.

The erection of the smelter in Copper gulch, Grampian district, is progressing rapidly, some 45 men being employed on it. After inspecting this, the gentlemen will visit the Copper King mine in Star district. Seven men are now at work developing this property, and they have about 200 tons of good ore on the dump.

OIL INTERESTS IN KERN.—Mr. W. S. Thorston, the oil and gas expert who was employed by local parties to come out from Toledo, Ohio, and examine some oil property in this county, arrived in town a little over a week ago. In company with J. S. Hambleton, superintendent of the Union Land & Oil Company's works, and Alphonse Weill of this place, he went out to the Temblor mountain and made an examination of the oil and gas indications in that section. His entire report has not been made public yet, but it is known that he said there was oil there in paying quantities. He does not believe flowing wells could be obtained, owing largely to the thickness of the oil and its consequent disinclination to flow. He thought it was hardly necessary to bore wells, as the natural springs now flowing would furnish a supply for some time. He also said if the present owners would not place too high a figure on the property he thought no difficulty would be experienced in getting capitalists to take hold of it and develop it. This, it is generally thought, would mean a pipe line leading from the oil district to the railroad at this point.—*Kern Echo.*

IRVING M. SCOTT of the Union Iron Works has gone to Washington to meet Secretary Whitney and perfect arrangements for the trial trip of the new cruiser Charleston, which is nearing completion. The Secretary of the Navy has invited proposals for the construction of a coast-defense vessel of 4000 tons, to be completed within three years. The armament will be furnished by the Government and the contractors can bid on the Secretary's plans or on plans of their own preparation. Mr. Scott will bid for the construction of the war-ship, and, probably, only two or three other bids will be received. The proposals for this work will be opened on the 26th of next February.

ON THE DECLINE.—The once prosperous little town of Hailey, Idaho, seems to be steadily on the decline in every branch of business, and its population is rapidly falling off. The postmaster of the town has resigned his position, and up to this time no one can be found to accept the position. The newspapers there show a falling off in business, and recently the *News-Miner* was compelled to decrease in size from a six to a five column sheet. This condition of things is to be deplored and it is hoped a change for the better will occur soon, and we believe it will, for the mineral resources of the Wood River country will yet come to the front and bring back prosperity to its people.

Growths of the Dark.

At Lernhart's drug store is to be seen a fungus of unique and beautiful form, that was brought up from the 1300 level of the Yellow Jacket mine. It was found growing on a timber in an old drift and is of a trumpet shape. The whole specimen—stalk and head—is nearly a foot in length. It is a species of mushroom, but of a distorted form, owing, no doubt, to the darkness of the place in which it was produced. An ordinary mushroom has the gills on the underside and is smooth on top.

This specimen has a crook in the stalk as though it had curved toward a place where there was some light—perhaps a dim light at the shaft—and the gills appear to have made an effort to reach in the same direction. Thus the outer rim of what would be the top of a common mushroom has been pushed forward so much beyond the central part as to form a cavity in the shape of the interior of a teacup, and the gills are seen (well defined) on what would be the outside of the teacup. A better idea of this phenomenon of fungus growth will perhaps be obtained if we say that it has been reversed from its natural position, exactly after the manner of an umbrella turned inside out by the wind. This reversal appears to have been due to an effort made by the "hymenium" or gilled part to reach forward toward a current of air or some faint light, thus overcoming the top or smooth part of the pileus, and so far reversing its form as to give it the shape of the mouth of a bill.

Many persons look upon the fungi found upon the timbers of old drifts as growths produced spontaneously by dampness and decay. In this we are sure they greatly err. Undoubtedly the spawn of fungi of various kinds is deposited on the timbers before they are taken down into the lower levels and remain on them until moisture and decay unite to produce conditions proper to their vegetation. In their efforts to attain to the other requisites of growth, air and light, they reach out till they take on snake-like and various other forms, yet at their terminal points will be found, in a distorted form, traces of their species. The queer fungus just found in the Yellow Jacket has such earmarks as show that it was born of the spawn of an ordinary mushroom.—*Virginia Enterprise.*

To Make Utah Iron.

G. H. Giles of Oshkosh, Wisconsin, and Dr. James T. Gregory of Ashland, Wisconsin, arrived here on Tuesday and left for Iron county yesterday afternoon for the purpose of examining the coal and iron deposits there. The gentlemen are members of a big Eastern syndicate which was organized some time ago for the purpose of engaging in iron mining in Utah, and last summer they sent out an expert who examined the deposits and made a very glowing report, which Messrs. Giles and Gregory decided to come out and verify for themselves. A *Tribune* reporter met Dr. Gregory at the Cullen yesterday morning, and when asked what the prospect was for the development of the mines, he replied: "Well, it all depends upon whether the reports made to us are true or not. If the enterprise is taken hold of it will be necessary to erect a very expensive plant, and we want to investigate before putting a lot of money into it. I will say, however, that if the property meets with our expectations, it will not be long before active operations are commenced."

"In that case, how much money will you expend?"

"It is very difficult to estimate that; we might start in with $200,000 or $300,000, but that would only be the beginning."

The gentlemen will spend about a week in Iron county, and then return home. They are both already interested in mining in Wisconsin. —*Salt Lake Tribune.*

PUMPING MACHINERY for the new placer mines on the Colorado river is being unloaded at Green river for cartage 115 miles, and two 16 mule teams are now loading up. Colonel N. R. Hite of Wichita, Kansas, is the prime mover in this venture, and the gold samples recently sent over to Green river make it look decidedly promising. The pump will throw 2000 gallons of water per minute from the Colorado river into two sluiceways.

THE Southern Pacific Co. is cutting down expenses. General Superintendent Fillmore told a reporter that the necessity of cutting down the company's operating cost was caused by the slackness of shipments all over the coast during this winter. About 1000 employes, including some assistant agents, have been discharged from various stations in Arizona, Nevada and this State.

JOHN FARISH is down from Park City, feeling happy over the success of the Woodside. Himself and partners are ahead about $50,000 on ore shipped, after paying all expenses and giving E P. Ferry 20 per cent royalty. They are shipping 50 or 60 tons per day, such as nets about $65 per ton.—*Salt Lake Tribune.*

THE Belmont *Courier* understands that several rich strikes have been made in the mines at Ophir and Summit canyons, Nye county, Nev. Some of the ore assays high. Also, that it is the intention of the Chicago M. & R. Co. to resume operations in their mine at Ophir canyon early next spring.

Imported Iron Ore.

One of the most prominent firms engaged in mining iron ore in the Lake Superior region has lately purchased a valuable ore bed on the south side of the island of Cuba. Pennsylvania capitalists have for several years past been mining iron ore in Cuba and shipping it to the United States for their own use in the Bethlehem and other iron works in Eastern Pennsylvania. Last year some 20,000 tons of ore were thus imported, and paid the duty of 75 cents per ton.

The purchase made recently comprises about 500 acres and a most valuable deposit of ore. It is located near the shore of the island, so that the ore may be shipped without serious cost. The quality of the ore is that which is most needed in this country for Bessemer steel. It contains less than 59-1000 per cent of phosphorus, so that it might be mixed with advantage with the ores of Lake Champlain and other American ores, which contain an undue proportion of phosphorus.

The quantity of ore in sight on the property is stated at not less than 1,000,000 tons. It is fortunate that the ore from this locality will not be controlled by any one of our Eastern iron manufacturers. It will be brought here for sale, and will, to some extent, take the place of Spanish or Lake Superior ores, which have been used for similar purposes.

There is one fact suggested by this enterprise, viz., that 75 cents per ton is not adequate protection against the importation of foreign ore, mined under favorable conditions as to labor and shipment.—*Tariff League Bulletin.*

THE RYAN SMELTING WORKS.—Active preparations are being made for the erection of the Ryan Smelting Works at Tacoma. The building will be 210 feet long and will contain four Root blowers, two furnaces 33x48, two reverberatory furnaces, a Corliss engine 48x20, two boilers 60x10. The main stack will be 90 feet high, 28 feet square at the base, the walls of which will be 5½ feet thick at the base and 18 inches at the top. The works will have a capacity of 200 tons per day, and will be equipped to handle all kinds of ore. The machinery has all been ordered from Fraser & Chalmers, Chicago, but it will not be shipped until the company can lay it down on the grounds and are ready to place it in position. The reduction works will, when in operation, employ from 200 to 300 men. The lead flux used will be procured from the Hunter mine at Mullan, in which Messrs. Ryan, Louderback and others of the reduction works company are interested. They want the smelter completed just as quickly as possible, and they expect to have it so by February, or, at the latest, March next. Sixty men are at work now engaged in completing the excavation, the cribbing and the foundation for the great stack.

OUT of a yield of $250,000 taken from the Delhi mine, Nevada county, in a stated period, $210,000 was paid in dividends. A vein of rich quartz has been struck in the lowest level, but its width has not yet been determined. The quartz crushed is rich and the sulphurets yield $200 a ton, $10,000 worth being saved last month.

The "San Francisco" of Nevada.

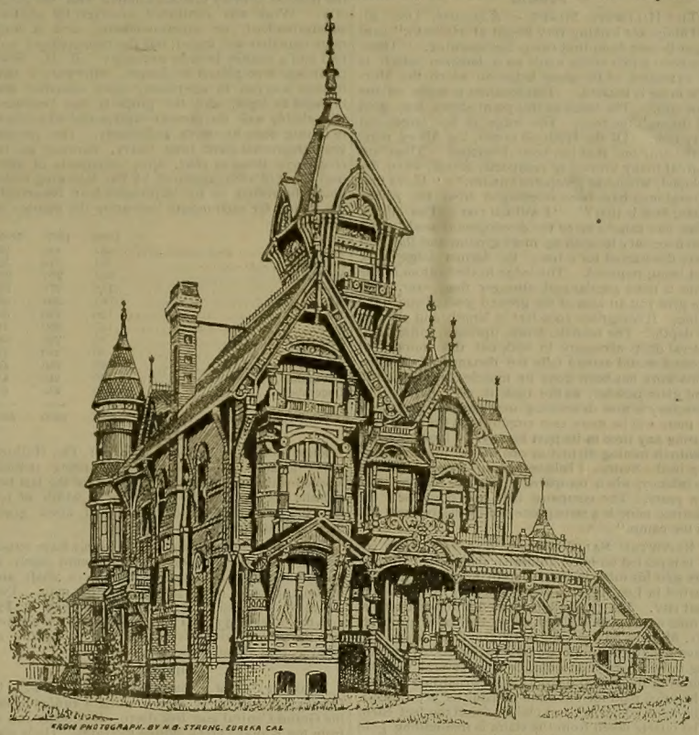
Virginia City is the metropolis of the State. Her population is almost as cosmopolitan as that of the Bay City. The town is situated on the eastern slope of Mt. Davidson. The altitude of B street, the principal thoroughfare, is 6319 feet.

According to the Surveyor-General's report, in 1857 Joe Kirby and others commenced placer mining in Six-Mile canyon, about half a mile below where the Ophir Works now stand. On Feb. 22, 1858, the first quartz claim was located in the Virginia Mining district, by James Finney, generally known as "Old Virginia," from whom the city of Virginia and the croppings took their name.

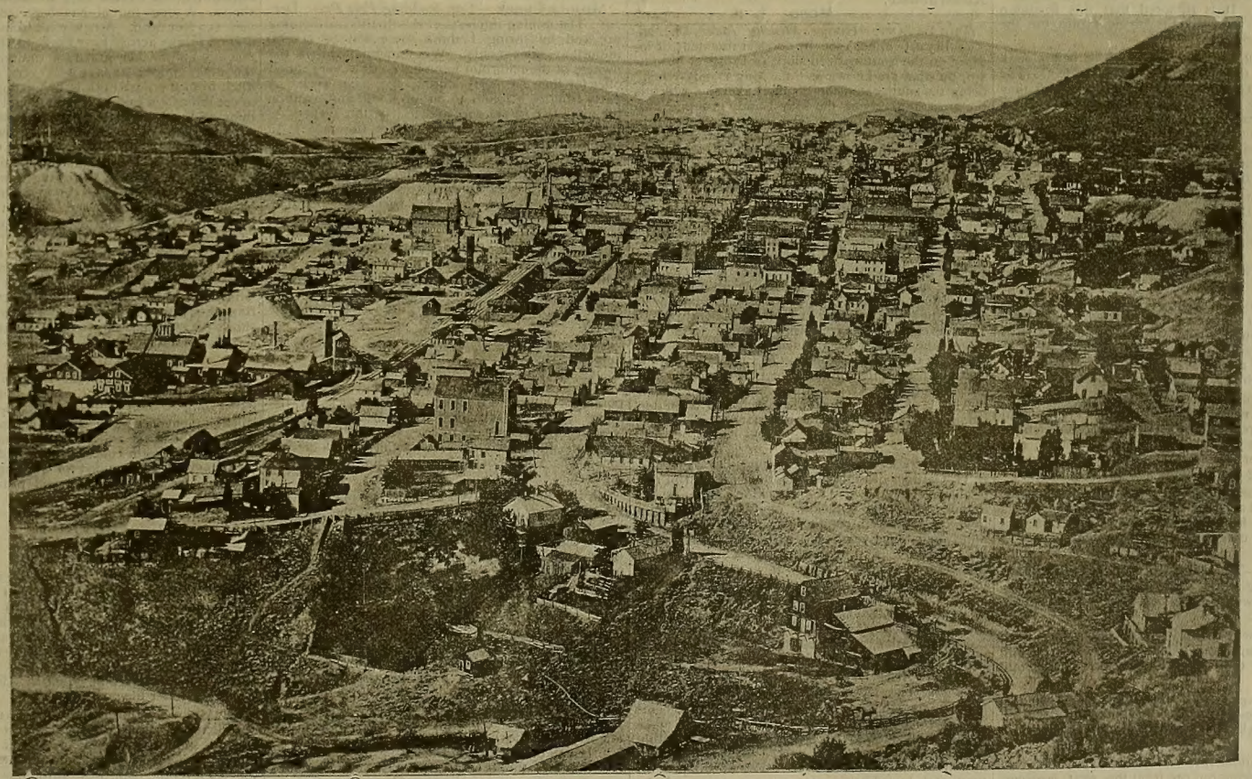
In June, 1859, Peter O'Reilly and Patrick McLaughlin discovered a rich vein of sulphuret of silver. The discovery being on the ground claimed by Kirby and others, Comstock was employed to purchase their claim, whereby Comstock's name was given to the great lode.

The population of Virginia City in 1861 was 2704, but in the palmiest days it was estimated at 20,000. To-day it is about 10,000. There has always been, and is still, considerable speculation as to how long this body of ore will hold out at the rate it is being extracted. Five or more years ago the opinion was so prevalent the camp was about exhausted, that real estate was of very little value. Subsequent explorations exploded the fallacy.

The 65 mining companies on the Comstock lode represented on the Stock and Exchange list at San Francisco have paid dividends, since their organization, amounting to over $44,000,000, after deducting all assessments ever made.



RESIDENCE OF MR. CARSON, EUREKA, CAL.



BIRDS-EYE VIEW OF VIRGINIA CITY, NEVADA.

There are many reasons which amply justify the conclusion that this lode is good for many years to come.

COMSTOCK BULLION.—The Virginia *Chronicle* has made the following estimate of the bullion yield of the Comstock mines during the month of December: Con. California and Virginia, $340,000; Hale and Norcross, $160,000; Confidence and Challenge, $150,000; Chollar and Potosi, $25,000; Alta, $25,000; Savage, $25,000; Occidental, $10,000; Yellow Jacket, $10,000; Overman, $7500.

Redwood Houses.

Nearly all of the wooden houses on this coast are made of California redwood, but it has only been within the past few years that it has been used for interior finish and decoration. Now, however, that painted wood is unfashionable for interiors, the native woods are being utilized, and the redwood largely. The roots and stumps have a curly grain, which is very beautiful when polished. We give an illustration on this page of the handsome residence of Mr. Carson, of the firm of Dolbeer & Carson, in Eureka, Humboldt county, built mainly of redwood.

Its exterior appearance is grand and attractive, as may be gleaned from the illustration. The interior is elegant in its appointments and finish. All the different forms of redwood—straight-grained, curly and variegated—besides foreign hardwoods, are used in the interior finish and decorating. Some idea of its elegance may be formed when it is known that all the lumber was finished and millwork done at Mr. Carson's mill, and yet the cost was $30,000. The stable in the rear and standing at one side is of the same architecture as the residence. Messrs. Newsome Bros. of San Francisco were the architects, and it may be well called a masterpiece of the builders' art. One of the most attractive features is the use of different woods, hard and soft, natural and stained, in the different suites of apartments, giving a rich, elegant and pleasing variety, and making this palatial residence one of the finest that can be seen anywhere, surrounded as it is by the spacious and well-appointed grounds, and occupying a commanding site.

PLANCHAS DE PLATA.—The sale of the famous Planchas de Plata group of mines, 18 miles southwest of Nogales, to a syndicate of New Orleans capitalists, has been completed and the money paid over. The property consists of five mines and ten stamp-mills. The price has not been definitely stated, and it is said to be $150,000 spot cash. The property is just over the line in Sonora, and has been worked for 15 years in an indifferent manner by Mexicans. The new company will start up the mill at once and also begin the erection of another large mill immediately.

THE Centennial Eureka, Tintic District, says the Salt Lake *Tribune*, sent in a ten-ton lot of ore from a rich pocket lately tapped, and had it sampled this week. It went 557 ounces silver, ½ ounce gold and 16 per cent lead. This late strike, together with the large bodies of lower grades being opened up, makes the Centennial loom up in the eyes of mining men.

THE oil country near Green river, Utah, is to be developed by the parties already interested in it, as they begin to feel they can handle the oil. They have been delayed heretofore by fears of the Standard Oil Company.

AT Central City, Colorado, a retort containing $40,000 in gold was placed in a bank for safe-keeping. The gold was all produced in a single day by one mine.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

DOYLE.—*Ledger*, Dec. 29: This property is located in Hunt's gulch, and very favorably situated for economic working. It lies between the Amador gold mine and the Amador Queen, and has a fall of over 400 feet for water-power. Two tunnels have been run. The south or footwall tunnel is in a distance of 200 feet. It has not been worked for years, but shows a large body of gold-bearing ore. The main or hanging-wall tunnel is in about the same distance, showing an enormous ledge of quartz 60 feet wide. The quartz has a healthy look, showing dark seams running through it, which carry a large percentage of rich sulphurets. It is certainly the finest prospect for a big paying mine to be found between the Zeile and the river, considering the small amount of development work done.

AMADOR GOLD MINE.—John I. Minear, superintendent of the Amador gold mine, says there is but little change in that mine; that he is working forty odd men (besides mill contractors) opening up the ground ready to take out ore to run the mill when finished. When asked when he expected to have the mill ready to run, he said it was impossible to tell, as it depended on so many things over which he had no control—machinery from the shop, bad roads and other things which can prevent its being finished. Plans for the new hoisting works, with pump and ore-crusher attached, are now at the Pacific Works, where the iron work is being made. The superintendent expects to have them ready to run by the time the mill is finished. The crusher is No. 5 of the Gates pattern, and will crush enough in 10 hours to keep the 60 stamps going. The mill is well under way, batteries all up, mortars set and line shafting in as fast as possible; water-wheels all up and much other work done.

VALPARAISO.—A cleanup was made at this mine this week. The Huntington roller-mill was run for 13 days, on an average character of the rock, crushing about 8 tons per day, or 104 tons in the 13 days. The yield was 105 ounces, worth $16 per ounce, making a total of $1680. This result exceeded the most sanguine expectations of the owners, Messrs. Ginocchio Bros. The chunk of gold was shipped to the mint this week.

COSMOPOLITAN.—*Dispatch*, Dec. 28: The east crosscut is in 110 feet. The ore body is cut 25 feet and the hanging-wall has not yet been reached. The ore will average $5 or $6 per ton. South is in 20 feet in slate.

PLYMOUTH CONSOLIDATED.—At the Pacific shaft they are hoisting night and day, while at the Empire but a day shift is on. The Pacific shaft being much deeper, the water runs through the connecting tunnel from the Empire, and dumps into the Pacific shaft. By running days alone at the Empire, that mine will be drained before the Pacific with its double shift. The Empire mill has been running through the rock left in the mill when work suspended a year ago. It is rumored that this 80-stamp crusher is to be removed to Angels Camp, but the story is not credited.

NORTH STAR.—The winze which is being sunk in the south tunnel is now down 10 feet. The rock ran out on the west side of the winze and they are now driving it toward the hanging-wall where the ledge still exists, although only a few inches in thickness. Work in the end of the tunnel is temporarily suspended while the winze is being put down. They have about 15 tons of very rich rock locked in a storeroom in the mine.

CUPPS.—Some villain set fire to the hoisting works on this mine last Monday night and it was entirely consumed by the flames. Mr. Cupps, last week, paid off the entire indebtedness and is now in San Francisco making arrangements to start the mine. The fire will be a detriment to the resumption of work.

NEW LONDON.—They are still driving the crosscut in the north tunnel on this property. For a time it looked as though a ledge of immense width had been encountered, as they had not met the wall when in a distance of 25 feet. The superintendent says the ledge, which is rich, runs east and west.

LADY BEDFORD.—J. N. Gillenwater, owner of the Lady Bedford, near Plymouth, has just made a trial run at the Empire mill on 30 tons of rock taken from his mine. The yield was entirely satisfactory, and Mr. Gillenwater will make immediate arrangements toward opening out his mine and erecting a mill.

POTOSI.—The shaft of this mine has been idle for some time, and also neglected; so the hoisting works and everything for 20 feet around it caved in last week. It will cost more to fix it up than to sink a new shaft.

OVERPLUS.—This mine, situated at Quartz mountain, is looking well. The Huntington mill has been closed down for a few days, but will start again on January 1st.

GOVER.—They will turn on the water this week from the new pipe, and will run the mine and mill with less water than they were using at the mill heretofore.

CAUCASIAN.—A. M. Vaughan, owner of this property, has just opened and cleaned out the shaft, and found a well-defined ledge of good-paying ore therein.

NORTH CALIFORNIA.—At the North California they are still taking out ore from the west crosscut.

Calaveras.

SALE.—Calaveras *Prospect*, Dec. 29: It is reported that a sale of the Nevills and Confidence mines in Angels has been made to an English syndicate. Mr. Lloyd, the representative of the company, was in town during the week.

El Dorado.

BULLION-PRODUCER. — Placerville *Republican*, Dec. 29: The old Granite Placer mine at Smith's Flat is coming to the front as a bullion-producer. This mine is on the same range, and is of the same material as the Mayflower and Dardanell mines at Forest Hill, and bids fair to be equally as productive. It is on the same channel and near the old Prospect Flat claim which yielded to its owners over one million and a quarter in gold. The Granite was opened in early times and produced a large amount of gold, but for some reason or another, like many other good mines of that time, work was suspended and it lay idle for many years. Mr. Thos. Potts (the lucky owner) ran a tunnel and struck a bed of blue cement gravel four feet thick, yielding about $6 to the carload of 800 pounds.

Fresno.

THE HILDRETH MINES. — *Expositor*, Dec. 26: "Things are looking very bright at Hildreth," said a gentleman from that camp this morning. "There has been a rich strike made on a location which is an extension of the same ledge on which the Morrow mine is located. This location is made on the east end. The ledge at this point shows free gold all through the rock. The ledge is not large, but very rich. Of the Hildreth mines, the Abbey mine is the only one that has been developed. There are a great many promising prospects, which, when developed, will make prosperous mines." "I hear that several men have been discharged from the Abbey mine; how is that?" "I will tell you. The Abbey mine had caught up to the development work, and it was necessary to open up more ground and the men were discharged for a time, the former large force not being required. The ledge in the bottom of the mine is more regular and stronger than ever. Let me give you an idea of the ground worked out in the mine. It comprises 1000 feet in length and 700 feet in depth. The tunnels, levels, upraises, winzes and lateral drifts necessary to work out this amount of ground would extend fully the distance of a mile. This work has been done by muscle, hammer, drill and giant powder, as the rock is very hard. The company is now developing new ground, and shortly there will be more men employed in the mine than during any time in its past history. I look upon the Hildreth mining district as one of the most promising in the State. I believe mining there is just in its infancy, when compared to what it will be in a few years. The company that has purchased the Morrow mine is a strong one, and will give new life to the camp."

REPORTED SALE.—Fresno *Expositor*, Dec. 26: It is reported on good authority that Jesse Morrow has sold his mine in the Hildreth mining district to parties in Los Angeles, represented by A. James of that city. The property is located three-quarters of a mile north of the Abbey mine, the latter property Mr. Morrow having sold in 1885. The parties who have bought the mine are largely interested in mining in Southern California, owning several valuable mines in the Calico district, San Bernardino county. The price paid for the mine remains as yet a secret. The mine comprises two claims 600x1500 feet each. The quartz taken from the claim is free-milling gold quartz. It is estimated that it will yield from $12 to $40 a ton in free gold. All the quartz carries more or less silver. The average width of the vein is 18 inches, and is very regular so far as developed. This mine was worked in the early days and some valuable specimens taken out. What little work has been done on the claim has been accomplished by hand and without the aid of machinery. It is understood that if the new company does not purchase the machinery of the Golconda mine, new machinery will be bought and work on the mine started at once.

Mono.

THE BRYANT.—Homer *Mining Index*, Dec. 29: The Bryant mine, 1500 by 600 feet in extent, is located on the southeastern slope of Prospect Mountain, on what are known as "the May Lundy veins," being the south extension of the Lakeview, which is the most southerly of the May Lundy group. Two parallel veins, averaging from two to seven feet in thickness, crop out boldly, and can be traced from the north end through the claim until they disappear under the overlying talus well toward the base of the mountain. The veins have the same trend and dip as in the May Lundy, and are filled with the same character of high-grade gold ore, which is to a considerable extent incased in porphyry carrying gold enough to give a very healthy prospect. Owing to the well-established fact that they have a good mine—one that will increase instead of depreciate in value, the owners have been disposed to take things easy and do but little on it; but by so doing they are pursuing a badly-mistaken policy. The developments have been confined to the east ledge, and consist of an incline on the vein, near the north end of the claim, 115 feet in depth, with a drift north from its bottom 80 feet on the vein; also, a drift south 45 feet. A stope was worked below the level of the south drift 20 feet, and a limited amount of stoping was done above it.

Nevada.

THE STOCKTON MINE.—*Tidings*, Dec. 27: Mr. P. G. Gardner of Stockton, a former resident of this township, who owns the Stockton mine, about a mile below the Limekiln, on Wolf creek, is in town on business in connection with his mine. This mine was worked years ago with good results, and Mr. Gardner is now getting up a company at Stockton to develop it fully. It is proposed to run in a tunnel 1800 feet, which will strike the ledge at a depth of 500 feet. The tunnel is now in several hundred feet. Mr. Gardner describes the ground of the Stockton as similar in formation to the famous North Star mine, and he considers the prospects of the property as very promising.

NORTH STAR DIVIDEND.—Grass Valley *Union*, Dec. 29: The North Star Mining Co. of this district will on Monday next pay a dividend of 50 cents per share, amounting to $50,000, which will make the third dividend of the same amount paid within the last six months. The mine is yielding finely, and never looked better than it does at the present time, and by addition of ten more stamps to the mill, which has just been made, the product of the mine will be considerably increased.

Napa.

QUICKSILVER.—*Calistogian*, Dec. 26: The Napa Consolidated Mine in the Oat Hill Mining District is one of the most valuable pieces of quicksilver mining property in California, except, of course, the New Almaden, in Santa Clara county; and even the latter by no means affords the per cent profit on its stock that the former does. The Napa Consolidated has been, and is, a remarkable mine. In 1878, 3050 flasks were shipped from it, and 3646 flasks in 1879. A small furnace was then used, and the opinion was entertained, on account of the formation of the ground, that the property of the company would not long pay stockholders, and would be abandoned. Twice since 1876, the prospects have been very dark, but further deposits of cinnabar were found, and shipments of metal have been made right along the past 11 years or more with but very little interruption. Perhaps the darkest time in the history of mining there was when Superintendent M. G. Rhodes left it and went to the Ætna mines. Then there seemed to be little cinnabar left. This was the opinion of every one acquainted with the property. Work was continued, however, by another superintendent, or superintendents, and a little more cinnabar was found; but the management was bad and a change became necessary. B. M. Newcomb was then placed in charge. Afterward a new furnace was put in operation, more cinnabar was brought to light, and the property has produced remarkably well, the present superintendent evidently having done his work judiciously. The present year, shipments have been heavy, showing an increase over those of 1887, also, shipments of 1887 over those of 1886, as shown by the following table, kindly furnished us by Superintendent Newcomb, the figures for each month indicating the number of flasks:

	1886.	1887	1888.
January	167	188	235
February	201	215	223
March	200	220	288
April	176	277	324
May	145	200	320
June	125	220	345
July	107	260	248
August	82	220	347
September	86	270	370
October	132	240	440
November	169	240	475
December	205	330	450
Totals	1785	2880	4065

Plumas.

RICH GULCH.—*National*, Dec. 22: The Hallsted mine, located on Rich gulch, is being steadily worked with good results. The rock for the last two months has averaged $6 per ton for a width of ten feet, the balance of the ledge being of lower grade ore. The owners have a good mine.

RICH GROUND.—Richards & Blakesly have struck very rich pay at Newtown in the ground lately in litigation. They are working through a shaft and making about an ounce per day to the man. Two pieces were picked up last week, one valued at $73 and the other at $35. They are running a tunnel, and the ground so far as prospected is equally as good as that already worked.

Shasta.

FROM IGO.—Cor. Shasta *Courier*, Dec. 29: P. Gibney has a force of men running a tunnel to tap his Grand Central 200 feet deep. It is being run in from the Kanaka creek side of the ridge. He is also doing some work on his Arizona claim. H. Rothwell has his Crystal bonded, with fair prospects of its being sold. Shaffer has out a good-sized pile of ore, and is running the same through Bull's arastra. J. P. Wright is taking out ore, and will start his arastra in a few days. C. J. Russell is taking out ore at the Atlantic on shares, the same being worked in Shirland's arastra. E. L. Ballou's arastra is running on his Hope ore. Assessment work is being done on several claims. Gravel miners about Igo and Muletown are ready for water.

MIDDLE CREEK.—Cor. Redding *Free Press*, Dec. 29: The mining interests of this district are looming up, and by spring I think there will be several important sales made. We understand that the owners of the tellurium mine have got a very good offer for their property during the past week. A party from S. F. offers to put up a mill and plant on the mine to cost $14,000, and to pay the owners of the same $10,000 in six months after the mill is in running order, and $10,000 in one year. We also understand that Mr. Ironsides has bonded his mine to parties in San Francisco. The Gem M. & M. Co. has bonded its mine and mill to some Eastern capitalists. We hear that our old friend P. Donahue has struck a good thing at Dog creek in the shape of an old channel. Patsy says he is making from $3 to $5 a day. He also reports good news from the quartz claims on Stacy and Clear creeks; says that at these points will be lively camps next spring. Talumet has been shut down for the holidays. Mr. A. B. Paul has gone to San Francisco to visit his family.

OLD DIGGINGS.—The Walker Bros. at Old Diggings are running their mill on very rich rock. Not having the tramway to their mine finished before the recent storm, the hauling of ore has ceased temporarily. Yet there is quite a lot of rock on the dump. George Martin has a rich discovery to the west of the old Seamans mine. He has a tunnel in 100 feet—all the way on a well-defined ledge of rich rock. The owners of the Seamans mine are negotiating a sale.

LOWER SPRINGS.—Work will be resumed at the Lower Springs mining camp as soon as the weather will permit by the Ottawa Mining and Milling Co., under the supervision of B. Jones, president, and George Atkins, superintendent. Mr. Rhoads is back from Illinois to oversee the building of his calcine furnace and chlorinating process in connection with the company.

Sierra.

MARGUERITE MINE.—Sierra *Tribune*, Dec. 29: Mr. Fred Morris, superintendent of the Marguerite mine, arrived from below night before last. All work is suspended at the mine for the winter, as it was found that with the present facilities the water could not be handled, and it is now too late in the season to get in a pump. Mr. Morris leaves in a few days for the East to confer with the owners. Work is to be resumed in the spring. Considerable ore was run through the mill, and the results obtained therefrom are said to have been entirely satisfactory to all concerned.

TUNNEL.—On the ridge below the Mountain House several tunnels have been started recently to strike the ancient river channel which courses through there. James W. Hammill and J. E. Johns have taken a contract to run 100 feet of tunnel at the Dayton Consolidated quartz mine.

Siskiyou.

PLACER MINES. — Yreka *Journal*, Dec. 27: Schroder & Werner have shut down mining operations at their mine and mill at Deadwood creek, having had a very successful run during the past summer and fall with some 25 hands employed. The river miners are still able to continue operations in taking out pay gravel, as there have been no storms or freezing weather to interfere, in fact the weather could not be more favorable. The hydraulic, placer and high gulch miners are unable to do much work at mining yet, owing to the dry time prevailing, the few showers so far being just heavy enough to only keep the roads muddy. The quartz miners have an abundance of quartz ready for crushing, and are anxiously waiting for storms to supply the streams in affording water-power to start their mills, but few of the mills being run by steam.

QUARTZ.—Mr. Frazer has put up a new five-stamp mill at Indian creek to crush a large body of low-grade ore in the old Golden Eagle ledge. He expects to reduce the quartz under a new process at a cost of $2.50 a ton, and it will yield at least $4 to $6 per ton. There are no doubt many ledges in the county of same style, containing a vast amount of quartz not worked on account of the cost of crushing, that would prove profitable with a cheap process of $2.50 a ton.

Trinity.

EAST FORK.—Cor. Trinity *Journal*, Dec. 26: There is no need of booming our mines now, as they are an assured success. Any one traveling along the back-bone trail to New river can learn this, for the steady drop of the stamps can be plainly heard from the Golden Chest and North Star, and better yet, they are dropping on gold ore in paying quantities—not waste. Many new prospects have been found this summer, and older ones are being steadily developed with bright indications ahead. On Yellow Jacket, a branch of the East Fork, most of the new lodes were found. Among those spoken of are the Alaska, a vein four feet in width, owned by Mr. Nickol. The Happy Dream group, consisting of three locations, join the Alaska, and judging from samples taken from the croppings they are worth owning. The Davis Bros.' location on the same stream is said to be looking well. The Ozark, on Rich gulch, has been closed down for the winter, it being very wet during the rainy season. Considerable ore is at the arastra, which is run night and day. The different mines owned and controlled by Capt. Trueworthy, on Barney gulch, are showing up finely; several hundred tons of ore on the different dumps lead one to believe that the Captain means business. Considerable ore from the Fountain Head is stored at the Thanksgiving arastra to be crushed as soon as water comes. Development on the Webfoot is being done, and an arastra will be built in the spring with which to work the rock. The lode varies from one to seven feet in width. The North Star and Linnie are strong veins; the mill, however, being only a five-stamp, is entirely too small for the amount of rock that can be taken from the mine, as there is no waste, the lode being four feet wide between walls and easy ground to work; consequently a large amount of ore can be extracted per day to the pick. The Enterprise Co.'s mines are looking as well as usual, and the ore as rich as the croppings when first worked. New buildings were put up this fall, an apron built on the dam and a 10-stamp mill purchased, which is a pretty sure sign of prosperity. Under the superintendency of Mr. Arnold the mines are being finely developed and a large amount of stoping ground opened up. There is enough in sight to run the arastra for the next three years. The Yellowstone mines, which have lain idle for so long, started up this fall. Under the supervision of Superintendent Paxton they are showing up in fine shape. A long tunnel has been run, tapping the vein 150 feet deep. A new road from the mines and a good bridge across East Fork, to the arastra, was recently built. The arastra is running on rock from the mine, and report says it is very good. A new ditch from the East Fork is being dug, and appearances indicate a mill next spring. The only placer mine on the creek that gives us a salute once in a while in shape of a boulder blast, is owned by Smith, Watron & Hubbard. The Golden Chest Co. was enabled to start its mill by the fall rains raising the water in East Branch, but owing to unseasoned timber having been used in erecting the mill a shrinkage of the battery blocks caused a slight delay, which, however, was soon remedied and all is now running smoothly. The heavy expense incurred by building new trails, packing the machinery 16 miles over a rough country, and developing the mine entitles them to success. Krumpe & Co., one mile above the last-named company, have a fine prospect. Work will be pushed ahead this winter and if by spring it still shows up as well as at present a good mine can be seen by a visitor to that section of East Branch.

Tuolumne.

WATER OUT.—Tuolumne *Independent*, Dec. 29: The water is now all out of the Eureka Consolidated, and as soon as the slum is cleaned up they will commence hoisting ore. The 20-stamp mill is probably the finest and most substantially built in the county. Eight concentrators and every necessary appliance is provided for working the rock, and it is expected that this mine will prove among the best.

NEVADA.

Washoe District.

CROWN POINT.—*Enterprise*, Dec. 29: The No. 3 west crosscut on the 700 level is out 50 feet, having been advaneed 24 feet since last report. The face is in clay, porphyry and low-grade quartz. The 700 raise is up 50 feet, having advanced 14 feet since last report. It has continued in good ore. The 800 east crosscut is in 57 feet. The face is porphyry and low-grade quartz. Have about 25 feet to go under the 700 level raise.

SAVAGE.—On the 400 level the northeast drift has been extended 27 feet, the main west drift 19 feet and the southeast drift No. 2, 26 feet. Are extracting ore from the southwest and northwest drifts. On the 500 level the main west drift was advanced 23 feet. Are extracting ore from east crosscut No. 1 and from the old stopes. Are also extracting ore from crosscuts Nos. 2 and 3 on the 600 level and from the old stopes on the 700 level. During the week have hoisted 512 tons of ore and have shipped to the Rock Point mill 488 tons, the average battery assay of which was $17.79 per ton. Have bullion on hand and previously shipped this month amounting to $10,226.36.

HALE & NORCROSS.—On the 500 level work in the main west drift has been temporarily discontinued. The face of this drift continues in favorable-looking ground. The north drift has been advanced 20 feet, and continues in the same quality of good ore heretofore reported, which we are stoping and sending to the mill. On the 600 level the west drift has been extended 25 feet. The face of this drift is

in good ore, which we consider to be the downward extension of the same ore which they are stoping on the 500 level. On the 800 level the east crosscut has been advanced 25 feet. The face is in clay and porphyry. The southwest crosscut has been advanced 20 feet; total distance, 90 feet. Have resumed work in the face of this crosscut and in the south drift. Are extracting ore from the stopes between 500 and 700 levels, which continue to yield the usual quantity of good ore. During the week have hoisted 961 tons of ore, and have shipped to the Mexican mill 1011 tons, and reduced 1050 tons. Average battery assays, $29 24 per ton. Have bullion on hand and previously shipped for the month amounting to $67,288.32.

GOULD & CURRY.—On the 200 level the north drift started 100 feet from top of upraise from 300 level has been extended 16 feet; total length, 120 feet; formation, porphyry with streaks of quartz. In this drift at a point 104 feet from west crosscut No. 1, west crosscut No. 2 has been extended 12 feet; total length, 42 feet; formation, hard porphyry. On the 450 level west crosscut started 60 feet from top of upraise from 500 level has been extended 20 feet; total length, 166 feet; formation, hard porphyry. On the 625 level work of repairing the main south drift is still in progress.

BEST & BELCHER.—On the 300 level the north drift 25 feet west of the winze has been extended 16 feet; total length, 90 feet; formation, porphyry, clay and quartz, showing some value. Incline winze has been sunk a total depth of 100 feet; formation, porphyry and quartz, showing some value. On the 625 level, work of repairing the main north drift is still in progress.

BELCHER.—The 200 north drift advanced 30 feet since last report, making its total length 288 feet. No change to report of the material in the face. The level drift to meet it advanced 20 feet. Have now cleaned out and repaired 226 feet of the 1100 north drift. The joint 1100 south drift advanced 49 feet since last report, making its total length 245 feet.

CHALLENGE.—The joint Challenge-Confidence raise from the 1300 level has been stopped for the present, as they have commenced drifting south on the vein on this level. This drift is in 17 feet, the face showing quartz of low grade. Shipped during the week, to the Brunswick mill, 98 tons of ore, the battery samples of which show a value of $26 per ton.

CONFIDENCE.—The raise from the 1200 level to connect with the 1100 level is up 105 feet, having been advanced 10 feet during the week. The top of the raise still shows ore of fair quality. Shipped during the week to the Brunswick mill, for reduction, 500 tons of ore, the battery samples of which show a value of $25 a ton.

JUSTICE.—The raise from the north drift is up 42 feet, the top of which shows five feet of good ore. The west drift on this level is now out 230 feet. Are making good progress in cutting out the shaft station on the 370 level.

IMPERIAL.—East crosscut No. 1 from the main north drift on the 1100 level is out a distance of 81 feet 24 feet having been added during the week. The face shows vein material of no value.

SEGREGATED BELCHER.—The joint 1100 south drift is now out 245 feet, having advanced 49 feet during the week. The face is in vein matter composed of clay and porphyry.

OVERMAN.—Have extracted 272 tons of ore and shipped 333 tons to the Vivian mill during the past week. Nothing new to report. All running as usual.

YELLOW JACKET.—Shipping 100 tons of white rock gold ore during the week, and are doing good prospecting work.

BALTIMORE.—There is nothing of importance to report in the work this week, beyond progress in the several drifts.

ALTA.—The usual work is reported in the mine. Extracting and reducing about 30 tons of ore per day.

BULLION.—The winze below the 640 level has been sunk 67 feet. The machinery is running well.

ANDES.—The usual progress is making on the 240 and 350 levels.

SCORPION.—The west crosscut on the 200 level is out 350 feet.

Aurora District.

POWER FOR MILLS.—Walker Lake *Bulletin*, Dec. 26: Surveyor Garrard has been engaged for the past week in surveying a route for the proposed line for the transmission of electricity from East Walker river to Aurora, at which place it is proposed to utilize the electricity in running quartz-mills. The electricity is to be generated by a dynamo placed in the river 12 miles from Aurora, and the object is to transmit force on a copper wire sufficient to propel the mills. Should the Aurora venture prove successful, it will revolutionize our principal industry and give an impetus to mining that could proceed from no other cause. There are deposits of low-grade ore of almost limitless extent on the Comstock, but the high cost of extraction, hauling and milling at present preclude the possibility of their being worked. Should the Aurora experiment prove successful, ore that will yield $5 per ton can be worked at a handsome profit to the stockholders, and in such an event our mines will continue to pour a stream of precious metal into the lap of the world for a hundred years to come.

Ely District.

FREEMAN'S DRY PROCESS.—Pioche *Record*, Dec. 29: The Ely Gold Mining and Milling Co. has just received one of Freeman's dry process separators, of a 50-ton per diem capacity. Experiments on a small scale have been made both here and at Osceola with the machine, and these experiments have proved satisfactory, and verify all that has been claimed for the process, viz: That it will save free gold, that is in the gravel, sand, or pulverized ore run through it. The Ely Co. will give it a thorough test, and if through it they can save all the gold in their pulp, a rich harvest awaits them.

El Dorado Canyon District.

THE MINES.—Cor. Pioche *Record*, Dec. 27: Thinking that a few facts from this remote corner of Lincoln county will be of interest to your readers, I send you a few items. We do not often see our operations in print, as in this camp there are mines operated by poor men who are not able to give them that systematic development which usually results in success. Districts like this that have been worked a long time are more likely to be neglected in this respect than new and booming ones. The S. W. Mining Co. is working 10 or 12 men on the Wall Street. J. M. Pickett is foreman. The rates of the company on custom ore that requires roasting are $30 per ton, and they give 76 per cent of the assay. T. J. Partridge is engineer at the mill and Frank Reed is pan-man. Among outside prospects may be mentioned the Silver Sequin. It has a shaft down 180 feet and a drift 50 feet from the bottom, all in ore. It is at present lying idle, owing to partnership complications. A railroad to the Vegas would bring these mines within 40 miles instead of 100, as now from here to the Needles on the A. & P. by the tedious and uncertain river route. Then the old argument of isolation could not be urged, old enterprises would be stimulated and new ones started. The resources of the Vegas valley are considerable. The surrounding mountains are covered with splendid timber, and vast bodies of low-grade lead ores are known to exist.

Garfield District.

IN BONANZA.—Cor. Walker Lake *Bulletin*, Dec. 26: There has been great joy at the Great Western mine, for in the lowest workings of the mine, some 500 feet below the surface, a rich body of ore, such as this mine since its first discovery has been famous for, has been uncovered in sinking a winze. The pay streak is about 18 inches wide and will assay well up in the hundreds (of ounces).

Golconda District.

THE ADELAIDE COPPER MINE.—*Silver State*, Dec. 26: The hoisting works on the Adelaide copper mine at Golconda were completed last Saturday. On Monday the machinery was tested and found satisfactory in every respect. There is sufficient power to work the mine to its fullest extent for a thousand feet. The work of sinking the main shaft will be resumed immediately and pushed rapidly this winter. The recent storms have raised the water in the creek considerably and it is thought there will soon be enough to start the furnace. There is a large supply of coke ore already at the works and smelting will be a matter of short issue as soon as the water increases a little.

Gold Run District.

PLACER MINES.—*Silver State*, Dec. 26: A sale of the Gold Run placer mines is being negotiated, the consideration it is said being $15,000. The mines are owned by Judge Bonnifield and Paul Pinson, who have expended considerable money in getting water on the ground. The gold obtained from these mines is coarse and worth $18 per ounce.

ARIZONA.

AROUND PRESCOTT.—*Journal-Miner*, Dec. 26: Placer miners have an abundance of water to carry on their vocation. Dan Hatz had some very rich specimens of gold rock to-day from his Ruby mine. Work is still being pushed on the Congress mine, and shipments of ore are being regularly made. A number of mining sales are still on the tapis, with prospects very favorable for their consummation. Louis Himmelreich arrived on Saturday night's train, to take charge of the construction of the Copper Basin smelter. Frank Alters has about 15 tons of ore from the Catoctin mine sacked, ready for shipment as soon as a pack train can be engaged. Hon. W. A. Rowe was in town to-day from his mining camp. He is developing his claim and shipping but very little ore, preferring to allow it to remain on the dump. I. T. Stoddard, president of the Oro Bella Mining Co., reports the sale of the United Verde copper mines at Jerome to W. A. Clark, who has been working them for several months under a lease. Dan Hatz sent a sample of ore from the rich strike he made in the Ruby mine, to Chicago, to be assayed. He has just received the returns, which give a value of $51,000 per ton, or $25 per pound, in gold, besides several dollars in silver. As there is at the present time more interest manifested by capital in this section and more inquiries for investment than for years before, our advice to miners is to work their claims with all the force and energy possible. The better a claim is developed the better the prospect for its sale. F. M. Murphy, superintendent of the Congress mine, returned to-day from a visit to the new strike near the Centennial mines, and brought with him a few specimens from it. He says there has not yet been sufficient development done to form an opinion as to the ultimate possibilities of it, the deepest workings not exceeding ten feet. The strike, however, he says is remarkable, as the parties have already taken out between $30,000 and $40,000 in gold nuggets and rich gold-bearing quartz, which they have sacked up. The country is being located for miles around, and there are a great many people in camp. As yet, the owners of the original claim have not even prospected the entire width of the ledge, although they have still a large quantity of rich ore in sight.

BONANZA CAMP.—Clifton *Clarion*, Dec. 26: There is considerable work being done in camp at present. Col. Ingram is having the assessment work done on all of his claims, and they are showing up finely. Messrs. Campbell & Muir's properties are looking exceedingly well, and as development progresses the ledges are improving both in size and richness. Capt. N. L. Jenkins, who last week shipped ten tons of high-grade ore from the Pittsburg claim to Denver, Col., is preparing to make another shipment of a carload. He is now down 60 feet on the claim, and is sinking and drifting. The mine shows much improvement. Capt. Jenkins has our best wishes. He shows what a man can do for a camp who has a little capital and a great deal of energy. Messrs. Higgins & Mullen are reported to have struck it rich near Morenci, and Thomas Haughey has also encountered a large body of rich ore on his claim. The returns were received the past week from a shipment of glance ore from the Carrasco group of copper mines near Morenci. Three hundred sacks were forwarded, which returned to the owners the sum of $1305 net. The expenses of freight and treatment were $442, giving a gross product of $1747, or nearly $6 a sack—truly a wonderful showing.

COLORADO.

IDAHO SPRINGS.—*News*, Dec. 29: A big strike was made last Saturday in the lower level east on the Kangaroo. F. C. Taylor is getting out large quantities of ore from his Windsor Castle lode. Water is being taken out of the Clarissa this week and work will be resumed at once. Work will be resumed on the Denver View about Feb. 1st, with W. S. R. Gow in charge. Some of the boys down from the Mary Foster report that some rich ore is being hoisted to the surface. El Dorado up Ute creek is being systematically developed. This lode is very close to the famous Lamartine. John Morris sent down a large lot of smelting ore last week from his Indiana prospect. The ore is low grade. The Champion mine is running eight levels, in all of which there is good paying mineral in large quantities. Mathews & Co.'s sampling works are having a large run this week. The Lake lode continues to produce steadily and there is considerable development work being done on the property. Nicholas & Miller, lessees on the Eclipse lode, opened up a new streak of ore last week. They will make a shipment next month. Bowden & Smith have disposed of their interest in the Cavern lode situated just above the Albro mine, to Eastern parties for $10,000. The old Albro at Dumont is in pay again. Quite a big streak of low-grade ore was recently encountered in one of the workings.

IDAHO.

LAST CHANCE.—Wardner *News*, Dec. 22: Work on the lower tunnel of the Last Chance mine is progressing rapidly, a distance of 585 feet has been reached, and the work of development is continued on the vein in an easterly direction, the full size of the drift being in ore. Its vertical depth is 248 feet from the surface.

ALMA CONSOLIDATED.—During the last three months extensive and most important developments have been made on the group of mines on Elk and Deer creeks, owned by the Alma Consolidated Mining Co., and as work continues most satisfactory results are attained. Two shifts are employed on the Alma tunnel on Deer creek running on the vein, through the mountain, simultaneously with two shifts working on the Alpharetta, to connect both; the distance between the heads of the tunnels is about 300 feet and the connection will be made about the first of February. The Hawkeye and Alma are waiting the completion of this tunnel to add their output to the mill. The crosscut on the 200-foot level in the Minnie Vernie develops the same body of ore as found in the upper workings. This grand showing at that depth establishes beyond all doubt the great value of the mine, which now can rank among the very best gold properties yet discovered. The stopes are looking splendidly; every chute is full of ore and there appears to be nothing wanting but the erection of extra machinery which will be added to the present plant early in the spring.

PONY GULCH.—Since the starting of the mill on the Fay Templeton, enough work has been done to establish the fact that both mine and mill are a financial success. On every pay-day all demands have been promptly met, besides the payment of large amounts for deadwork, and before long the owners can hope to come in for dividends. From statements previously published it might be inferred that the last cleanup of $3400 was the entire result of the first month's run. This is not correct, as a previous cleanup was made and the bullion shipped as it came from the retort to the San Francisco mint which amounted to within a fraction of the last return. E. W. Derry, who erected the Huntington mill in use here, has had much experience with similar plants in California, and he pronounces them unexcelled in all their workings. Mr. J. H. Seek of San Francisco is now in charge as amalgamator.

LOWER CALIFORNIA.

CONSOLIDATED MINES.—San Diego *Union*, Dec. 27: The Consolidated St. Nicholas & San Francisco Gold Mining Co. of Lower California, which now has control of the two well-known mines just north of Real del Castillo, in the heart of the famous gold belt which, during the past year, has been inspected for the first time in nearly 20 years, has gone into the work of development with an energy and determination that promise speedy and magnificent results. Nearly every steamer for a month or more has carried machinery and supplies for the consolidated mines, and the work is being pushed in a thorough and practical manner. At the St. Nicholas mine there are three shafts, two with a depth of 90 feet and one of 30 feet. In the San Francisco there is a horizontal tunnel of 70 feet, which has developed several pockets. The ore is free mining and milling gold quartz from medium to high grade, and in quantities apparently inexhaustible. The officers of the company are as follows: President, R. Bigsby; secretary, I. R. Bigsby; treasurer, J. H. Ballagh; directors, A. Morales, J. M. Ybarra, J. H. Ballagh, R. Bigsby, T. M. Glenn, W. H. Brockmann, I. R. Bigsby.

MONTANA.

FROM PONY.—Cor. Virginia City *Madisonian*, Dec. 26: Messrs. Boyd, Long & Co. crushed in Elling & Morris' mill last fall a large amount of ore from the old Pat O'Harra and an adjacent mine, which yielded a fair return for their labor, and then the same stamps pounded $76 per ton out of 31 tons of Messrs. McKittrick & Mood's Gilded Age, which mine is looking splendid at a depth of 80 feet, with a large amount of rich ore in sight. James Boyd and Ed Yates have leased the White Pine and are prosecuting work with vigor. Mr. Ritchie of Butte has purchased the Yukon lode above town, and has two men at work who are finding very flattering prospects. During the summer and fall Judge Duncan, with his corps of miners, has been making runs in the Pony and Red Bluff mills from a mine on Norwegian, the ore yielding from $25 to $40 per ton. Messrs. Elling & Morris have a force of men at work on their Clipper lode extracting free-milling ore from a four-foot crevice, much of which assays $500 per ton, while the great bodies of base ore in their Willow Creek, Boss Tweed, Strawberry, Keystone and other mines stand glistening in silence in huge crevices, awaiting the advent of a railroad to transport them to some smelter. And why shouldn't we have a railroad as well as other less favored localities? We have these Mineral hill mines, which of themselves would justify the building of one. We have the Potosi silver mines, a few miles up Willow creek, with a splendid showing so far as developed. We have the Norwegian placers, four miles from here, while 12 miles east are the famous Red Bluff quartz mines. The same distance south is Richmond flats with its great Revenue mine, now operated by a strong company with a large force of men and with their mill running steadily with handsome results. Still further southeast, six miles, are the Meadow creek placer mines, recently purchased and now worked by a large flume company, while at the head of same creek are a number of very promising gold lodes. In addition to all this I will mention some rich and extensive bar diggings on the Jefferson river, 12 miles north of here, owned by N. J. Isdell, which will soon be worked extensively by means of water conducted from the Jefferson.

DIPS, SPURS AND ANGLES.—Phillipsburg *Mail*, Dec. 29: Con Peoples will commence sinking the shaft on the Ant this week. The Ant is the adjoining property to the Wasp, which Mr. Peoples sold to the Granite Co. not long ago for $10,000. Joe Annear finished his contract with the Bi-Metallic Co.—the stonework at their new mill, last week. All other work is rapidly nearing completion and the Mammoth mill will soon be in readiness to put the machinery in motion. John M. Long, who is working some mines over in Harvey Creek district, is actively developing and has three men employed. It is claimed that they have a big thing over there and intimated that with the opening of spring a very rich thing will be disclosed. It is a gold property and is a mine already. There has been considerable talk lately regarding the Trout mine and the possibility of its starting up again this season. There will certainly be something done with this property in the near future, but it is so wound up by litigation at present that it will require months to put it in shape for any one to proceed with the work. John Caplice of Butte, one of the principal stockholders, is now in St. Louis, trying to quiet the title.

NEW MEXICO.

AT WORK.—Silver City *Enterprise*, Dec. 29: John A. Miller of this city is now prosecuting work on the Hidden Treasure, at Lake Valley. He has leased the Virginia to Judge W. P. Keil, who is doing quite well. Last week Idus L. Fielder disposed of a one-half interest in the Centralia, Central district, to A. T. Ward, a mining man of experience, for $5000 cash. Development work will be commenced on the mine in a few days. The Yankee Girl is looking well. George Goodwin brought in a few hundred pounds of specimens that would make a good showing from any camp. "Sandy" McCorkle, who is mining at Bald Mountain, states that he has encountered a considerable amount of high-grade ore, and feels encouraged at the prospects. He is in charge of the work being done there by a St. Louis Co. Peter Mungall, while doing the assessment work on the Red Cloud, at Black Hawk, owned by W. G. Shedd and Mrs. John Black, made a strike, which for richness it is said cannot be excelled by anything in that camp, which has produced many tons of ore worth from $6 to $10 per pound. The extent of the strike has not yet been determined.

MINING DEALS.—Kingston *Shaft*, Dec. 26: Six important mining deals are about to be consummated on North Percha. Thomas Cahill and William Burns are working a force of men on the Gallilio. Four important mining deals made this week on the Terra Blanca. The Caledonia mine has increased its force and is taking out plenty of good ore. The Lady Franklin mine continues to work although the water is very difficult to handle. R. P. Van Horn & Co. have out, ready for shipment, one carload of high-grade ore from the Gypsy mine. The Uncle Jack now has at the least calculation $10,000 worth of ore in sight, and is making arrangements to stope it out. Ed Baird sold this week his one-third interest in the Lone Star mine to Judge Burns for $1000. This claim is on Sawpit gulch, and on the same ledge as the Gypsey and Gallilio mines.

OREGON.

RICH STRIKE.—Bedrock *Democrat*, Dec. 27: From parties down from Cracker creek we learn that a rich strike was made a few days since in the Excelsior mine, and the ore being taken therefrom is so rich that it is being sacked just as it comes from the ledge without being assorted. The ledge is wide and increasing, and Supt. Donaldson is highly elated over the prospects, and when the good news is telegraphed to the owners in the East, it will give them renewed confidence in the mines of Baker county.

A MINING DEAL.—O. S. Buckland, the Sparta merchant, and duly empowered agent of Rufus Perkins of Polo, Illinois, has been in Baker City the past couple of days transacting important business. He informs us that he has purchased in the name of Rufus Perkins the one-fourth interest of H. W. Fowler in the Forest Queen, Queen Extension, Silona and Star mines, situated in Cornucopia Mining district, Union county, Oregon. Extensive work will be commenced on these mines in a short time and shipments made of the ore to Denver for reduction.

UTAH.

MARBLE.—Salt Lake *Tribune*, Dec. 27: Jewett B. Francis has returned from Iron county, where he has been to locate valuable marble quarries, and the samples he has brought up for polishing look remarkably good. While in Cedar City he noticed one big improvement, in that Bro. Chaffin has inclosed his residence premises with a fence, which they have been without for 20 years.

MINES ABOUT MILFORD.—Mr. B. A. Spear writes: The outlook for copper developments after the holidays is good; the head representatives of the great French syndicate are here, and seem pleased with what is in sight. Both houses of Congress should immediately pass the Stewart silver bill, and all the country west of Omaha will become alive with new industries and new people. Utah will then change front. Considerable prospecting now seems to be going on in the southwest, and in the northwest a large deposit of manganese has been discovered close to the line of a proposed railroad; the ore will average 50 per cent, and carries from $4 to $8 in gold per ton. James Hedges of Frisco is on the eve of making a sale of his sulphur mines near Antelope Springs, and only five miles west of the proposed extension of the Utah Central railway.

MECHANICAL PROGRESS.

The Manufacture of Russia Sheet Iron.

Mr. F. L. Garrison communicates to the Journal of the United States Association of Charcoal Workers the following in regard to this much misunderstood question :

There appears to be much misunderstanding in reference to the manufacture of sheet iron in Russia, and questions are frequently asked the writer : "What are the secrets connected with it?" "How is it made?" "Could admission be obtained to the iron works in the Urals, where this iron is made?" It is difficult to understand why such questions should be asked by persons versed in the literature of iron and steel, for Dr. Percy wrote a very excellent and accurate monograph on the subject a number of years ago.

Not having had the opportunity of personally visiting the Russian iron works in the Urals, Dr. Percy's paper was compiled from data furnished him by a number of persons who had actually visited these sheet-iron works. Since it has been my good fortune to have the opportunity of seeing some of these works in the Urals but a short time ago, I will, at the risk of telling an old story, briefly describe the process of manufacture as I saw it.

The ores used for the manufacture of this iron are mostly from the celebrated mines of Maloblagodatj, and average about the following chemical composition : Metallic iron 60 per cent, silica 5 per cent, phosphorus from 0.15 to 0 06 per cent. The ore is generally smelted into charcoal pig iron and converted into malleable iron by puddling or by a Franche-Comte hearth. Frequently, however, the malleable iron is made directly from the ore in various kinds of bloomaries.

The blooms or billets thus obtained are rolled into bars 6 inches wide, ¼ inch thick, and 30 inches in length. These bars are assorted, the inferior ones "piled" and re-rolled, while the others are carefully heated to redness and cross-rolled into sheets about 30 inches square, requiring from eight to ten passes through the rolls. These sheets are twice again heated to redness and rolled in sets of three each, care being taken that every sheet before being passed through the rolls is brushed off with a wet broom made of fir, and at the same time that powdered charcoal is dexterously sprinkled between the sheets. Ten passes are thus made, and the resulting sheets trimmed to a standard size of 25 by 56 inches. After being assorted and the defective ones thrown out, each sheet is wetted with water, dusted with charcoal powder and dried. They are then made into packets containing from 60 to 100, and bound up with the waste sheets.

The packets are placed one at a time, with a log of wood at each of the four sides, in a nearly air-tight chamber, and carefully annealed for five or six hours. When this has been completed the packet is removed and hammered with a trip-hammer weighing about a ton, the area of its striking surface being about 6 by 14 inches. The face of the hammer is made of this somewhat unusual shape in order to secure a wavy appearance on the surface of the packet. After the packet has received 90 blows equally distributed over its surface it is reheated and the hammering repeated in the same manner. Some time after the first hammering the packet is broken and the sheets wetted with a mop to harden the surface. After the second hammering the packet is broken, the sheets examined to ascertain if any are welded together, and completely finished cold sheets are placed alternately between those of the packet, thus making a large packet of from 140 to 200 sheets. It is supposed that the interposition of these cold sheets produces the peculiar greenish color that the finished sheets possess on cooling.

This large packet is then given what is known as the finishing or polishing hammering. For this purpose the trip-hammer used has a larger face than the others, having an area about 17 by 21 inches. When the hammering has been properly done, the packet has received 60 blows, equally distributed, and the sheets should have a perfectly smooth, mirror-like surface. The packet is now broken before cooling, each sheet cleaned with a wet fir broom to remove the remaining charcoal powder, carefully inspected, and the good sheets stood on their edges in vertical racks to cool. These sheets are trimmed to regulation size (28 by 56 inches) and assorted into Nos. 1, 2, 3, according to their appearance, and again assorted according to weight, which varies from 10 to 12 pounds per sheet. The quality varies according to color and freedom from flaws or spots. A first-class sheet must be without the slightest flaw and have a peculiar metallic gray color, and on bending a number of times with the fingers, very little or no scale is separated, as in the case of ordinary sheet iron.

The peculiar property of Russian sheet iron is the beautiful polished coating of oxides ("glanz") which it possesses. If there is any secret in the process, it probably lies in the "trick" of giving this polish. As far as I was able to judge, from personal observation and conversation with the Russian iron-masters, the excellence of this sheet iron appeared to be due to no secret, but to a variety of conditions peculiar to and nearly always present in the Russian iron works of the Urals. Besides the few particulars already noted in the above description of this process, it should be borne in mind that the iron ores of the Urals are particularly pure, and that the fuel used is exclusively charcoal and wood. Another, and equally as important consideration, lies in the fact that this same process of manufacturing sheet iron has been carried on in the Urals for the last hundred years. As a consequence, the workmen have acquired a peculiar skill, the want of which has made attempts to manufacture equally as good iron outside of Russia generally less successful. It is difficult to understand what effect the use of charcoal powder between the sheets as they are rolled and hammered, has upon the quality. It is equally as difficult to understand the effect of the interposition of the cold finished sheets upon the production of the polished coating of oxide. The Russian iron-masters seem to attribute the excellence of their product more to this peculiar treatment than to any other cause. One thing is quite certain, there is no secret about the process, and if the Russian sheet iron is so much superior to any other, it is due to the combination of causes already indicated.

Important Discovery in Pig-Iron Production.

An English letter in the *American Manufacturer* of Dec. 14th devotes considerable space to what is termed "a remarkable discovery" in pig-iron production. We copy as follows: Mr. Charles Wood, the new president of the Cleveland Institution of Engineers, has this week made public the details of the "remarkable discovery" in pig iron production, of which he, in conjunction with Mr. Stead, is the author. This discovery is that silicon has the power to convert combined carbon into uncombined carbon. In other words, it is possible by the addition of about 1½ per cent of silicon, white iron can be converted into gray, and that by regulating the proportion results similar to those effected in the aluminium and other alloys now so largely used in foundry-work can be obtained.

The hardest scrap can be made perfectly soft by judiciously mixing this silicious iron in the cupola, so that the castings will plane or turn in the latter with the greatest ease, and even curl up in front of the tool.

Such, said Mr. Wood, has been the spread of the new practice in the iron foundries of France and the continent generally, that several hundred iron founders are purchasing special Cleveland brands in place of the rich and more expensive Scotch qualities. They can there melt down large quantities of hard scrap which in some places was even buried as being too hard to use. The same thing is true of some of the foundries and elsewhere. Silicon iron has become as much a requisite with them as No. 1 Scotch was a year or two ago. One striking proof of the effect of the invention is that there is now a large and steady demand for the hundreds of tons of glazed iron which used to be returned to the furnaces in Cleveland as unsalable.

Mr. Wood explains that the discovery was the outcome of an earlier discovery that an additional 1½ per cent of silicon is sufficient to convert white iron into gray iron. The inventors afterward learned how to so regulate their iron as to stop the loss in the foundry, and which was much more, to materially add to the strength of the castings without employing higher class grades of iron.

THE FAILURE OF THE HAINSWORTH GUN, to which reference was made in this column last week, is further referred to in the *American Manufacturer*, from which it will be seen that the bursting of the first gun is not considered a failure of the principle of making steel guns by casting instead of by the slow and expensive process of "building up." That journal says: While there is no question that this gun went to pieces under a fair test, it by no means follows that a cast-steel gun is not practicable. The only thing that is proven by this test is that this particular gun, made in the particular way and of the metal this gun was made of, and tempered in the way that this gun was tempered, has proven a failure. Its failure is no argument against the making of cast-steel guns by casting them. It is a fact that a great deal of cast-iron ordnance broke in testing, prior to the making of cast-iron guns, at the Fort Pitt works in this city, but when the proper mixtures of metal and the proper proportioning of the parts, and the proper method of casting were arrived at, the result was the production of the remarkable cast-iron guns with which the name of the Fort Pitt works is identified. Now, the gentleman who had as much to do with the production of these Fort Pitt guns as any other person, and who probably knows the capabilities of cast steel as well, if not better, than any steel-maker in the world, is confident from his knowledge of gun-making, and of the possibilities of cast steel, that a cast-steel gun can be made which will not only equal built-up cast-steel guns, but will far excel them. Relative to the cause of the failure of this particular gun, we are authorized by Mr. Hainsworth to say that his belief is that it failed as the result of his own mistake in tempering or hardening the inside of the gun more than the outside, his purpose being to avoid erosion. Mr. Hainsworth thinks that if the gun had been left in its normal condition after casting it would have answered the tests. This mistake in giving a higher temper to the inside than to the outside resulted in a variety of internal strains which seriously weakened the gun, and caused its failure.

SCIENTIFIC PROGRESS.

THE SIROCCO —Most of the hot winds of the Old World are modified forms of the simoom. The sirocco originates in the Sahara and travels northward to the Mediterranean and Southern Europe, but it is not so deadly as its prototype. It brings with it great quantities of the desert sand, and the air becomes so dense at times that the sun is obscured as if by a London fog. While it remains on the African mainland it is characterized by a very marked dryness, as there are no extensive water surfaces to supply it with moisture. As soon, however, as it is launched over the Mediterranean it begins to take up copious draughts, so that when it reaches Malta, Sicily and the southern shores of Europe as a wind from between southeast and southwest, it has undergone a change from a hot, dry wind to a hot damp wind. The result of this alteration is that it becomes most enervating to the human constitution. Indeed, while it prevails from one to several days at a time, life is scarcely worth living, so depressing and burdensome is the wind. It is the *plumbeus Auster* of Horace. Human energy is quite dissipated under its fatiguing influence, and, with a temperature ranging between 95° and 110°, the streets of the towns affected by it are deserted. To the Sicilians the oppressive wind is a perfect plague, for, although naturally indolent, they cannot stand the further loss of energy induced by it. During its prevalence iron rusts, clothes spoil with mildew, meat turns putrid, grapes and green leaves wither, wine will not fine and paint will not dry. Sicily experiences the sirocco about a dozen times a year, but it is not so frequently met with in other parts of Europe. There is no mistaking the origin of the wind, as the reddish sand is still present when it arrives on the northern shores of the Mediterranean and causes a misty atmosphere.—*Cornhill Magazine.*

THE FUNCTIONS OF VINE LEAVES —D. S. Marvin says : There should be made this distinction between the leaves upon the vine : The several leaves opposite the clusters of grapes upon the lower part of the cane may truly be termed fruit leaves, upon which the development of the cluster mainly depends; the leaves at the ends of the cane are more for the development of wood and the long thinning of the canes. Of course the functions of all plants are carried on through the leaves. Sometimes there is too much of a tendency to the development of fruit, sometimes of wood. The best species and varieties of the vine are those that are somewhat evenly balanced in these tendencies. This enables the vintner to turn the functions of the plant into the development that he desires. In the case of young vines and poor growers, it is to wood growth; in mature and vigorous vines, to a greater development of fruit. If by accident the leaves upon the lower portions of the cane are lost, there are never as well-developed clusters thereon, and if the ends of the canes are clipped off at the last bunch of grapes early in the season, the leaves grow much larger, with larger clusters of fruit; but the practice can be carried too far for the health and permanence of the vine. If the most of our vigorous sorts are so clipped year after year, the vines become weakened, the health impaired, and disease follows. The skilled vintner has no fast and invariable rules; he is governed by the condition of each vine. If he wants more fruit from a healthy, strong vine, he shortens the cane and throws the force of the vine into better developed clusters and leaves at the base of the canes. Experience has demonstrated that this process can be carried on from year to year, provided he does not trim too close, say from one to four nodes beyond the upper clusters under ordinary conditions, and one node for the side shoots.

A FLORIDA RIVER.—The Sopy-chopy is certainly one of the wildest, most gloomy streams that I have ever visited. It is of great depth in proportion to its width, and winds and twists about in a most perplexing manner. A few miles above the canal the banks were scarcely 30 yards apart, and the trees in places actually met overhead in an arch. Of course, sails in such places were useless, and we were obliged to pole our way laboriously along. The stillness was intense—no sound of bird or beast disturbed the solemn silence of the solitudes. I do not think that we saw a single living creature all day, but slowly ascended in perfect silence. It was really awe-inspiring; we felt like explorers in an unknown land, and vague memories of Ponce de Leon were awakened as we cleaved the dark waters beneath the lowering arch of trees. Cypress, with hydra roots, rose from the black surface, like Dante's imaginations of a damned race, their contorted forms writhed like souls in agony. Long vines hung drooping from trees like serpents to stay approach to the recesses of the swamp. Slight, mysterious noises back in the dense woods made the silence all the more intense. All was somber, all was dark. The very sunlight was excluded for most of the day by the solid mass of foliage that made the river lie in one almost continuous shade.—*Forest and Stream.*

THE EARTH'S CLOUD BELTS.—We learn from the researches of M. Teisserenc de Bort that there is a marked tendency of the earth's cloudliness throughout the year to arrange itself in belts parallel to the equator. A belt of maximum cloudliness may be traced near the equator, two bands of light cloudliness extending from 15 to 35 degrees of latitude north and south, and two zones of greater cloudliness between 45 and 60 degrees, beyond which the sky seems to become clearer toward the poles. These zones toward the poles have a noticeable tendency to follow the sun in its change of declination, moving northward in spring and southward in autumn. The zones of clear sky correspond with regions of high pressure. The distribution of cloudliness, according to M. de Bort, is a direct consequence of the course of the wind.

SOLUBILITY OF SULPHUR IN ALCOHOL .—Mr. Arthur G. Bloxam, in the *Chemical News*, says: "The fact that sulphur crystallizes from its solution in hot alcohol in a white prismatic form has not, it appears, been generally noticed in text-books, for Miller's 'Inorganic Chemistry' is the only book at my disposal in which I can find it mentioned. This is the more surprising as it has become of considerable importance since the introduction of rubber corks. I discovered this fact for myself while separating some fat and sulphur with alcohol, being surprised at the deposition of white crystals from the hot solution. By dissolving sulphur in hot methylated spirit, and allowing it to cool slowly in a vessel surrounded by hot water, prisms of lengths up to one-half inch were obtained; they were brilliantly transparent, and so white that they might have been taken for crystals of niter, but they had become quite opaque and pale-yellow in the course of 36 hours, although kept under the liquid. A low power of the microscope showed very beautifully the change into octahedra. A more important bearing of the subject is in its relation to the use of rubber corks with alcohol. Mr. G. S. Johnson has called my attention to some crystals which he obtained in extracting a resinous body with alcohol, and which proved to be sulphur derived from the rubber cork connecting his flask and condenser. If a rubber cork be boiled with alcohol for 15 minutes, a good crop of sulphur crystals is obtained on cooling the liquid. It is evident that if alcohol be constantly distilled on to a rubber cork the resulting error will be still greater."

A "TOOTOMETER."—A Connecticut man has invented a device which he calls a "tootometer," by which the whistlings of engines are recorded. By it one may easily ascertain whether the engineer of a locomotive has sounded his whistle properly at the different crossings and localities along his run where the regulations require the same. Every irregular whistle is also recorded, as for cattle on the track, etc. The instrument is handed to the engineer, set for his trip, and when the trip is completed the record is read off at the office. Such a record is often important in case of a suit in court for damages, for not giving the usual warning by the whistle, etc.

FAILURE of the natural gas supply continues to be predicted, and, in fact, has been emphatically indicated in several places. The companies furnishing the gas in Pittsburg recently called upon the manufacturers to exchange their schedule of working hours so as to bring their heaviest work into the night, the reason being that the supply of gas in the daytime is not adequate. The workmen, however, refused to comply with the demand, and at one or more mills they have struck. Should the gas supply fail, resulting in the return of manufacturers to the use of coal, one element of "discrimination" in facilities at different manufacturing points would be removed.

IS IT MEERSCHAUM?—Some deposits have been found in the north of Ireland of a mineral almost pure white in color and of very light specific gravity, bearing a close resemblance to meerschaum. Some specimens have been submitted to a well-known pipe manufacturer, who says it is meerschaum but declines at present to give an opinion as to its commercial value, preferring to suspend his judgment until he has had an opportunity of seeing more of it and testing its suitability for the manufacture of pipes.

EFFECTS OF PRESSURE.—Lead in the form of filings, under a pressure of 2000 atmospheres, or 13 tons to the square inch, becomes compressed into a solid block, in which it is impossible to detect the slightest vestige of the original grains. Under the pressure of 5000 atmospheres it liquefies. Tin, when compressed in powder, becomes solid under a pressure of 10 tons on the square inch; zinc at 38 tons, antimony at 38 tons, aluminum at 38 tons, bismuth at 38 tons and copper at 33 tons.

CIVILIZATION IN CENTRAL AFRICA.—One of the discoveries recently made in Central Africa is a village of houses built along a street and having gabled roofs. The inhabitants are of superior order of intelligence, keep good order in the village and sleep on beds raised above the ground.

IMPROVED CARBONS.—Chas. Tappan has invented a liquid preparation which, it is said, on being applied to the carbons increases the intensity of a 2000-candle power arc light to a three-fold degree.

MAN has been alluded to as a walking coal mine, and it is for him to decide whether it will send forth heat and light, or only soot and smoke.

GOOD HEALTH.

Infant Mortality.

Dr. J. M. French contributes a paper on this subject to the *Popular Science Monthly* for December, which contains plain and practical suggestions as to the causes which destroy the lives of one-third of all the children before they reach the age of five years.

The subject has often been treated by scientists and physicians, and possibly much has been done among the better classes of society to remedy the evil in certain localities, but in general the percentage of infant mortality has not been materially reduced. Statistics show that in Norway the proportion of deaths is 204 5 per 1000 born; in England, 338 per 1000, and in Italy 507 (or nearly 60 per cent) per 1000. In 51 "healthy districts," so called, in England and Wales, it is stated, the average was 175 per 1000, while in the vicinity of Liverpool it was 460 in 1000.

In Vermont, in 1883, the average of deaths among 1000 children under five years of age was 23.8 per cent. For 12 years in Massachusetts, the mortality averaged 37.74 per cent, and in the city of New York, in seven years, it was exactly 50 per cent. Dr. Jacobi claims that more than half of those children who expire before they reach their sixth year die in the first year of their infancy. Statistics also verify the fact that the proportion of children who lose their lives in the cities before they are five years old is much greater than that of those born and reared in the rural districts. Dr. Curtiss estimates that "in all the great cities of North America, out of every 100 live-born children, about 25 die before the end of the first year, and from 40 to 50 before the close of the fifth year."

Dr. French enumerates at length the direct and indirect causes of this mortality as follows: Inheritance of defective constitutions and parental diseases; impoverished condition of the parents, combined with attendant ignorance, carelessness and inefficiency to properly provide for their offspring; exposure to cold and wet; excessive heat; improper feeding; filth, bad air, bad sewerage, etc., and overcrowding in tenements.

The list of diseases induced by these causes is very large, and includes infectious maladies, such as scarlet fever, diphtheria, etc., which afflict an average of from 15 to 20 per cent of those who die before their sixth birthday; acute lung diseases, with an average mortality of from 10 to 15 per cent., tubercular and constitutional diseases, as scrofula, consumption, etc., which as causes of infant death average from 10 to 15 per cent, and the diarrheal diseases, which remove about 25 per cent of children under five years old.

Dr. French's article is quite exhaustive and should be heeded by moralists, political economists, and especially by parents and those who contemplate marriage. The remedies for this great infant mortality are found largely in the removal of its causes by proper prevention and improved care and nursing.

MEDICAL HYPOCHONDRIACS.—The common people are not the only ones who become hypochondriacs. There are many practitioners in good standing who give way to the same phantasy. The St. Louis *Globe-Democrat* says: So many people are hypochondriacs that a physician expects to find one-third of his patients laboring under imaginary ills. It is easy for people to exaggerate symptoms, and, by giving themselves into the hands of quacks, become confirmed victims of ill health. What is not at all unusual is to find physicians who have become thoroughly hyped. Many of them with great reputations and very large practice and capable of diagnosing any case become cranks concerning their own health. They exaggerate the slightest symptoms into dangerous cases and believe they have chronic troubles when they would know that, in a patient, it would be but a slight indisposition. Most physicians are not competent to treat themselves, and many of them are confirmed hypochondriacs. Medical students begin early to imagine themselves afflicted with the various diseases they are studying. I remember I had a room-mate who became thoroughly hyped after entering the course. One day he caught a cold, and that night suddenly informed me he believed he was going to die, as he was certain that he was afflicted with a new malignant fever which we had been studying that day. I went immediately for one of the professors, and he not being in, I had another come. The second understood the case at once and gave my friend some simple remedy, and later the first came, and he, wishing to give the young man a lesson, had me administer a liberal dose of ipecac. This made him very sick, but cured him of the malignant fever.

MIND AND BODY SUFFER.—Probably there is no other class of people so peculiarly liable to dyspeptic troubles as Americans. They are notoriously erratic, not only in their habits of eating, but in other ways of living. They are always "on the jump." Personal convenience and welfare are among the minor considerations; there is always some other to take precedence. To acquire wealth is the one aim of many, but not all. Some have a noble purpose in life—to win in the art, the literary, the scientific, or the political world, places that cannot be easily filled when they are gone; but ambition is singularly the characteristic of all. None seem satisfied with the present; all cherish fond hopes of the future. Nor is this passion as a rule moderate in intensity, wisely regulated and limited to a healthy stimulus. Many feel its full tenacity and power, and all other promptings are held in check by it. Again, it is too often ill-directed, and when it is, mind and body inevitably suffer. In a word, Americans are a restless people, possessed by that constant and wearing anxiety to "better" their condition. The more they acquire, the more they want.—*Boston Herald.*

A MECHANICAL CURE FOR HICCOUGH.—Procure a glass of water and pour a little of it down the patient's throat. While he is drinking the water he should press a finger on the orifice of each ear. By this method you open the glottis, and in five seconds the thing is done. Should you by any chance meet with an obstinate case, you may rest assured that the throat and ears were not closed at one and the same time; either the water was swallowed before the ears were thoroughly stopped, or the water was not sufficient to fill the throat. Another precaution is to keep the chin well up. This cure was obtained by the writer from an old Indian medical officer who had experimented for some years to discover a method of relieving the terrible stage of hiccoughing in yellow fever, and this cure was the outcome.—*Pharmaceutical Journal.*

EFFECT OF THE IMAGINATION IN SICKNESS.—An instance has just occurred in Brooklyn, New York, to show the strong influence which the imagination has over a weak and sensitive mind. Jacob Hertline was bitten by a dog which he supposed had hydrophobia. He died of fright and nervousness, a medical examination proving there were no rabies in his case.

GUM-CHEWERS should take warning from the fate of a Newton, Conn., girl, aged 16. A piece of gum slipped down her throat, and, lodging at the entrance to the stomach, caused a fatal ulceration.

USEFUL INFORMATION.

FLINTLOCK GUNS—WHO USE THEM NOW?—It is difficult to believe, says the *St. James' Gazette*, that in these days of repeating and magazine rifles, when a flintlock gun or pistol commands a fair price as a curiosity, there should be actually existing in England a considerable industry in the manufacture of gun flints; and when we add to this a largish business in strike-a-lights or tinder-box flints, the fact is still more remarkable. The chief center, if not the only remaining center of this manufacture, is the picturesque little town of Brandon, in Suffolk, which has been engaged in this line of business from immemorial time. Not only did the chief supply of gun flints and tinder-box flints come from this spot during the long period when Englishmen lighted their candles and fought their battles with flint and steel, but long, very long before—before guns and candles and iron, and even bronze, were known to the inhabitants of these islands, Brandon was celebrated for its superior quality of flint, as it is to-day, and there is abundant evidence to show that from the prehistoric period down to the present day there has hardly been a break in the gathering and preparing flint for the wants of man at this spot. It will be, no doubt, asked who uses gun flints now? The answer is, the natives of Africa, to whom we have philanthropically traded our obsolete flintlock muskets and rifles, to enable them to kill each other—and occasionally ourselves—more commodiously. The fine flints quarried and shaped at Brandon are packed in kegs and exported to the various parts on the east and west coasts of Africa, whence they find their way into the interior for barter with the natives.

A PALACE OF SALT.—The people of Salt Lake City are contemplating the erection of a great "salt palace." It would be a structure that would lay in the shade all the ice and corn palaces ever constructed. The main part of the structure could be of the finest specimens of rock salt to be found in the quarries, chiseled, carved and artistically arranged, while the interior fittings should be of crystallized work from the lake on a grand scale. Such a palace should be permanent. If properly protected from the winter rains it could be made of the most unique and striking style of architecture; it could be made one of the wonders of the world. When lighted by electricity the structure would have all of the sparkle and diamond glitter of the great ice palaces, and with the difference in the salt palace's favor that heat would not melt or dim its glories in the least.

A NEW TOBACCO DISEASE.—A Constantinople journal states that the cultivation of tobacco is in danger of a disease hitherto unknown. The malady has appeared in Greece, in some plantations of the Phtiotide. The plants, appearing very healthy during the day, bend suddenly at night to the earth and the next day are dead.

AN ASBESTOS PIPE.—Another novelty is the asbestos pipe, the bowl of which is made of asbestos, and resembles a well-colored meerschaum in appearance; the mouthpiece upon being withdrawn from the stem reveals a spear of wire, which reaches to the bowl, having projecting barbs its full length. On these can be wrapped a little cotton, wool, or wadding, and so effectually catch and hold the nicotine. A company with $100,000 has been formed at Denver, Colorado, which will manufacture this pipe.

HOW TO SPLIT PAPER.—"Oh, dear! I have a picture printed on one side of this paper and some reading matter on the other, and I wanted to save both," said a young lady recently, who was pasting scraps into a book.

"Well, you can save both," said her friend.

"Why, how can I do that?"

"There are two ways of splitting a piece of paper. One is to lay the sheet of paper on a piece of glass, soak it thoroughly with water, and then press it smoothly all over the glass. With a little care the upper half of the sheet can be peeled off, leaving the under half on the glass. Let this dry and it will come off the glass very easily; of course the glass must be perfectly clean. The second way is a better one, but it requires some good practice. Paste a piece of cloth or strong paper on each side of the sheet to be split. When it is thoroughly dried, pull the two pieces of cloth apart suddenly and violently. The paste can then be softened with water and the two halves of the sheet easily taken off the cloths."—*N. Y. Mail and Express.*

EXTRACTION OF OIL FROM WOOD.—Referring to the extraction of oil from wood in Sweden, to which we directed attention some time ago, *La Nature*, in a recent issue, says that it is becoming, year by year, a more important industry. Those parts of the trees which have hitherto been regarded as useless, such as the stumps and roots, are no longer left in the forest to rot, but are subjected to various methods of treatment, by which not only wood oil, but also turpentine, creosote, acetic acid, charcoal and tar are obtained from them. The oil, as it is now usually extracted, cannot be burnt in ordinary lamps, for it smokes too much. But it may be used in special lamps, and when the oil is mixed with a certain quantity of photogen it may be consumed in ordinary lamps. It costs about 3d. per pint; it does not explode, and lasts 25 times longer than photogen. When intended for lighting it is extracted wholly from pines and firs. Thirty factories in Sweden are said to make its extraction part of their business, and the production is referred to as considerable.

MORE PIPE LINES.—A pipe line connecting St. Louis with the Lima, Ohio, and Pennsylvania oil-fields, via Chicago, is one of the probabilities of the ensuing 12 months. It is stated that the increasing consumption of fuel oils in St. Louis, through the introduction of improved oil-burners for furnaces, had decided the Standard to continue its pipe line from Chicago to St. Louis, and that the pipe will be laid next spring. For an oil pipe line the best wrought-iron pipe is used. It must be capable of resisting a pressure of 3000 pounds, as the oil is forced up long and steep grades. The size used in other pipe lines is eight inches in inside diameter. It costs about $1 per linear foot, or over $5000 per mile, and the cost of laying it is fully $1000 per mile.

AN ESTIMATE OF SOME INTEREST.—In order to give his hearers some idea as to how great a period of time 3600 years is—the time elapsed since the Egyptians lived whose mummied bodies are being found—the Rev. Chas. S. Robinson, whose lectures at the Madison-avenue Reformed church, New York, are proving so interesting, invited answers to this problem: "What would be the present value of a chain found about the neck of a mummied princess, at compound interest at 6 per cent, assuming the original value at $20?" The answer shows a row of some ninety figures.

A CEMENT CO.—Mr. Forrester, the cement expert, is confident of seeing a company incorporated at Salt Lake, as he has been able to satisfy parties with whom he has talked of his ability and experience in cement-making. Mr. Forrester has found all the ingredients necessary for manufacturing a first-class article of English cement between Ogden and Provo, after extended search. He is sure, because he has had chemical analysis made, and the ingredients are precisely the same as in the old country.

THE Professor of Geology in the University of West Virginia says that the rumors of failure of natural gas are idle and have no foundation, being set going by parties who wish to bear the natural-gas stocks. He insists that the production will largely increase for years to come.

THE WINE PRODUCT OF EUROPE.—The total amount of wine annually produced in Europe may be fairly estimated at about 2,752,000,000 gallons, which, at six bottles to the gallon, is 16,512,000,000 bottles, or about four dozen bottles of wine to each inhabitant of Europe.

A WALKING DAIRY.—Grass Valley has a walking dairy. A Chinese drives a cow from house to house and milks his customers' orders in plain sight. They get their milk straight and John gets the coin for each order.

ENGINEERING NOTES.

MR. KEITH ON ELECTRIC POWER.—A cotemporary, under this head, says: Prof. N. S. Keith, the well-known electrician of this city, has been in great demand of late by many persons who have required his advice in the matter of transmission of water-power by electricity for use in mines. Prof. Keith thinks that it will not be a very long time before many of the mines will abandon their present expensive methods of receiving power, chiefly from steam, and will utilize waterfalls not too far distant from the mines where dynamos will be located, from which will run wires to motors used for drilling, pumping, hoisting, hauling and crushing. The professor is still a warm advocate of the electric system of street cars, although the experiments made in this city, under his superintendence, were not entirely successful. On this subject he says: "Compare the loss in power absorbed by moving the cables alone in the cable-railway systems with the loss from resistance of electric conductors capable of performing the same service. Authorities state the cable losses at from 68 to 90 per cent of the total power. The losses due to dynamo, conductor and motor can easily be made less than 30 per cent. The loss from the cable is the same, whether one or many cars are to be moved. The loss when only one car is moved is almost 100 per cent. But with an equally long electric line, the loss with only one car on the line need not be two-horse power. Electric railways are being run all over this country and Europe. Crude in their beginnings, they are fast being improved."

RAILROAD ACROSS ASIA MINOR.—The consular reports lately issued by the English Government include a paper which presents some interesting details relative to the projected railway from Scutari, the Asiatic suburb of Constantinople, to Bagdad on the Tigris. In August last an imperial order was issued sanctioning the construction of the proposed line by a syndicate of English financiers. A French company, in favor of adopting a narrow-gauge system, also made a bid for the contract, but the Sultan decided for the British competitors and for a wide-gauge road. It is estimated that the line can be built at a cost of $77,500,000. Its length is 1400 miles, or more than 100 miles greater than that of all the present Turkish railway systems, European and Asiatic combined. Once in successful operation, the road will create a new Asia Minor, open to the trade of the world a vast territory now closed, totally change the character of the country, and practically advance Turkey in Asia from, say the sixteenth to the nineteenth century. Navigation from Bagdad, the terminus on the Tigris, to the Persian gulf, is easy. A new through highway to the East, independent of the Suez canal, will thus be open, which will bring Europe nine or ten days nearer to India than it is now.

AN ENGINEERING FEAT.—Quite a novel engineering feat was recently performed on the line of the Panama canal—nothing less than the lifting of a steam launch over a bridge, under which it could not pass. The Panama *Star and Herald* says: Another feat has been performed in connection with Panama canal work. This time it has been a peculiar one. The canal steam launch No. 16, of about 30 tons, was required to effect some work on the upper part of the canal. It would have required time and much expenditure to take her apart and to put her together again higher up. A powerful hoisting derrick called the "Ponton Bique" was called upon for its services, and it easily and fortunately lifted the steam launch over the bridge. This is the first time a canal steam launch has been lifted across a bridge in this manner, and we congratulate the American Contracting and Dredging Co. for the success which attended the difficult task they had undertaken to execute.

THE EIFFEL TOWER.—Notwithstanding all that has been said against the great Eiffel Tower at Paris, the work is being steadily carried forward. At last accounts it had reached a hight of over 600 feet some time in November. If the work is still going on (and we hear nothing to the contrary), it will reach the great elevation of 900 feet—within 100 feet of the original design—by the end of the year, and will be fully completed early in February. If completed, it may be well recognized as one of the wonders of the world. Meanwhile the decorative and accessory parts of the work are not neglected, and there is every prospect that the tower will be completed in all its details at the opening of the exhibition.

NEW DEVICE FOR UTILIZING WATER-POWER. A Russian engineer, M. Tayn, has invented a new means of utilizing a current of water. The apparatus consists of an endless cable, carrying a series of canvas cones which open and shut like an umbrella. The endless cable passes over a double drum on board a pontoon, and at the other end over a pulley suspended from a buoy. The current opening the cones on the rope moves the cable at a certain speed, and this drives a shaft or drum. On the upper part of the rope the cones are naturally closed by the current to which they present their points. This plan, it is suggested, would serve to raise a certain quantity of water for the purpose of irrigation.

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Saturday Morning, Jan. 5, 1889.

TABLE OF CONTENTS.

EDITORIALS.—The Pig Iron Market; Aerial Planes in Mining Operations; A New Concentrator, 1. Passing Events; The Solar Eclipse, 8.
ILLUSTRATIONS. — Arrangement of Terminal for Double-Cable Suspension Hoist for Mining Operations, 1. Residence of Mr. Carson, Eureka, Cal.; Bird's-Eye View of Virginia City, Nevada, 3. Descriptions of the Solar Eclipse of 1889, 9. The Moon as seen Through an Inverting Telescope, 13.
CORRESPONDENCE.—Lixiviation of Silver Ores with Hyposulphite Solutions; Honey-Comb Rusty Quartz, 2
MISCELLANEOUS.—King Boodle; The Beaver Copper Mines; Growths of the Dark; To Make Utah Iron, 2. Imported Iron Ore; The San Francisco of Nevada; Redwood Houses, 3.
MECHANICAL PROGRESS.—The Manufacture of Russia Sheet Iron; Important Discovery in Pig Iron Production; The Failure of the Hainsworth Gun, 6.
SCIENTIFIC PROGRESS.—The Sirocco; The Functions of Vine Leaves; A Florida River; The Earth's Cloud Belts; Solubility of Sulphur in Alcohol; A Tootometer; Is it Meerschaum; Effects of Pressure; Civilization in Central Africa; Improved Carbons, 6.
GOOD HEALTH.—Infant Mortality; Medical Hypochondriacs; Mind and Body Suffer; A Mechanical Cure for Hiccough; Effects of the Imagination in Sickness, 7.
USEFUL INFORMATION.—Flintlock Guns; A Palace of Salt; A New Tobacco Disease; An Asbestos Pipe; How to Split Paper; Extraction of Oil from Wood; More Pipe Lines; An Estimate of Some Interest; A Cement Co.; The Wine Product of Europe; A Walking Dairy, 7.
ENGINEERING NOTES.—Mr. Keith on Electric Power; Railroad Across Asia Minor; An Engineering Feat; The Eiffel Tower; New Device for Utilizing Water Power, 7.
COTTON AND WOOL.—Cotton Crop and Its Movement; The World's Cotton Manufactures, 10.
FLOUR MILL NOTES.—Wheat and Flour in France; Vissalia Flour Mill, 11.
SHOP NOTES.—Changing Lubricating Oils; Bursting Strain of Revolving Wheels; Balance Wheel; Durable Rust Joint, 11.
MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 8-9.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 12.

Business Announcements.

[NEW THIS ISSUE.]

Draughtsman—F. L. Depew, Boston, Mass.

☞ *See Advertising Columns.*

Passing Events.

The greatest interest was manifested in the eclipse which occurred on Tuesday, and thousands of people witnessed the phenomenon. Many parties of scientific observers selected favorable stations, and all of them met with good success. The weather was clear at all points where parties with instruments were stationed, both in California and Nevada, and several hundred photographs were taken.

The find of a good vein of building slate in a tunnel being run in a gold mine in El Dorado county is a lucky one. There are already two slate quarries in that county, and this new vein will be developed at once. Good slate is scarce and is quite valuable.

The strike in the Harqua Hala mines, Centennial district, Arizona, is an important one. The ledge is very large and the carbonates are rich.

The first number of the PRESS for the year 1889 goes to our readers this week, and we hope they will oblige us by calling the attention of others to the merits of the publication and the advantage of subscribing to it.

The Solar Eclipse.

The Observations Generally Successful.

The brief reports made by the different parties in the field for observing the total solar eclipse of January 1st show that fine weather generally prevailed and good observations were made. We gave a list of these parties and their stations in the PRESS of last week. There were few places where clouds interfered with the views. The main interest of the observers seems to have centered in observations of the corona and study of the phenomenon. The exact periods of contact were noted by the scientific parties, but they, too, expended their best efforts in photographing, drawing or noting the corona. The party from the Lick Observatory made spectroscopic observations, and the result of their work will be looked for with interest.

The Lick Observatory Party.

At Bartlett Springs, Lake Co., the Lick Observatory party had made their rendezvous and were well satisfied with their choice. The sky was hazy, but the corona was beautifully distinct. Mr. Keeler saw remarkable changes in the coronal lines. Mr. Barnard obtained nine photographs with three different cameras. Hill got all the contacts and studied the structure of the inner corona. Leuschner made seven measures of the light during totality, and several drawings and paintings were made by others. Mr. Keeler informed a reporter that he was quite satisfied with the work accomplished, and that he had telegraphed Professor Holden at the Lick Observatory of the entire success of the expedition. He added that Mr. Barnard exposed his plates in regular order and the development only will reveal the exact nature of his success. Mr. Hill observed all the contacts, the times of which were recorded on the chronometer by Mrs. Hill. Mr. Leuschner obtained the photometric comparison assigned to him to his entire satisfaction.

At the Lick Observatory, Mt. Hamilton, the eclipse was observed successfully by Prof. Holden and Mr. Burnham. Thirteen photographs were taken.

Harvard University.

At Willows, Colusa county, was the Harvard University party. Prof. Pickering says: "It was perfectly clear here during totality, and the only failure I made was in catching the first contact. A cloud obscured our vision just as the moon entered upon the surface of the sun. The second and third observations were perfectly satisfactory. We took seven pictures with the 13-inch telescope, seven more with the eight-inch Bache, and one with the other eight-inch instrument. In all we have some 50 or 60 pictures. The majority of the plates will not be developed until we get back to Harvard. About 30 gentlemen from Willows and the vicinity were with us when we took the observations. I was very much surprised at the details of the corona. I expected they would be similar to the eclipse of 1878. It was rather lighter during totality than I expected to find it. The eclipse was without doubt the finest I have ever seen, and I am more than satisfied with the result of my observations. The Boyden 13-inch telescope, which was to be used in coronal photography, and was expected to give the finest representations of the corona in existence, was among the best of these instruments, while the eight-inch telescopes of fine power were also on hand to photograph the details of the outer corona. We had the largest photographic telescope in operation that has ever been trained on an eclipse of the sun, and we took altogether about 60 pictures—7 with the 13-inch instrument, 7 with one and one with another of the 8-inch telescopes, besides several with the spectroscope and many with other apparatus. There was just a little trouble with clouds at first, but on the whole I can state that California has done better for eclipse-observers than any country in which such phenomena have been scientifically regarded for many years."

Brown University and Amherst.

Prof. Winslow Repton of Brown University and A. Lawrence Rotch of the Blue Hill Observatory, near Boston, each well equipped for the work in hand, were also stationed at Willows, not far from the point of observation of the Harvard collegians.

At Marysville, P. W. Griffiths made several exposures of wet and dry plates, and these views will be sent to Amherst College. During the eclipse it was very cool, but immediately after it became much warmer. Several streaks of lightning were noticed at the Marysville Buttes during the time of totality.

Carleton College Party.

Chico, Butte county, was the location of a party of observers from Carleton College, Northfield, Minn., consisting of Professors Payne, Pearson and Wilson. The party used a six-inch photographic telescope and other photographic apparatus and a two-inch zenith telescope. Professors Wilson and Pearson exposed nine plates during the period of totality and six between the first and last contact. First contact, 12:24:20 o'clock, observed time; first contact, 12:24:35, computed time; second, computed time, 1:48:09; second, observed time, 1:48:19; third, computed time, 1:50:02; third, observed time, 1:50:14; fourth, computed time, 3.8:00; fourth, observed time, 3:7:56.

Sketches of the corona were made by Professors Wilson and Payne and Surveyor Brown. It was a most beautiful sight, though the sky was not perfectly clear. Four long streamers were seen. The northern and southern limbs of the sun showed a great variety of radiating filaments.

At Calistoga, Alexander Badlam and party had three telescopes, one of them a large one. Aside from the usual observations, this party took 71 photographs during the eclipse.

The Swift party from the Warner Observatory at Rochester was stationed near Norman, Colusa county.

The Normal School.

At San Jose (outside the line of totality) the Normal School observing party consisted of Profs. Kleeberger, Holway, and Randall, and the instruments were a four-inch refracting telescope and smoked glasses. At the time of the greatest obscuration "Bailey's Beads," the "Corona," and prominences were carefully looked for, but were rendered invisible by floating clouds and the unobscured portion of the sun. The effect of the eclipse on the color of the landscape was marked, and the intensity of light from the remaining portion of the sun was a source of surprise. Venus was plainly seen with the naked eye.

Among the phenomena observed was the effect of the eclipse upon images of the sun formed where its light shone through apertures. A beam of light showing through a crack in the shutter formed innumerable interlaced and overlapping crescent-shaped images of the sun.

University of the Pacific.

The University of the Pacific has a fine transit instrument and a six-inch refracting telescope in its observatory. Observations were made by Prof. Wilbur W. Thoburn, assisted by Prof. H. H. Briggs. During the first quarter of the eclipse the sky was obscured by clouds, but from that time on it was comparatively clear.

At Winnemucca, Nevada.

At Winnemucca, Nev., several parties were stationed. The individuals were: Prof. H. A. Howe of Denver, W. E. Elkin of Yale, T. D. Davidson of San Francisco, J. A. Brashear and Henry Phipps of Alleghany, Pa., E. P. Austin of Salt Lake, Colonel Maxson, United States Surveyor, E. M. Vanharlingen of Winnemucca, and T. G. Blinn and P. B. Glidden of East Oakland, all of whom, with the exception of Blinn and Glidden, acted in concert. The day was clear, not a cloud being above the horizon, and the scientists are enthusiastic in their praises of the Nevada atmosphere. The corona was not seen before totality, but two of the observers say they saw it 20 seconds after. Prof. Howe states that after the first contact the mountains of the moon were plainly visible and the definition was beautiful.

The general appearance of totality resembled that of 1878, but the extent of the corona was less by half. Several drawings of the corona made during totality have this same general appearance. No great protuberances were visible. Two were observed which seemed to be of a filamentary character, and great sheets of flame were seen to be distinctly separated from the main body, which was of a brilliant pinkish color.

Photographers took 12 negatives of the eclipse during totality. At the poles the streamers were radial, and as they started from points to the east and west of the poles they flowed off in tangential lines. Observers noted the direction of the motion of the shadow bands, which were about two inches wide. Alternately shadow and light sped along about eight feet per second.

The shadow was seen to move along slowly over the landscape like an immense cloud.

At Anderson Springs.

Miss Joey Anderson writes us from Anderson Springs that the eclipse, as viewed there, commenced at 12h. 21m.; totality commenced at 1h. 45m.; totality ended, 1h. 47 m.; eclipse ended, 3h. 11m.

No particular change was noticed in the atmosphere or landscape, only the shadows deepened shortly before totality—no ruddy or lurid glow seen. During totality only one star was visible, and that in the east. It did not become dark enough to require a light to see the face of the watch, although light was kept near at hand expecting that it would be needed. The return of the sunlight was startling in the extreme.

The Observations at Cloverdale.

There were several parties observing at Cloverdale, Sonoma county. The largest there and the largest in the field at any point where scientific observations were made, was that of the Pacific Amateur Photographic Association, operating under the direction of Mr. Charles Burckhalter, assistant in charge of the Chabot Observatory, Oakland. There were in all 68 members of this party, as follows:

Members of the association—A. J. Treat, S. C. Passavant, Chas. Burckhalter, O. V. Lange, Chas. G. Yale (of the MINING AND SCIENTIFIC PRESS), P. Carleton, C. F. Montealegre, J. W. Stanford, J. V. A. Rey, Eugene Frost, Samuel C. Partridge, W. C. Gibbs, George W. Dornin, William Letts Oliver, J. H. Johnson, E. W. Runyon, A. P Redington, W. H. Chapman, W. H. Lowden, E. L. Woods, George Tasheira, F. H. McConnell, George W. Reed, C. L. Goddard, W. S. Davis.

Assistants—Alpheus Bull Jr., Harry T. Compton, Marsden Campbell, C. P. Grinwood, George H. Strong (of the MINING AND SCIENTIFIC PRESS), William F. Booth, W. B Ewer (of the MINING AND SCIENTIFIC PRESS), and Lew Tasheira.

Recorders—H. W. Schwerin, William N. McCarthy, W. C. Edes, Alfred K. Gibbs, M. P. Donnelly, F. C. de Long, George A. Story, J. A. Bauer, E S. Gray, E. B. Moore, George B. Baer, Walter Henry, M. Seligson, E. P. Livingston, F. S. Wright, C. W. Wilkinson, Harry Phelan, Moses Callan. Thomas Andrews, Mrs. C. L. Goddard, Miss Hermione Rey, Mrs. E. S. Gray, Mrs. Geo. Tasheira.

Sketchers—Mrs. George Roe, Miss Silvia Rey, Miss Truesdell, Miss Treat, Colonel C. Mason Kinne, Captain W. B. Hooper.

The following professional and amateur photographers not connected with the association were also present: I. W. Taber, A. C. Burnham, W. B. Tyler, Seth C. Jones, Louis de F. Bartlett, Bert Remmel.

The geographical position of this station was found by Mr. Compton to be latitude 38° 47′ 30″; longitude 122° 57′ and 25″. During the morning several drills were gone through so that the observers would have some practice and be enabled to carry out instructions properly.

There were 30 cameras in the two rows, and on each side of these were several telescopes. Some of the larger cameras were also provided with telescopes as finders. An allotment had been made by the committee for each of the photographers, in order that a great variety of exposure of plates would be insured. Some of them were to make exposures of half a second, while others exposed their plates over 40 seconds. Some used slow plates with long exposures, and some, rapid plates with quick exposures. Each knew exactly what was expected of him and carried out instructions to the letter.

Counting Time.

In order that there should be uniformity with regard to time, and each should know exactly the period at which the different plates were exposed and the time of exposure, a very good arrangement was devised by Mr. Burckhalter. A battery and telegraphic sounder were connected with a sidereal chronometer so that the beats of the seconds were sounded. About one minute before totality, Mr. Alpheus Bull, Jr. began counting aloud, so all could hear distinctly, he taking the time from the sounder. An observer was in the mean time carefully observing for the instant of totality through a telescope. This preliminary counting was done to determine how long before totality any observer could notice the corona, and each one noted on a prepared card when he saw it. As totality commenced, Mr. Compton, another observer, called "time," and immediately Mr. George Strong of the MINING AND SCIENTIFIC PRESS commenced counting aloud, taking the sounder as his guide. The work of the photographers then began and continued until the last instant of totality was called, when Mr. Strong ceased counting and Mr. Bull again commenced counting till he had counted 50.

The counting after totality was so that the length of time the corona could be noticed could be recorded. The object of having two men to call was that voices of different tones could be recognized as marking the periods o before and after totality and during tota phase. Each photographer had an assistan

and each assistant had a card devised by W. H. Lowden, on which was printed a row of figures from 1 up to 200. His instructions were to indicate on this card the exact second of totality at which the lens of the camera was removed and again when replaced, and repeat this as many times as there were plates exposed. This card then furnished a record not only of the time of exposure of each plate, but the period during totality the exposure was made. The assistant had but to listen to the voice of Mr. Strong, who was calling, and mark on the card the number being called, as the lens was uncapped and capped. This arrangement proved perfect, as in every case the time and period of exposure of every plate is known, and all were working on the same time by chronometer. For scientific purposes, the knowledge that any given negative was made in a certain number of seconds is of great importance as a guide for further work of this kind.

Actinic Strength of the Light.

D:. S. C. Passavant of this city took with him a Warneroke sensitometer for the purpose of testing the actinic strength of the light of the corona. He reports that an exposure was made by his assistant, Thomas Andrews, to an H. L. plate, which registers 15 on the sensitometer by the ordinary tests. This exposure lasted 15 seconds, commencing at 41 seconds after totality and ending at 56 It is hoped that this will be a valuable test for future work of this kind, as the sensitometer will register the exact strength of the light, as compared with that of the sun, and enable photographers on similar occasions hereafter to expose their plates with a greater degree of certainty than is possible at the present day.

A portion of the same plate on which this exposure was made will be tested in the ordinary manner and developed at the same time, while still another portion will be exposed for 15 seconds only. By this means the exact value of the corona light should be obtained.

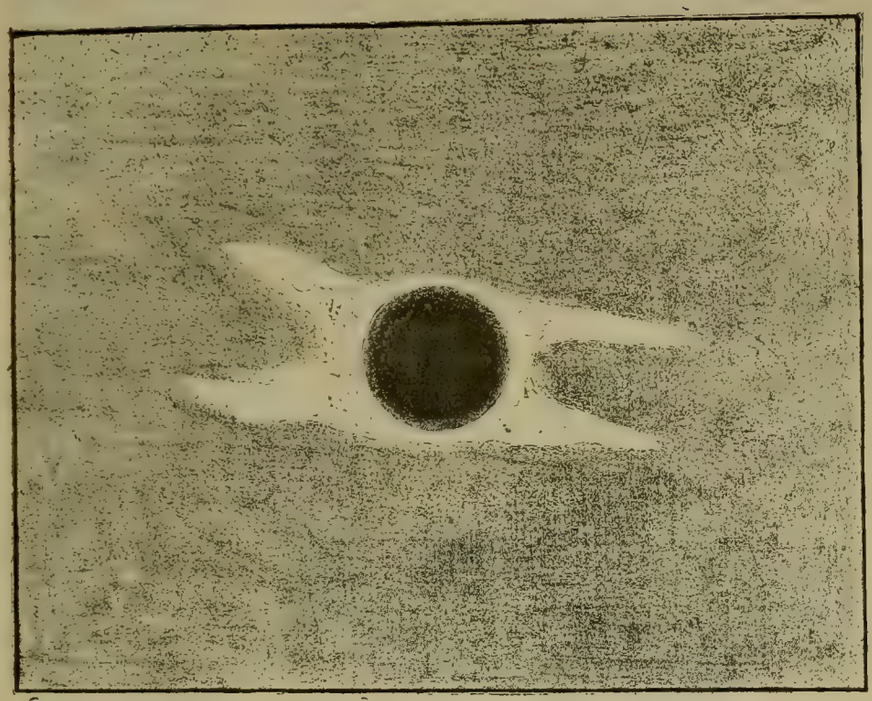
The party paid little attention to the contacts, the intention being to observe mainly for corona and sun flames. Cards were prepared having a central black disk, so that each observer could draw the corona as it appeared to him. There was a great similarity in all the drawings, the only difference being in the length of the rays. The ladies making sketches and who are skillful colorers, were instructed to protect their eyes preceding the total phase, so that the eyes would be color-sensitive. They describe the color of the sky before totality as being a leaden blue. It became brighter and more luminous during totality as it extended up to the corona. The light near the disk of the moon was an intense luminous silver, with a bluish tint similar to the light of an electric arc. The outer corona was similar in color, though fainter, fading away into the surrounding sky. The disk of the moon appeared of a gaseous aspect and of a dark, hazy, purple color. At no time did it appear black. The streamers, which extended in an oblique direction, were of the same color as the outer corona. Warm colored or red rays were not observed by those who had made their eyes sensitive by protection previous to totality. One of the cuts on this page is from a colored drawing made by Mrs. Laura B Roe. The colors are so delicate that it is difficult to reproduce in black and white the rays as she drew them. The reproduction shows the corona more extended than the original drawing.

One of the best drawings was that made by C. Mason Kinne of the San Francisco Microscopical Society, and this we reproduce. He used a low objective and saw the color of the inner corona, or photosphere, as a cold, steely blue, fading into purple red and slight yellow, being first chemical heat and finally color rays. He also observed a slight protuberance on the northwest periphery.

The extended rays were about two decimeter of the sun. No color was seen except in the photosphere, as described. The corona belongs to the sun, but the radiation of light beyond the sun he thinks is the refraction of light on the cosmic dust permeating the whole universe.

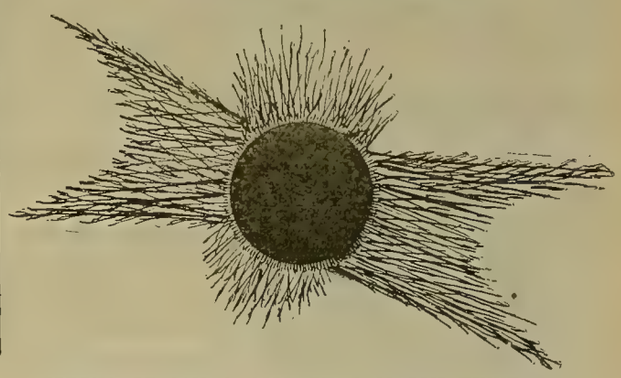
Captain C. L. Hooper of the United States

CORONA OF 1870.

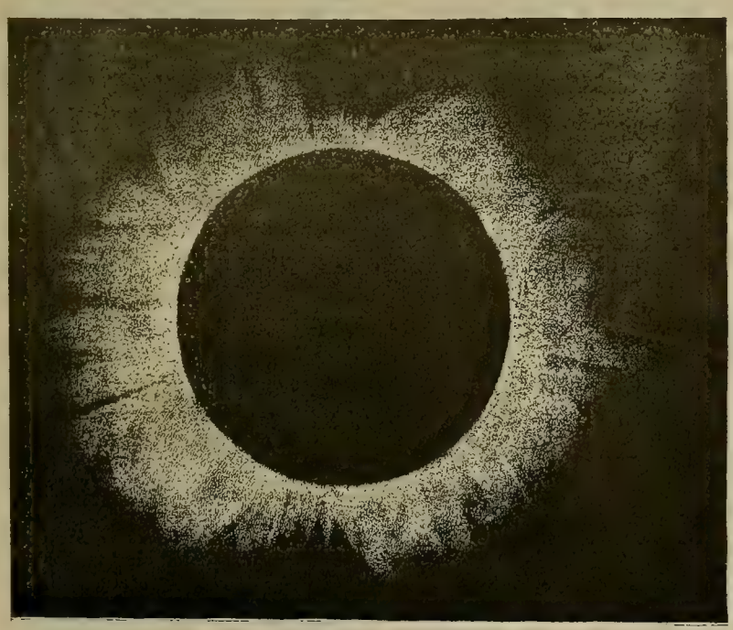


THE CORONA OF JAN. 1, 1889, FROM A COLORED DRAWING.

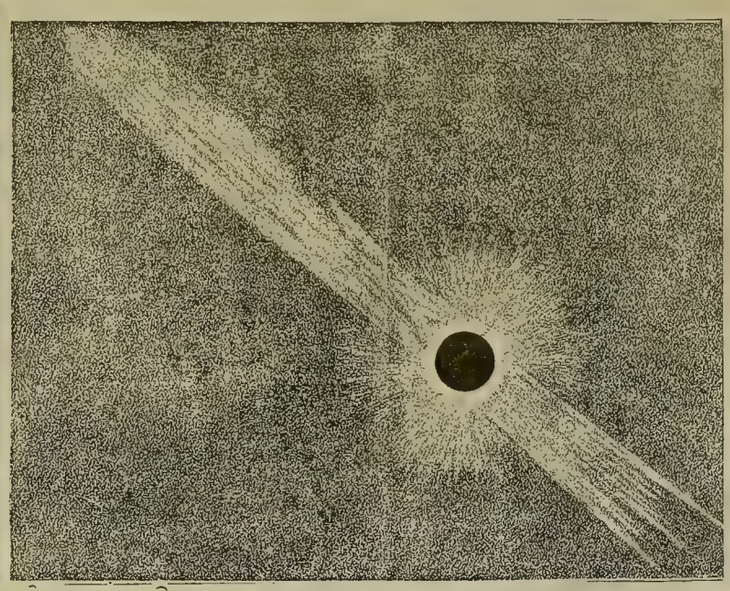
OUTER CORONA OF 1869.



CORONA OF JAN. 1, 1889, BY C. MASON KINNE.



CORONA OF 1871.



OUTER CORONA OF 1878.

revenue cutter Corwin was with Colonel J. M. Donahue's party accompanying the photographers. He had a 2½ inch telescope, but noticed no color at all in the corona. It was a swallow-tail shape and expanded about one degree on each side, as nearly as he could judge, in the direction of the ecliptic. No signs of protuberances or flames were noticed. The light appeared like that from a shaded electric light.

We give some other engravings also showing the corona as seen at previous eclipses. These are from Prof. Todd's pamphlet. One shows the outer corona of 1869, another the corona of 1870, and another that of 1871.

The Total Phase.

The arrangements for complete silence during the period of counting aloud came near being spoiled by the very unexpected shrieking of locomotive whistles at the adjacent station during the total phase, and the callers had to shout to be heard. But though annoyed, the observers had been so well drilled in the morning that they went steadily on with their work. The period of totality was 104 seconds, during which time 164 negatives were made. Some of these have since been developed and show very good results. The sky was perfectly clear during totality, though there were a few clouds both before and after. One large cloud below the moon was beautifully illumined with prismatic colors just before totality, and this was the most picturesque part of the eclipse to many who witnessed it.

Meteorological Observations.

The meteorological observations were made by W. B. Ewer of the MINING AND SCIENTIFIC PRESS with instruments furnished by Melville Attwood and the Chabot Observatory. The wind was so slight that the anemometer scarcely recorded it. The black-bulb thermometer, exposed to the sun, recorded 69⅞ at 12:35, 62 at 1 P. M., 61 at 1:15, 52 at 1:35, 46 at 1:45, and 42 during the totality. The dry-bulb thermometer registered 55½ at 12:35, 54 at 12:50, 55½ at 1:07, 54 at 1:25, 57 at 1:40, and 51 during total phase. The wet-bulb thermometer ran down from 51½ to 49, the latter figure during totality. The barometer dropped five hundredths during the total phase, quickly returning to normal figures on its conclusion.

The Cameras.

The largest camera was that of Mr. Burckhalter, who had for the time being converted his Newtonian reflecting 10½-inch telescope into a telescopic camera mounted in a wooden tube eight feet six inches long. The minor axis of the diagonal mirror was 3½ inches; focal length, 84 inches. The diameter of the image in this camera was 13-16 of an inch, the field being about 4½ degrees. In this camera ten plates were exposed, varying from half a second to ten seconds. The plates used were Passavant's "C. I. P." and "H. L," with a respective sensitometer register of 22 and 15. The camera was arranged with alt-azimuth mounting, the motion being controlled by Mr. Yale of the MINING AND SCIENTIFIC PRESS, who assisted Mr. Burckhalter. Mr. Will Booth recorded and Mr. Marden Campbell uncapped and capped lens, while Mr. Burckhalter himself attended to the exposure of the plates.

The camera of W. H. Lowden had a Beck lens, 22-inch focus and 11x14 plates. It was mounted for altitude and azimuth, and slow plates made from a special emulsion by Dr. Passavant were used. One plate was exposed 41 seconds and the other 28 seconds. These long exposures were purposely made in order to obtain details of the corona and perhaps detect an intra-mercurial planet. If any negative shows, that one of Mr. Lowden's must do it.

W. O. Gibbs used a camera recently patented by himself through the MINING AND SCIENTIFIC PRESS Patent Agency. The plate was 5x7; single landscape lens; 22-inch focus. He exposed two slow and two fast plates. Mr. Gibbs was the first one of the party who saw the corona.

Mr. W. Letts Oliver exposed six plates, some slow and some rapid. He used a half-plate camera, single-view lens, 32-inch focus. He made two negatives before totality and one of the rainbow in the clouds.

O. V. Lange exposed one of his plates one-quarter second and none of them more than four. Some since developed showed excellent results.

Mr. I. W. Taber had two cameras, one of them the largest regular camera in the field. He was very fully equipped and with his professional experience must have made some successful negatives. His assistant, Mr. Burnham, made several views of the station while all the instruments and observers were in position.

Both Mr. Burckhalter, director of the party, and Mr. Treat, president of the association, expressed themselves greatly pleased at the manner the work was done by observers and assistants. There was no hitch of any kind, everything being done according to program. Clock signals were sent by the Lick Observatory, so the time is accurate.

It was not as dark as was expected during totality, though the chickens in neighboring yards went to roost. None of this party observed rose-colored sun flames. The corona was brighter than expected, but with less color.

The negatives, drawings and written observations of this party will finally be transmitted to the Lick Observatory, where they will form part of the permanent scientific records of the eclipse.

Shortly after the ending of totality all the suppressed excitement of those present broke out, and enthusiastic cheers were given for the Chabot Observatory, the Amateur Photographers' Association and Mr. Burckhalter, who directed all the work. All were satisfied that the long-prepared arrangements had worked perfectly.

Similar demonstrations occurred with the other parties, the Eastern observers particularly congratulating themselves on the clearness of the California atmosphere and the success of their expeditions.

We shall be able to give fuller details of results after the negatives have all been developed, and the recorded observations written out.

Coast Industrial Notes.

THE following officers were recently elected by the Longshore Lumbermen's Protective Association: President, Robert Hamilton; Vice-President, Michael Ford; Recording Secretary, Laurence Buckley; Financial Secretary, H. P. Wynn; Treasurer, August Pearson; Board of Trustees, Philip Ermoth, John T. Anderson, John Sullivan, William Grodt, Isaac Baker; Sergeant-at-Arms, Edward Austin.

A PLANING MILL is being built at Ellensburg, Washington Territory. The latest and most improved machinery, to be driven by a 48 horse power engine, will be placed in the building. In connection with the main building there will be a large warehouse, lumber shed and drying-room, and all kinds of building material will be kept on hand. Doors, sash, flooring and ornamental work will also be a special feature. The firm have expended during the past year over $12,000 for material purchased abroad which should have been produced in Ellensburg. They expect to give employment to 30 or 40 men in their new mills, and will also employ a large number of carpenters. Their increasing business has made necessary the erection of this mill, and contracts enough are already in sight for next year to justify the enterprise.

THE erection of a plant capable of crushing 300 to 400 tons of porphyry a day for use in San Diego street-paving is contemplated. This enterprise is the outcome of a discovery of a fine grade of porphyry rock in the Sweetwater valley. W. J. Holmes of San Diego is at the head of the scheme. The erection of the plant will cost about $15,000 and would afford employment for a large force of men. The rock, which is of superior quality, can be delivered in San Diego for less than $1.50 a ton.

THE powder-mills people report the manufacture of unusually large quantities of high explosives of late. The Donahue Railroad Company has used immense quantities, as have the Southern Pacific and the miners in various parts of the coast.

THE advanced railroad rates of manufactured iron is playing into the hands of our iron works people. If the new rates are continued for any length of time they will result in the increase of home manufacture of many articles now largely brought here by rail from Pittsburg and other Eastern cities.

THE *Alaskan* says: It is very likely that two new canneries will be erected in Sitka next season. One is to be put up by Lynde & Hough, who have formed a partnership with John L. Carlson and Foard & Stokes; and the Kinney Packing Co., with Mr. Bell of Astoria, Oregon, as superintendent, intends erecting the other. Mr. Bell says he believes that the increase next year in the number of cases of canned salmon turned out in Alaska over the present will be full 200,000, an advance of over 45 per cent.

THE Moodyville mill at Burrard inlet has been closed for a few days for an extensive overhauling and repairs. The opportunity will be availed of to put in some new machinery.

AMONG other things, two bills were proposed at a recent meeting of the Council of Federated Trades, one of which was to provide for proper sanitary measures for employes working in factories, and the other to insure the safety of employes from machinery and elevators. Officers were nominated to be elected at the next meeting. The delegate from the Musicians' Union reported that his union had revised the schedule of prices. The only change made was in the price of church music, which was reduced. Assemblyman Simpson appeared before the Council and requested their support to a bill which he proposed to introduce in the next Legislature, to regulate the rate of wages of the employes on Government contract work. The matter was taken under consideration.

THE following bill will be introduced in the Legislature by Labor Commissioner Tobin. It is entitled "An Act Concerning Child Labor": Section 1. No male under the age of sixteen years, nor any woman under the age of eighteen years, shall be employed at labor in any manufacturing establishment in this State for a longer period than sixty hours a week. Sec. 2. No child under thirteen years of age shall be employed by any person, firm or corporation, and every minor under sixteen years of age, when so employed, shall be recorded by name in a book kept for the purpose, and a certificate, duly verified by its parent, or guardian, or if the child shall have no parent or guardian then such certificate, stating age and place of birth of such child, shall be kept on file by the employer, which book and which certificate shall be produced by him or his agent at the requirement of any official duly authorized by law to make such requirement. Sec. 3. Every person, firm or corporation employing women under eighteen years of age or minors under sixteen years of age in any manufacturing establishment shall post and keep posted in a conspicuous place in every room where such help is employed a printed notice stating the number of hours per day for each day of the week required of such persons, and in every room where children under sixteen years of age are employed, a list of their names with ages. Sec. 4. Any person who knowingly violates or omits to comply with any of the foregoing provisions of this Act, or who knowingly employs or suffers or permits any child to be employed in violation of its provisions, shall, on conviction, be punished by a fine of not less than $50 or more than $100, and in default of payment of such fine, by imprisonment for not less than thirty days nor more than ninety days for each. Sec. 5. This Act to go into effect and force upon passage.

BIDS for work on the McDonough building on the corner of Fifteenth and Broadway, Oakland, were opened, and contracts on them were awarded as follows: For iron work, Judson Iron Works, $5124 90; brick work and excavating, V. L. Fortin, $15,272; stone work, F. E. Knowles, $1575.

THE annual report of the Oregon State Fish Commissioners sets forth that the law governing salmon fishing is generally obeyed, and that the establishment of more hatcheries would increase the number of salmon and end the difficulty between the fishermen and canners about prices. It recommends the remedying of the law so as to prohibit salmon being handled in the close season, and to prohibit the practice of taking fish near spawning-grounds; also the offering of bounty for sea-lions and other salmon destroyers, and the extension of the opening of the season to April 15th. It is the belief of the Commissioners that the present fine of $500 or one year in prison for the violation of the law is excessive.

THE Mendocino *Dispatch-Democrat* says: H. T. Hatch's new sawmill is nearing completion, and will soon be inclosed and ready for work. The building will be 36x120, with the ell 36x60. The machinery is all up, and the lumber for the building is now being sawed and put together as rapidly as possible. The engine is an 85 horse power and the capacity of the mill will be 46,000 feet daily.

DELEGATE BROWN of the Stevedores' Protective Union says that work on the city front is very slack at present. If a man earns $12 a week he is doing very well indeed. The principal trouble experienced is from the men who withdrew from the union. These men are going around the water front offering to work for 50 cents an hour, while the union men will not work for less than 55 cents. The Riggers and Stevedores' Union, he adds, also cause a good deal of trouble on the front. They do all they can against the Stevedores' Protective Union, even going so far as to impose a $5 fine on any of their foremen who employ a member of the latter organization, no matter how scarce men may be.

THE Hanford *Sentinel* says the fish sent by express from L moore from September 15 to December 1, 1888, were 60,565 pounds. It will be seen that the combined fish product shipped from Lemoore and Hanford, all from Tulare Lake, amounts to 133,620 pounds, or about 66½ tons in two and one-half months. These fisheries will continue through the winter until the summer season forbids.

ALLEN TOWLE was talking the other day of the fine water-power to be had on the Bear river canal just above Auburn, Placer Co. He has made a personal examination of the facilities there, and says that several hundred horse-power may be had so easily that he wonders that some enterprising manufacturer has not long ago made use of it. Mr. Towle thinks it is one of the best chances in the country, located as it is close by the railroad.

THE Board of Harbor Commissioners has determined to give the various processes for destroying the teredo a test on the new Beale-street wharf.

IN the San Jose and Santa Clara electric railroad the conducting wires of insulation are in a concrete-imbedded conduit, 8x15 inches in size, which is immediately beneath the center of the roadbed. The opening to the conduit is a three-quarter inch slot in the center of the track, through which the insulated wire connects the dynamo with the motor attached to the car's axle. There are now in San Jose 14 miles of this wire conductor in operation, equal to seven miles of track, and when the work in hand is completed there will be 20 miles of conductors, or ten miles of track, which will be the most extensive electric railway system in the world. When finished the system will have cost between $450,000 and $500,000.

COTTON AND WOOL.

The Cotton Crop and its Movement.

Reports indicate a very large movement of cotton to Europe this year. Up to September 30th, 3,055 000 000 pounds had gone forward against 2 932,000,000 taken in 1886–87, and 2,847,000,000 in 1885–86. For the three months ending November 30th, the northern mills took 43,000 bales less than for the corresponding period in 1887. It seems now a pretty well-settled fact that the quality of this season's cotton crop is inferior to that of last year. The wet weather of September was particularly hard on the sightliness of the cotton in the boll, and stained cotton is sure to be found in abundance in the market for the rest of the season. The quantity is still a subject for shrewd guessing, but the indications are favorable for a final crop of 7,000,000 bales. The yield per acre is said to be the same as last year, that is, 173 pounds, net, of lint. No system of improved cultivation has yet been devised to increase this yield in an average of years.

According to Ellison's annual review, the world's consumption of cotton is thought to have increased 46 per cent, but this statement is questioned in other quarters. Ten years ago the consumption of Great Britain was 60,000 bales a week; of the continent, 50,000 bales a week, and of the United States 30,000 bales, in all 140,000 bales, according to Mr. Ellison's own figures. For the last year, the aggregate consumption may be approximately estimated at 195,000 bales a week, thus indicating an increase of 25 per cent instead of 46.

Even the corrected figures show a very considerable increase and are quite sufficient to force a promotion of cotton culture in countries where it now receives but little attention. Thus far but little gain has been made during the last 15 years, outside of the United States. Experiments in India and Egypt have not been very successful. The most promising field, for new effort, just now appears to be south-western Russia in Asia, which is represented to be peculiarly adapted to such culture. It is not to be presumed, says the Boston *Journal of Commerce*, that the United States has reached its maximum production of cotton, yet it is an opportune question whether it will not soon become necessary for spinners to look more to other cotton-growing countries for additional supply. It is not so much a question of the cotton-growing capacity of the Southern States as it is a question of agricultural economy, whether to consider cotton culture other than an auxiliary in general husbandry. For the finest counts of yarn, the American varieties will always be held in preference, for any considerable quantity, but for ordinary counts other cottons can be used, alone or in mixtures. South America and Asiatic countries have not yet shown what they can do under a well-conducted system of cultivation. The United States need stand in no fear of competition from other regions of the world; it will be only when this country is unable to meet the demands of manufacturing that attention will be directed elsewhere.

The World's Cotton Manufactures.

Mr. Ellison estimates that there were 82,135,000 spindles at work in the world last year, compared to 81,840,000 the year previous. He allows for an increase of 200,000 in Europe, 25,000 in the United States, and 70,000 in the East Indies.

In 1883 the foregoing countries were estimated to have 78,950,000 spindles, showing an increase in the past five years of over four per cent. The consumption of cotton in 1883 was calculated at 9,684,000 bales, showing an increase of a little over 2 7 per cent in five years. For this period the consumption per spindle has fallen behind, according to these figures, though it should be remembered that the consumption was unusually large in 1883 throughout Europe and the United States.

Cotton-Mills in Greece.

Piræus, the ancient harbor of Athens, has, in the course of a few years, risen from the state of an insignificant port of transit to the rank of an industrial town with 30,000 inhabitants. There are at present eight cotton-spinning mills with 36,000 spindles, four textile factories with dyehouses attached, eight grist-mills, etc., in operation. Besides, there are scattered throughout Greece 15 or 20 mills with 80,000 spindles, and four linen factories, which produce daily 1000 pieces of linen. At the places where silk is raised, there are also silk-mills. Since 50 years, the manufacture of fakuels—that is, printed kerchiefs, which are worn by Oriental women wound about their hair in exquisite taste—has become a special industry, in which a factory at Lysa employs steam-power and 150 workmen, producing 1000 a day.

Cotton Manufactures in China.

Cotton manufacturing is finding an existence in the Empire of China, especially in Shanghai. The beginning of the enterprise was the introduction of a number of Japanese cotton gins so arranged as to be run by belt-power from a steam engine. Recent advices from Shanghai to the Boston *Journal of Commerce* are to the effect that the Chinese cotton merchants of the place have petitioned the authorities adversely to the further prosecution of the cotton-spinning company's operations, which are now con-

fined to cleansing the raw material and placing it upon the market. The object of the company is to spin and weave the cotton which it gins, but which has not yet been attained beyond the preliminary steps. The objection entertained by the petitioners toward the company is because of the latter's practice of putting its ginned cotton upon the market in competition and to the prejudice of the business of the cotton merchants who deal only in hand-cleaned cotton. The authorities are evidently not in sympathy with the purposes of the petitioners, as the amount of cotton annually cleansed by the company with its machinery is only a very small portion of the hand-cleaned cotton marketed in Shanghai. Besides, the "superiority of machinery over handwork, which it illustrates, cannot but tend to the advantage of commerce." The authorities are not slow in condemning the petition as exhibiting a disposition to obtain an improper monopoly and undue control of the cotton business. The company, at present, is simply utilizing its ginning machinery till its plant is completed for spinning and weaving.

THE IMPORTS OF WOOL for the first nine months of the present year are about the same, in amount, as for the corresponding time last year, that is, 73,907,515 pounds against 77,085,506 pounds. There was an increase in the amount of clothing wools, but a marked decrease in that of combing wools. About an eighth part of the clothing-wool imports was forwarded to Canadian mills. There was 15 per cent more yards imported of women's and children's dress goods than for the corresponding nine months in 1887.

THE WOODLAND WOOLEN-MILLS turn out 1000 yards of flannel a day. They have begun to make blankets, and when in full running order they intend to turn out 200 a day.

IT is now almost assured that the Australasian wool clip of this season is superior in quality and larger in quantity than that of last year.

Flour Mill Notes.

Wheat and Flour in France.

The large falling off in this year's wheat crop in France is causing much discussion in that country. The acreage of wheat sown there for 1888 exceeded that of 1887 by 2.3 per cent; but the yield was less by 21 per cent, leaving an aggregate deficiency of over 80,000,000 bushels, which must be obtained from foreign countries. In 1887 the United States exported to France only 19,500,000 bushels. What proportion of the 80,000,000 will be made up by this country is a matter of no little interest, and will depend largely on what course the French Government takes in regard to the very heavy import duty on wheat which is now 26⅔ cents per bushel, and the selling price has advanced fully 15 cents on the bushel. There is an earnest demand for a material decrease in this duty, made by the great industrial classes, by the many who are non-protectionists from principle and from the commercial men who are engaged in the wheat-importing business. The question as to what the Government should do to mitigate the effects of the unfortunate harvest upon the poor wage-workers is just now the foremost political topic of the country, or at least it was so previous to the great Panama canal collapse, which adds still further to the critical condition of the working classes. The opposition to reducing the import duty comes from the theoretical protectionists, who dread to see any backward step in tariff legislation, and from those who are largely engaged in wheat-raising on French soil. The indications are, however, that the present import duties will be strictly adhered to, in which case people will economize and retrench on that class of diet, whereby the extra demand for the foreign product will be materially lessened. Under all these circumstances, it is but reasonable to look for a decided increase in the demand for American wheat in France during the coming year.

The Flour Question in Portugal.

The King of Portugal, in view of the increase in the cost of flour, has already issued a decree reducing the duty on imported wheat. This was avowedly done to favor the working classes. With the exception of Russia, all the laboring classes of Europe seem destined to suffer more or less from the shortness of the European product, and the consequent advance in the staff of life.

THE VISALIA FLOUR-MILL, owned by Messrs. Fox & Williams, which was totally destroyed by fire Nov. 9th, was a severe loss, as it was insured for much less than half its value. Within a year many improvements had been made in the mill, it having within that time been converted from the old burr process to a modern roller-mill, at an expense of about $20,000. The warehouse was filled with flour, barley, wheat and corn. The Tulare *Times* in alluding to the disaster says that the mill received patronage from the uttermost bounds of the county, and as many as 20 teams have been seen in camp near there at one time, waiting for their grist. It brought an immense patronage to our business men, and they cannot afford to do without it. The mill was an old structure, the brick building having been constructed in 1858. Previous to that date, however, in 1854, Dr. R. R. Matthews and his brother Warren had erected a two-story frame building for a mill just north of the brick building. The original mill was constructed of oak lumber, the heavier timbers being hewed from oak trees which grew near the site, while the oak lumber was sawed at a mill then being operated about seven miles east of this city.

Shop Notes.

CHANGING LUBRICATING OILS.—It is a mystery that men who are called upon to use lubricating oils—that is, to do the work of using them, and the work resulting from their use—can never understand why, when an oil has been found just right for the purpose for which it is intended, a change is made by those who control the purchasing power. Valuable machinery is often sadly damaged by such changes. The highest priced oil is not always the best, but the best of common oils is generally the cheapest. When a large quantity of machinery is operated, the quality of the oil used often has an important bearing on the amount of coal burned, and sometimes the rapid destruction of delicate machinery more than overbalances the cost of both coal and oil. The reason, sometimes, why a change of oil is made when the quality is in every way satisfactory, is that the new "oil man" has an insinuating way with him, that captivates the purchaser, and sometimes, alas! the purchasing agent is captured by other means. There are reputable dealers in oils, who, a quality having by experiment been found that is best for the purpose, undertake to furnish it of a standard grade as long as desired. Lubricating oils are, at the present day, very commonly a compound of animal and mineral oils, and vary quite widely as compounded for different purposes. Many dealers have been to considerable trouble and expense in getting at the best mixtures, and can frequently give good advice when the purpose for which the oil is to be used is known to them.—*Am. Machinist.*

THE BURSTING STRAIN OF REVOLVING WHEELS.—A correspondent of the *American Machinist* gives the following simple rule for determining the bursting strain of revolving-wheels. Though the rule may not be absolutely exact, it gives results near enough for practical purposes by the use of a very few figures: The strain per square inch of pulley-rim section is one-tenth of the square of velocity in feet per second, nearly. As determined by Mr. Porter's formula, the strain due to running a 20-foot wheel 100 revolutions per minute = 1085 pounds per square inch, and by the above rule ($V^2 .10$) the strain figures 1096 pounds per square inch of section. A five-foot wheel, at 200 revolutions, has, by Mr. Porter's rule, a strain of say 271 pounds per square inch, and by rule above given about 273 pounds—a difference too slight to quarrel over, considering the fluctuation in strength in different castings, or even in different parts of the same casting. Knowing the belt speed, it is, in many cases, quite possible to determine the strain by "mental 'rithmetic." The constant .1 has been taken instead of that actually due to cast iron, as it allows us to point off one figure at the right of the V^2 value, instead of making the usual division.

A GRAVE ERROR is often made by many firms in not keeping their apprentices after they have become journeymen in preference to hiring new men. A firm will hire a boy to learn the trade and increase his pay as agreed in the contract made when the boy commences, and then let him go rather than pay him journeymen's wages, even if in need of help at the time, and hire another man in his place who is not acquainted with the shop or office, whichever it may be, and pay him the wages that the former apprentice has to seek in another place. As a rule, the young journeyman, after having served his apprenticeship with the firm, is generally worth more than a new man would be, as he knows where everything is, what will suit the boss, and also how to "hit" the customers, an accomplishment that requires time and experience.

THE BALANCE-WHEEL.—When a piston speed of 250 or 300 feet per minute was considered full fast, there was not absolute need of the balancing of rotating parts, and the fly-wheel could carry without perceptible jar 50 or 100 pounds extra at one point of its periphery without being noticed. Indeed, the old-fashioned stationaries had a simple balance-wheel, not intended to be used as a pulley, and whether cast whole or in segments afterward bolted together, was hung very much in the state in which it came from the foundry. But with increase of speeds came the requirement of a careful balance in the large wheel, and with a piston speed of 600 or 700 feet an unbalanced fly-wheel would soon become a flying-wheel, or a wheel of flying fragments.

A DURABLE RUST JOINT.—To make a rust joint that will bear heat, cold and rough usage, the following formula has been highly recommended: Ten parts of iron filings, three parts chloride of lime, and enough water to make into paste. Put the mixture in between the pieces to be joined and bolt them together, leaving until dry. After 12 hours the cement has been known to break off the solid iron.

What Every Subscriber Should Have.

AN EASY BINDER.—A. T. Dewey's Patent Elastic Binder, for periodicals, music and other printed sheets, is the handiest, best and cheapest of all economical and practical file binders. Newspapers are quickly placed in it and held neatly, as in a cloth-bound book. It is durable, and so simple a child can use it. Price, size of Mining and Scientific Press, Rural Press, Watchman, Fraternal Publishing Co's. journals, Harper's Weekly and Scientific American, 85 cents; postage 10 cents. Postpaid to subscribers of this paper, 50 cents. Send to this office for illustrated circular. Agents wanted.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

SOME men are at work prospecting for diamonds on Dry creek, Amador county, where the formation is said to be favorable. Some very small diamonds have been found both there and at Cherokee.

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THE BEST PRACTICAL MINING JOURNAL IN THE WORLD.

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This new work is by one of the most experienced hydraulicians of the country. It abounds with useful tables for ready reference, in which the results of abstruse calculations are all placed in a form so that one can find what he wants in a moment. For the engineer the principles, formulæ, coefficients, etc., are given; and for those not familiar with higher mathematics, examples, rules, and tables are prepared. Thus the needs of the scientist and the practical miner or millman are each met. It is the most complete work on the subject yet published, and is specially applicable to the Pacific Coast.

Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated:

General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulæ Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated and Expressed in Formulæ and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water Over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow Through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water Through Short Tubes and Compound Tubes; Flow of Water Through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend—Cicular and Angular; Flow Through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

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Assessment Notices.

Gover Mining Company—Location of principal place of business, San Francisco, California. Location of works, near Drytown, Amador County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors held on the 23th day of November, 1888, an Assessment (No. 1) of Fifteen (15) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Nos. 13 and 15 Fremont street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 5th day of January, 1889, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on Tuesday, the 29th day of January, 1889, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

L. G. HARVEY, Secretary.

OFFICE—13 and 15 Fremont Street, San Francisco, Cal.

Lord of Lorn Gold and Silver Mining Com-pany. Location of principal place of business, City and County of San Francisco, State of California. Location of works, Gold Hill Mining District, State of Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 19th day of December, 1888, an Assessment (No. 4) of Ten (10) Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 313 California street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 21st day of January, 1889, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Monday, the 11th day of February, 1889, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

L. G. HARVEY, Secretary.

OFFICE—313 California St., San Francisco, Cal.

STOCKHOLDERS' MEETING.

OFFICE OF

The Superior Mill and Mining Company.

A SPECIAL MEETING of the stockholders of the Superior Mill and Mining Company will be held at the office of the company, Room 11, 303 California Street, San Francisco, California, on Wednesday, February 20, 1889, at 1 o'clock P. M., for the purpose of taking into consideration the increasing of the capital stock of said company from ten million (10,000,000) dollars, divided into one hundred thousand (100,000) shares of the par value of one hundred (100) dollars per share, to fifteen million (15,000,000) dollars, divided into one hundred and fifty thousand (150,000) shares of the par value of one hundred (100) dollars each. Transfer books will close on Monday, February 18, 1889, at 3 o'clock P. M. By order of the Board of Directors.

J. M BUFFINGTON Secretary.

OFFICE—Room 11, No. 303 California Street, San Francisco, California.

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DIVIDEND NOTICE.

The German Savings and Loan Society,
526 California Street.

For the half-year ending December 31, 1888, a dividend has been declared at the rate of five and one-tenth (5 1-10) per cent per annum on Term Deposits, and four and one-fourth (4¼) per cent per annum on Ordinary Deposits. Payable on and after Wednesday, January 2, 1889.

GEO. TOURNY, Secretary.

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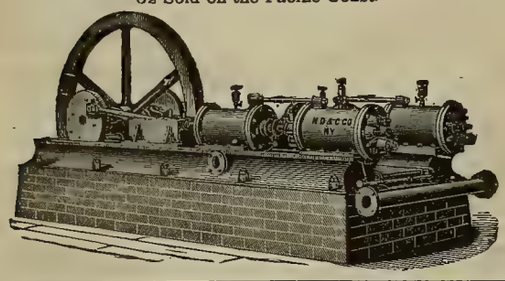

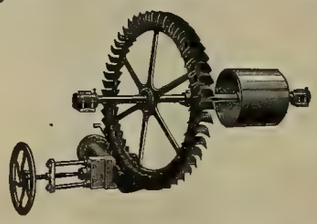

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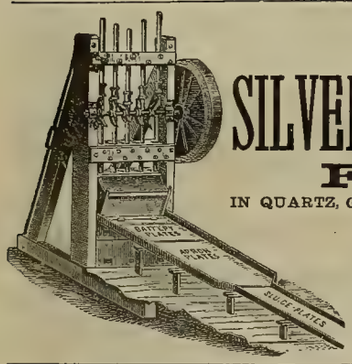

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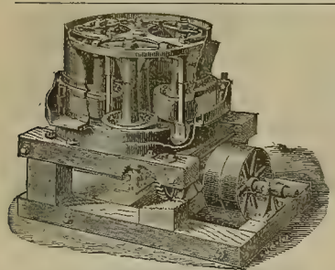

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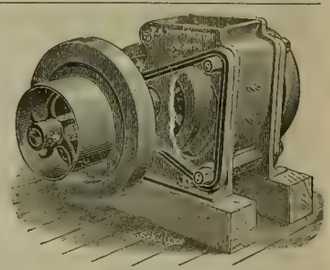

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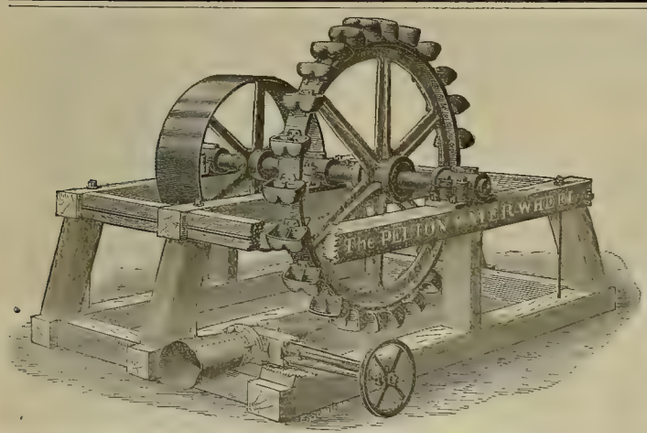

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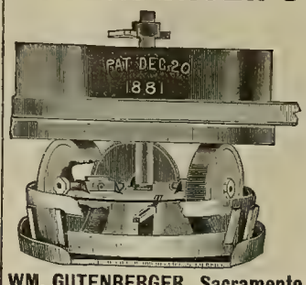

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THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Lefler, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No. 1, 32 ft.; No. 2, 34 ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

The Moon.

The picture of the moon that we present to our readers in this week's PRESS is enlarged from a photograph of 5½ inches to the size shown, and is taken from a negative made at the Lick Observatory by Prof. Burnham, assisted by other Lick astronomers.

The view given is as seen in an inverting telescope, such as is always used by astronomers. Many of the craters and prominent features are very well shown on the right-hand edge, technically termed the terminator. The small dark spot, about three-fourths of an inch from the bottom, showing an almost complete white ring, is the crater or ring-plain, known to astronomers as Plato. About half an inch above and slightly to the left will be seen an almost straight black mark three-eighths of an inch long. This is known as the Great Valley of the Alps, it being in the heart of the range of mountains known as the Lunar Alps. The range of mountains above running from left to right is known as the Lunar Appennines, and the large crater to the right of the two smaller ones is known as Archimedes.

Several points of light on the right-hand edge, apparently in the darkness, are the shadows of lunar mountains, the sun not being high enough to show the land between them and the main body of the moon. This may be easily understood when it is known that the sun rising, for instance, on the Sierra Nevadas before the intermediate ground between the Sierra Nevadas and the Coast Range is illuminated, the tops of the mountains, if viewed from the moon, would be seen as points of light. In other words, the rough edge of terminator on the right of the picture is the point of sunrise on the moon; the shadows all bend to the right.

It will be noticed that several craters have a small bright point in the center. This is the central cone or mountain, and it will be noticed that the shadow is always on the right of this little point of light, while the shadow on the left is caused by the crater wall. The partly shadowed portions to the left are smooth plains supposed to have been at one time the old ocean beds of the moon, *Mare Christum* being prominently seen in the left-hand edge or limb.

All the white portion toward the left is a mountainous and hilly region, and would show as rough as the portion on the right-hand edge if the shadows could be seen. The rough portion on the right-hand edge would, in about three days after this picture was taken, be a glaring white mass like that portion shown to the left, and a new region would be in view showing all the wild rugged grandeur seen upon the terminator in the picture. It will be noted that there are three craters just above the center at the right-hand side linked together. The middle one is the oldest of the three, the one at the bottom being perfect, having crushed in the wall of the middle one by a great gorge between them; the small crater (about 20 miles across) is just on the wall of the lower crater. The small crater appears just to the left of the center of the large crater on the crater floor, showing as a round white dot with small shadow on the eastern left-hand side (as seen in the telescope). It is impossible to describe all the features plainly brought to view without extending this article beyond reasonable limits.

The small irregularities noticed upon the eastern side of the limb are lunar mountains that are at right angles to the eye. These, of course, do not show without close inspection, but it must be remembered that the moon is about 2160 miles through, and it would require a very large mountain to show itself upon the edge.

THE MOON AS SEEN THROUGH AN INVERTING TELESCOPE.

EL DORADO SLATE.—The El Dorado Big Tunnel and Mining Co., which is driving a tunnel 3400 feet in length on its mining ground about a mile and a half north of Placerville, El Dorado county, has struck, at a distance of 470 feet from the mouth of the tunnel, an immense body of superior slate, which bids fair to exceed in value the gold-bearing quartz lodes, for the development of which the tunnel is being driven. The tunnel now penetrates this slate body 35 feet, at a distance of 350 feet beneath the surface of the ground. Expert slatemen, who have derived life-long experience in the slate quarries of Wales and Pennsylvania, have examined the slate and pronounce it superior to any they have ever seen, entirely free from foreign or metallic substances, and of a texture that permits it to split to the thinness of paper with but a trifling waste.

THE San Diego *Union* of Dec. 27th, says: At noon yesterday the water in the Sweetwater dam had reached the greatest depth in the history of the immense structure. The depth registered at that time was 51 feet 6 inches, and more water has flowed into the dam during the present rain than has been used from it during the entire year.

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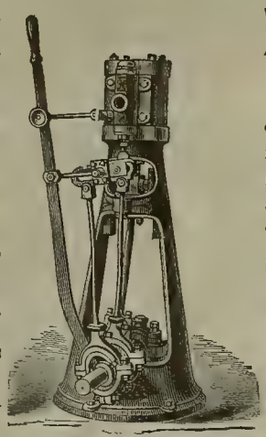

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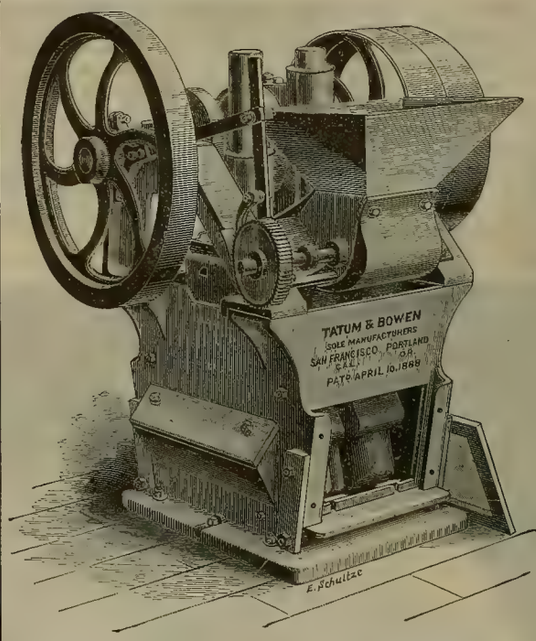

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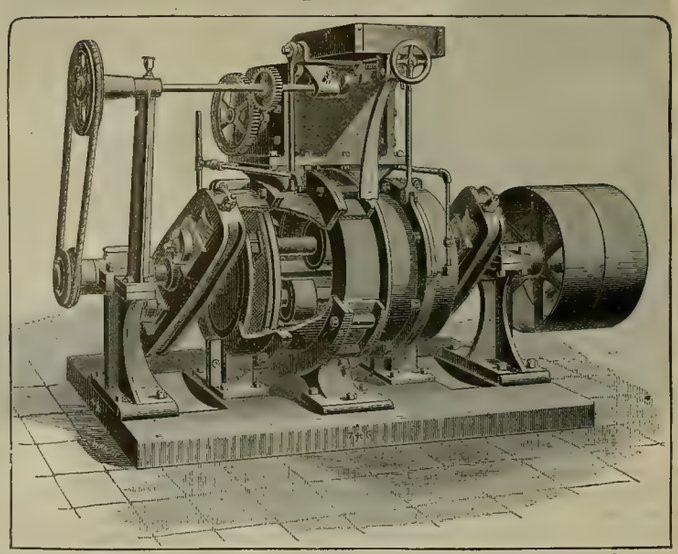

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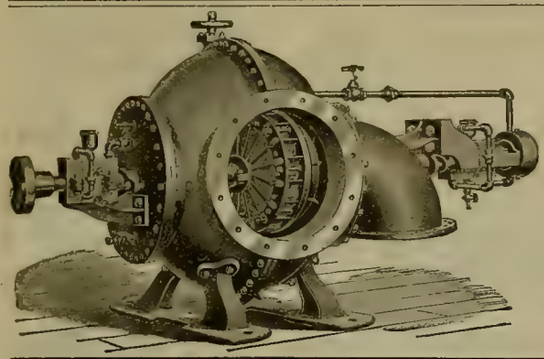

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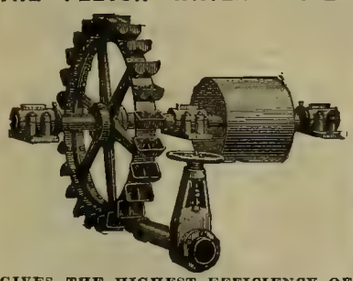

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MARKET REPORTS.

Local Market.

SAN FRANCISCO, Jan. 3, 1889.

As stock-taking and the annual settlements are about over, general trade is expected to run in its usual channels. There is a prevailing opinion that 1889 will be an unusually prosperous year in all lines of trade and manufactures, based on an increasing population, extension of railroads and more general improvements throughout the coast. The mining industry also promises to be more largely developed than for several years past. Money is reported to be easier, with the banks disposed to extend liberal accommodations. In last month the regular dividends declared in this city by incorporated companies aggregated $502,850, of which sum $252,250 was disbursed by mining companies. To the above will be added at an early day in this month the quarterly, semi-annual and annual dividends of companies that do not pay regular monthly dividends. It is stated that by the middle of the month we will have a very easy money market unless a mining stock deal is sprung, but which well-informed parties hardly look for until later on in the year. While this may be the case, there is no denying that the mining-stock market is attracting considerable attention, owing to the active work going on in the leading mines listed on the two stock exchanges. The character of much of this work is kept quiet, but from all reliable information obtainable, it is very important and should result favorably before many weeks pass. As has been stated, the work being done runs toward the West or Red Lode, where the mines, following the lead of West Con. Virginia, are preparing for active work. The latest mine to begin action is the Andes, which has lain dormant for several years past. The pulp assay returns of ore crushed from the Chollar averaged the past week $21 a ton, Hale and Norcross, over $25, and Savage, over $20. It is thought that when the Mining Stock Association gets into good working order, which will probably be at an early day, the ore from the above mines as well as from the other mines will give much better returns, and outside holders of stocks be better protected. The Bodie mines are reported to be working into better position for ore extraction, as are the Tuscaroras and the Quijotoas.

It is stated by authorities in Virginia City that the Comstock mines yielded in bullion $6,353,848 last year, and since 1875, $149,999,777.

The sale day of the Sutro tunnel has been postponed to the 14th of the present month. It is reported by well-informed parties that a New York syndicate has been organized to buy the property.

SILVER—The market gained in strength up to Saturday, after which it fell off, but closes steady and firm. The available supply in this city continues light, necessitating buyers bidding well up to meet their wants. There was coined at the mint in this city last year as follows: Standard dollars, $657,000; quarter dollars $304 000; dimes, $172,000; total, $1,133,000. There was imported into this port in 1888 silver as follows: Foreign bullion, $2,386,120; American coin $133,535; and foreign coin, $390,484; total, $2,910,121. The exports by sea in 1888 were as follows: To Hong Kong, bullion, $4,572,900; Mexican dollars, $5,339,948; to Japan, bullion, $1,853,800; Mexican dollars, $180,000; to Bombay, bullion, $3,036,503; to Calcutta, bullion, $419 - 503; elsewhere, bullion, $5300; Mexican dollars, $165,335; silver coin, $44 656; total, $15,637,439. The Comstock mines promise an increase in their silver production for the next few months.

The local silver market closed strong to-day at 92¾c bid, with light offerings. London cables quote 42½d, and telegrams from New York quote that market at 92¾c.

QUICKSILVER—The market the past week ruled steady with only a fair demand. The exports hence by sea in 1888 aggregated 11 933 flasks, against 18,619 flasks in 1887. China took in last year 3758 flasks. New York 2320, and Mexico 4766. Compared with 1887, China took 153 flasks more, while Mexico took 1631 flasks less, and New York 6050 less. The receipts of quicksilver at this port for the past three years were as follows: 1888, 22,825 flasks; 1887, 28,085; 1886, 17,345.

LEAD—The market is reported quiet but steady. New York mail advices report that the upward movement there was brought about by free purchases of early options by some large operators who had bought at low prices.

BORAX—The market is quiet. The exports last year aggregated a little over 6,500,000 pounds; in 1887, 10,692,055 pounds, and in 1886, 11,733.596 pounds. The receipts at this port last year aggregated 7,321,800 pounds; in 1887, 7,532,500 pounds, and in 1886, 7,929 700.

IRON—There is nothing new to report in the market. Holders and importers are firm in their views, while consumers are offish and only buy in a hand to-mouth way.

COAL—Receipts at this port in 1888 aggregated 1,386,463 tons, in 1887 1,113,878 tons, and in 1886 1,087,690 tons. The arrivals at San Diego and San Pedro in last year aggregated 101,368 tons; in 1887, 68,996 tons; in 1886, 20,986 tons. The demand for steam coals is increasing, with the call confined to no particular section. The colder weather is producing a better inquiry for house coal. As yet there is no change in prices, although it is stated that the tone of the market is firmer.

COKE—The market continues to rule very strong under light supplies and a good inquiry. The importations in last year aggregated 25,763 tons; in 1887, 22,657 tons.

Eastern Metal Markets.

By Telegraph

NEW YORK, Jan. 3, 1889.—The following are the closing prices the past week:

	Silver in London	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42 7 16	92¾	$17 20	$3 75	$21 80
Friday	42⅜	93¼	17 30	3 90	21 95
Saturday	42⅜	93 1-16	17 35	3 90	21 90
Monday	42 9-16	92⅜	17 40	3 92½	22 15
Tuesday	....	....	....	....	....
Wednesday	42⅜	92⅜	17 25	3 90	21@22

Borax was steady at 8⅞@9¾c for refined and 8@8¼c for concentrated. Quicksilver is very quiet, but lower, 58@60c being quoted. Bids for lake copper were made at $17.10@17.30; January, February and March delivery, $17.40@17.50 asked. Consumers obtain useful material at $16.50. Pig lead has worked up to $3.85@3.90, without material transfers. Six hundred tons will be sold by auction to-day. Refined petroleum is easier and a decline is expected. Barrels, $7.10; plain cases, $9.10.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, ——@——; Billiton Tin, $24.50@——; Banca Tin, $24.25@24.50; Baltimore Copper, ——@——; Oriord Copper, $16.00@16.25; P. S. C. Copper, —— @ ——; Foreign Lead $4.75@5.00; Foreign Spelter, $5.90@6.00; Antimony, Hallett's, $10.75@11.00; Cookson's, $12.50@13.50.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Jan. 3, 1889.

ANTIMONY—French Star	13½@	14½
BORAX—Refined	7½@	7¾
Powdered	7½@	7¾
Concentrated	6½@	7¾
COPPER—		
Bolt	26 @	27
Sheathing	26 @	—
Ingot	16 90 @	19 00
Fire Box Sheets	— @	26
IRON—Glengarnock ton	— @	—
Eglinton, ton	— @	—
American Soft, No. 1, ton	— @	32 50
Oregon Pig, ton	— @	30 00
Clay Lane White	— @	24 50
Shotts, No. 1	— @	29 00
Bar Iron (base price) ₱ lb	2½@	3
Chrome iron ore, ₱ ton	8 00 @	10 00
LEAD—Pig	5 @	—
Bar	5½@	—
Sheet	8 @	—
Pipe	7 @	—
Shot, discount 10% on 500 bags Drop, ₱ bag	1 55 @	—
Buck, ₱ bag	1 75 @	—
Chilled, do	1 95 @	—
STEEL—English, lb	16 @	20
Canton tool	9½@	—
Black Diamond tool	10 @	16
Pick and Hammer	8 @	10
Machinery	4½@	5
Toe Calk	4½@	—
TINPLATE—Coke, prompt shipment	4 85 @	4 90
Coke on spot	@	5 15
Charcoal, 14x20	6 75 @	7 25
do roofing, 14x20	5 50 @	5 62
Pig tin, ₱ lb	23½@	25
QUICKSILVER—By the flask	@42	50
Flasks, new	1 05 @	—
Flasks, old	85 @	—
COKE—English, ton	20 00 @	—

PRICES OF COAL "TO ARRIVE."

	Per Ton.		Per Ton.
Australian	$10 50 @11 00	Cardiff	10 50@11 00
Liverpool Steam	11 00 @11 50	Lehigh Lump.	20 00@— —
West Hartley.	11 50 @12 50	Cumberland bk	18 00@18 50
Scotch Splint.	11 00 @12 00	Egg, hard	16 50@17 00

Mining Share Market.

The market has been quiet during the week and transactions have been few, with little change in prices. The Virginia *Enterprise* says: The electricians are still at work drying out the electric generator in the Chollar electric chamber. It has been found that the humidity in the chamber is 78 per cent, but it is believed that when once the dynamos are in successful operation they will keep themselves dry. They expect to be able to make another test run about the 1st. The mill is now running 40 stamps propelled by the surface Pelton wheel, but it requires about 300 inches of water to make her go. This quantity of water will be understood when account is taken that the California mill, under its wire-rope system of transmission, runs 60 stamps, grinding about four tons to the stamp to the Chollar's three, with only 140 inches of water. Of course the California mill uses its water three times over after it runs off from its surface wheel, while the Nevada mill uses only a surface wheel.

The Sutro Tunnel Co. are figuring upon a project to extend their tunnel through the Silver Hill and on west to the Baltimore, a distance of about one mile. With their present facilities, it is believed that the total cost would not exceed $200,000. The tunnel would strike the Silver Hill at a depth of about 800 feet, and would strike the Baltimore at a depth of about 1200 feet.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Navajo, Jan. 3, $14,000; Hale and Norcross, 2, $87,488; Con. California and Virginia, Dec. 29, $46,880; Hanauer, 29, $4830; Woodside, 29, $6450; Hanauer, 30, $2250.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but competent men.

A. F. JEWETT—Tulare Co.
F. B. LOGAN—Southern California.
H. G. PARSONS—Northern California.
GEO. WILSON—Sacramento Co.
W. B. FROST—Fresno Co.
W. W. THEOBALDS—San Diego Co.
JOHN L. DOYLE—Utah, Wyoming and Colorado.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, *or beyond the time he intends to pay for it*, let him not fail to write us *direct* to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or of some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL OF YOUR PAPER.

CORRECTION.—Mr. C. H. Aaron writes us as follows: "In my article, No. 4, on Lixiviation, second paragraph, in second column, for 'add solution of calcium carbonate,' etc., read 'add solution of calcium chloride as long as it precipitates; if the liquid still reacts alkaline, caustic is present,' etc."

MINING SHAREHOLDERS' DIRECTORY.

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ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T. LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Big Canyon G M Co	California	1	20	Dec 20	Jan 22	Feb 7	T W Nolin	230 Montgomery St
Commonwealth Con M Co	Nevada	7	50	Nov 24	Jan 4	Ja 31	H Deas	309 Montgomery St
Concordia M C	Nevada	2	50	Nov 12	Dec 24	Jan 12	G C Higgins	121 Montgomery St
California Slate Co	California	3	30	Dec 13	Jan 19	Fe 1	8 J O Hansome	10 California St
Gt Western Quicksilver M Co	Cal	3	10	Nov 28	Jan 7	Jan 28	A Hals-y	328 Montgomery St
Gover M Co	California	1	15	Nov 28	Jan 5	Jan 29	L G Harvey	13 Fremont St
Gray Eagle M Co	Nevada	10	05	Nov 13	Jan 2	Jan 22	O H Bogart	327 Pine St
Horseshoe Bar Con M Co	California	2	10	Dec 7	Jan 14	Feb 4	D M Kent	330 Pine St
Ko-suth M Co	Nevada	10	10	Nov 21	Dec 24	Jan 19	E P Flint	328 Montgomery St
Lord of Lorn M Co	Nevada	4	10	Nov 13	Dec 28	Jan 22	L G Harvey	313 California St
Live Oak Drift Gravel Co	California	10	05	Nov 19	Dec 21	Jan 16	J Morizio	328 Montgomery St
Montrose M Co	Colorado	1	11	Oct 3	Dec 24	Jan 28	F E Luty	330 Pine St
North Gould & Curry M Co	Nevada	10	20	Dec 18	Jan 18	Feb 4	C H Mason	331 Montgomery St
Nevada Queen M Co	Nevada	4	50	Dec 21	Jan 28	Feb 25	H Deas	309 Montgomery St
Omilak M Co	Alaska	6	20	Dec 4	Jan 5	Jan 24	D M Kent	330 Pine St
Occ dental Con M Co	Nevada	3	25	Dec 27	Jan 31	Feb 25	A K Durbrow	369 Montgomery St
Puget Sound Iron Co	Wash Ter	13	1 00	Dec 29	Feb 2	Feb 25	A Halsey	328 Montgomery St
Ra sell Reduction & M Co	California	4	05	Dec 15	Jan 21	Feb 2	J Morizio	328 Montgomery St
Sag Belcher & Mides Con M Co	Nev	2	25	Dec 3	Jan 7	J n 28	E B Holmes	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Alaska M & M Co	Alaska	R D Fry	420 Montgomery St	Annual	Jan 9
Bullion M Co	Nevada	R R Grayson	327 Pine St	Annual	Jan 10
Black Diamond Coal Co	California	J H Dobinson	305 Sansome St	Annual	Jan 15
Chicago M & M Co	Nevada	W Grant	320 Montgomery St	Annual	Jan 7
Loma M Co	Nevada	C B Higgins	408 California St	Annual	Jan 8
Mayflower Gravel M Co	California	J Morizio	328 Montgomery St	Annual	Jan 8
Spring Valley G M Co	California	H Pichoir	320 Sansome St	Special	Feb 26
Silver King M Co	Arizona	J Nash	328 Montgomery St	Annual	Jan 8
Shasta Iron Co	California	C H Morgan	16 Fremont St	Annual	Jan 8
Sierra Nevada M Co	Nevada	E L Parker	309 Montgomery St	Annual	Jan 16

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Oct 11
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	1	Nov 26
Candelaria Con M Co	Mexico	C P Givens	221 Market St	50	Nov 12
Eureka Con M Co	Nevada	H R P Hutton	306 Pine St	25	July 9
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Idaho M Co	California		Gr s Valley	50	Oct 11
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1 00	Dec 10

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING DEC. 25, 1888.

394,958.—ELECTRIC BELTS—S. Colling, Oakland, Cal.

395,046.—PIPE-WRENCH — C. H. H. French, Hollister, Cal.

395,052.—ROLLER-BEARING—R. W. Hent, S. F.

395,150.—DENTAL ENGINE—W. A. Knowles, Alameda, Cal.

394,989.—HARVESTER—J. N. Miller. S. F.

395 072.—CAR-COUPLING—F. Ott, Estrella, Cal.

395.096.—FIRE ALARM—Alex. Watson, S. F.

395,097.—CANDLESTICK—G. Werntz, Placerville, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GRAIN-HARVESTER —Jens N. Miller, S. F. No. 394,989. Dated Dec. 25, 1888. The invention relates to certain improvements in harvesters of that class in which a comb projects in front and takes off the heads of the grain, while a revolving beater receives and thrashes these heads as they pass backward from the comb. The patent covers certain constructions and combinations of devices.

MINER'S CANDLESTICK. — Gabriel Werntz, Placerville, El Dorado county. No. 395,097. Dated Dec. 25, 1888. The handle portion has a ring at the rear end and the spear point for pushing into the timber may be detached and reversed so the point will project into the ring, thus shortening the candlestick when not in use so it may be carried in the pocket. There is a detachable hook also, by which it may be hung up. The candle socket has an automatic extinguisher, so that when the candle burns down low it will be extinguished. By having a jointed and detachable spear the candlestick may be made of greater length, so that there is not so much danger of the candle igniting dry wood which may be near it, while at the same time by uncoupling the parts the implement may be conveniently placed in the pocket.

BATTERY-CELL FOR ELECTRIC BELTS — Simeon Colling, Oakland. No. 394,958. Dated Dec. 25, 1888. This invention relates to that class of electric or galvanic belts in which a number of separate independent cells or batteries are connected together flexibly, the whole being attached to a suitable band which is fitted to the wearer. The invention consists in a certain novel construction of the independent cells or batteries, and the connection in series. The object is to construct in a belt of this class a cell or battery which can be readily disconnected from the adjacent ones, and can be easily taken to pieces for the purpose of renewing the parts.

Sampling Works for Sale.

The works are situated on A. & P. R. R., Calico Mining District, Daggett, Cal., and contain a first-class Engine and Boiler with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPY & CHILDS, 123 California street, San Francisco.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPAN	WEEK ENDING Dec. 13.		WEEK ENDING Dec 20.		WEEK ENDING Dec. 27.		WEEK ENDING Jan. 3.	
Alpha	2 75	3.10	2.70	3.10	2 65	2.9	2.55	3.15
Alta	2.70	3.00	2.75	2.90	2.65	2.90	2.65	2.90
Argenta	1.35	1.60	1.25	1 40	1.00	1.2	1.00	1.30
Belcher	6.25	7⅛	6⅝	7.25	6.00	6.75	5.75	7⅛
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	6⅝	9.00	8.00	9.00	6.00	8.25	7⅛	7.50
Bullion	1.40	1.5	1.40	1.50	1.35	1.45	1.20	1.45
Baltimore	.45	.50	....	.45	.35	.45	.35	.40
Bella Isle	.35	.45	.40	.45	....	.35	40	.45
Bodie Con	1.55	1.70	1.45	1.5	1.25	1.3	1 35	2 80
Benton	2.80	2.90	....	....	....	2.0	2.65	3.00
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	....	.50	.70	.55	.45	.55	.50	.75
Con. Va. & Cal	1⅛	11	10⅛	1⅛	9⅜	1⅛	9⅜	10⅜
Challenge	5⅜	6 0	5.50	6.50	5.00	5⅜	5.00	6⅜
Champion	....	....	....	....	....	....	....	....
Chollar	3 60	3.90	3.30	3.65	3.00	3.50	3.10	3.50
Confidence	15⅜	16⅛	....	1⅛	....	.15	15	16⅛
Con. Imperial	.85	1.05	.85	1 00	.75	.9	.70	.90
Caledonia	.45	.60	.50	.55	.40	.50	....	.45
Con. Pacific	....	....	....	....	....	....	....	....
Crown Point	5⅜	6.5	5.75	7.50	6⅜	7.50	6 50	7 75
Crocker	.90	1.10	.85	.90	.70	.85	.80	.90
Central	....	....	.35	.40	....	....	....	....
Dudley	....	....	....	....	....	....	....	....
East & Belcher	....	....	....	....	....	....	....	....
Eureka Con	....	....	....	....	....	....	....	....
Exchequer	1.20	1.35	1.20	1.35	1.15	1.25	1.15	1.25
Grand Prize	.70	.85	.80	.90	65	.85	.65	.75
Gould & Curry	3.90	4.4	4.20	4 50	3.55	4.15	2.65	4 30
Hale & Norcross	5⅜	6.0	5⅜	6.40	5⅜	5⅜	5 25	5.75
Holmes	....	....	....	.85	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	....	....	.40	.45	.25	.35	....	.35
Justice	1.75	1.9	1 50	1.8	1.75	2.00	1.70	2.45
Kentuck	....	2 7	2.50	2.90	2.20	2.75	2.75	2.85
Lady Wash	.50	.55	.50	.5	.45	.50	.50	.55
Martin White	....	....	....	....	....	....	....	....
Mono	1.10	1.30	....	1.10	1.00	1.05	1.05	1.70
Mexican	4.70	5.25	4.70	4.95	4.00	4.50	3.70	4.65
Mt. Diablo	....	....	....	....	....	....	....	....
Northern Belle	....	....	....	....	....	....	....	....
Navajo	2 10	2.20	2.10	2.40	1.60	1.65	1.75	1.80
North Belle Isle	2.70	2 85	2.80	3.2	2.65	2.85	2.60	2.90
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.80	3.00	2.95	3.40	2.55	2.80	2.55	2.95
North G & C	....	....	....	....	....	....	....	....
Occidental	2.10	2.25	1.80	2.10	1.60	2.00	1.60	2 00
Ophir	6⅝	8⅜	7⅜	8.10	6⅜	7.00	6 25	7.50
Overman	1.5	1.75	1.00	1.90	1.50	1.70	1.55	1.85
Potosi	3.05	3.40	2.75	3.15	2.5	2.80	2 50	2.65
Peerless	1.55	1.70	1 40	1.45	1.25	1.30	1.20	1.45
Peer	.55	.70	.45	.50	.40	.45	.40	.45
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	3 85	4.25	3.80	4.15	3.45	3.80	3.25	3.95
S. B. & M	3.00	3 35	3.00	3.25	2.80	3.00	2.75	3.90
Sierra Nevada	3.50	4.00	3 75	4.00	3.15	3.55	3.10	3.45
Silver Hill	.65	.85	.80	4.90	.80	.85	.75	.95
Silver King	....	....	....	1.00	....	....	....	....
Scorpion	....	.60	....	.55	....	.50	.50	.55
Syndicate	....	....	....	....	....	.10	.10	.15
Union Con	3.60	3.90	3.55	3.80	3.05	3.40	2.90	3.60
Utah	1.40	1.60	.50	1.60	1.25	1.40	1.20	1.45
Yellow Jacket	4.90	5⅜	4.85	5.50	4.90	5⅜	4.75	5⅜
....	....	....	....	....	....	....	....	....

Sales at San Francisco Stock Exchange.

(THURSDAY, Jan. 3

300	Alta	1.15	
800	Argenta	10c	
350	Alta	2.8	
20	Alpha	2.75	
170	Belcher	6.00	
200	B. & Belcher	7	
100	Benton	2.75	
1270	Bodie	2 20	
200	Baltimore	45c	
500	Bulwer	65c	
100	Bullion	1.40	
200	Challenge	5⅜	
250	Chollar	3.25	
200	Commonwealth	4.50	
20	Confidence	15.00	
225	Con Va & Cal	9.75	
800	Con. Imperial	90c	
650	Crocker	1.05	
130	Crown Point	7.00	
200	Exchequer	1.25	
100	Grand Prize	75c	
100	Gould & Curry		5.55
100	Hale & Nor		.55
1100	Justice		2.4½
200	Kyes		25c
150	Mexican		3 95
400	Mono		1 55
100	New York		55c
50	Nev. Queen		2.90
250	Ophir		6¾
200	Overman		1.65
250	Occidental Con		1.70
100	Potosi		2.65
150	Peer		50c
150	Peerless		1.40
190	Savage		3 55
250	Sierra Nevada		3 30
550	S. B. & M		3.25
600	Silver Hill		1.10
1 0	Utah		1.30
200	Union		3.15
300	W Comstock		75c
150	Yellow Jacket		5⅜

Successful Patent Solicitors.

As Dewey & Co have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

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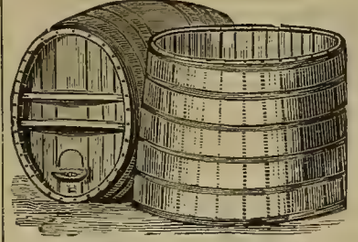

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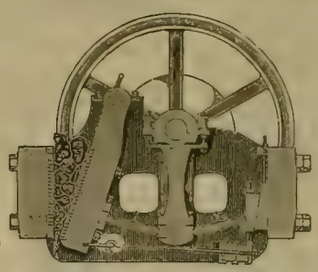

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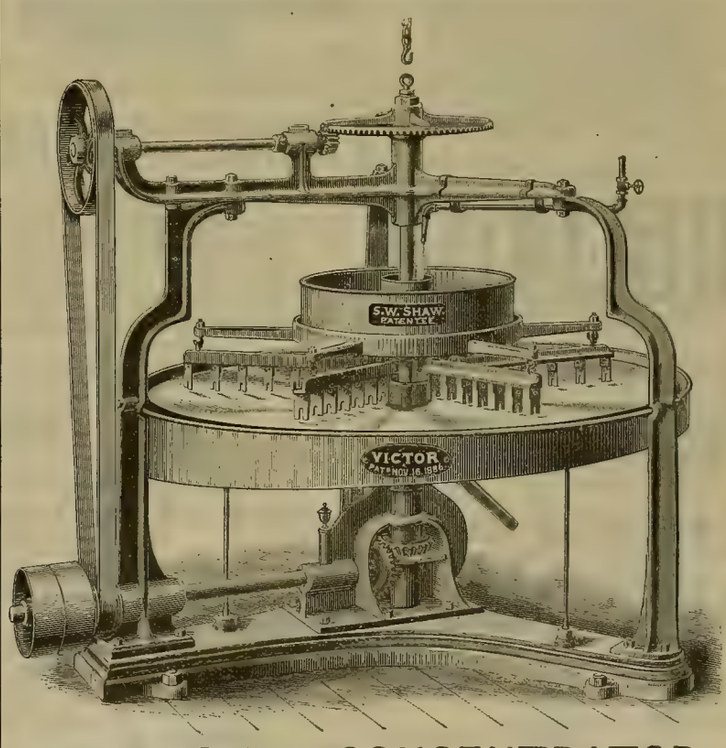

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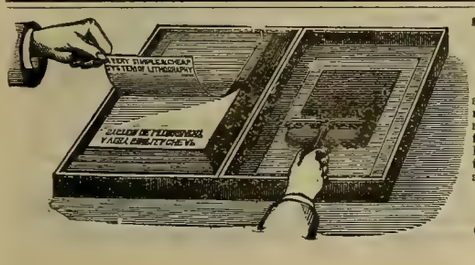

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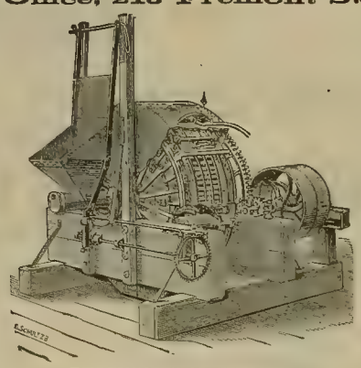

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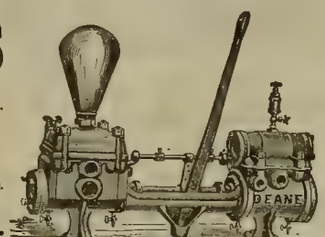

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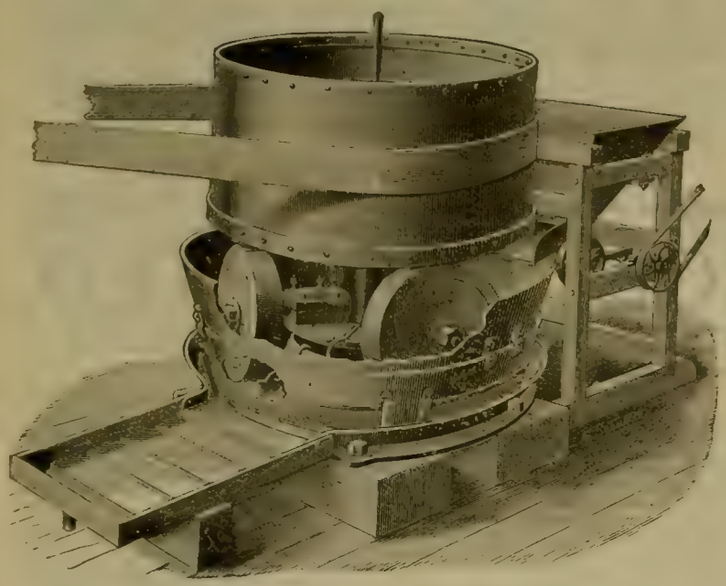

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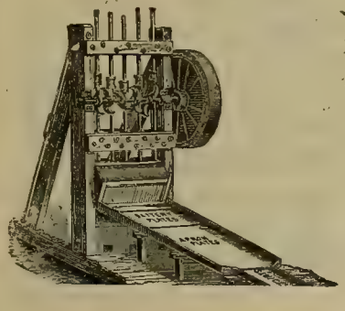

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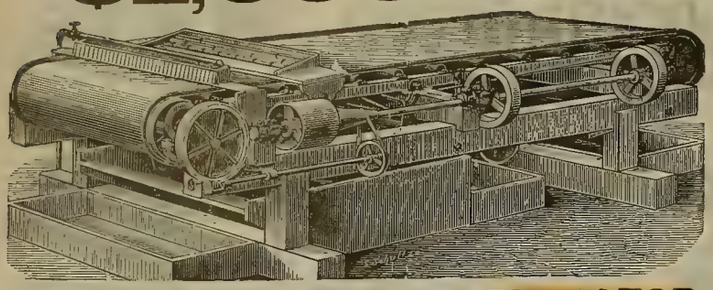

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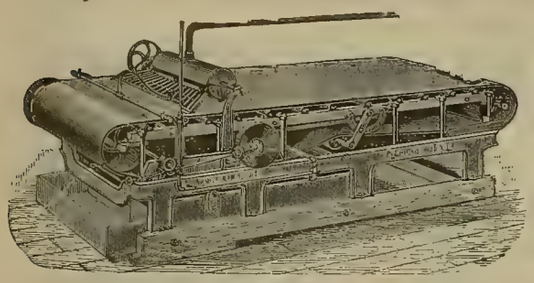

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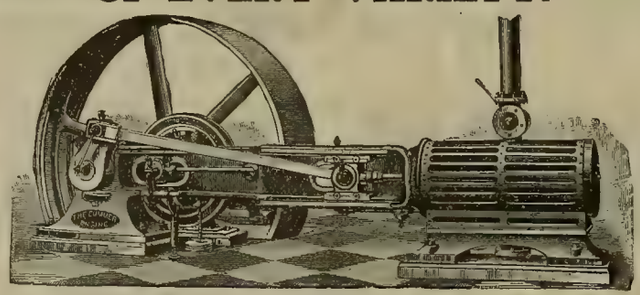

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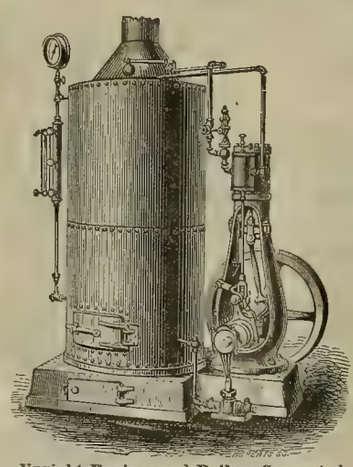

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO. Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 12, 1889.

VOLUME LVII. Number 2.

British Columbia Mines.

We had a conversation, a few days since, with Mr. Wm. Craib, superintendent of the Nicolia Mining Co., Yale district, near Kamloops, British Columbia. There are about 150 men in the district, 60 of them working for the Nicolia Co. They have no mill as yet, but are developing the mine and properly opening it. Three shafts are being sunk, the deepest of which is down 290 feet. The ore extracted is stored away for future use, as it is not intended to put up a mill until next season. When erected, it will have a capacity of 100 tons a day. The company is a wealthy one and can afford to open its property thoroughly before putting up reduction works. They are investigating the workings of the Russell process, and may use that in beneficiating their ores.

The district covers an area five or six miles long by about three in width. The ledges average about two feet, and the ores will run from $30 to $500 per ton. Some has just been worked at Luckhardt's in this city and turned out very well.

Other prominent mines in the district are the Mary Reynolds and the Star. The former of these has been shipping ores to the Selby lead works which run from $100 to $150 per ton. The ores of the district are silver, galena, and gray copper, the latter predominating. There is plenty of wood close by, and water enough for mills though there is not sufficient for power purposes.

In Kootenai district, about 200 miles from Yale district, there are some splendid prospects in gold, silver and copper, some of the copper-silver ore running as high as $3000 per ton in silver.

While there are some rich gold quartz veins in the region, the majority of the claims are silver mines. Mr. Craib has great faith in the mineral resources of the area referred to, thinking that in time it will be proved to be the most prominent mineral country on the coast. He has been ill since his arrival in this city, but is improving, and will return to British Columbia in a couple of weeks.

The Gibbs Camera.

Of late years, since the invention of dry plates, the manufacture of photographic cameras has largely increased, owing to the demand for them by amateur photographers. This demand has been met by manufacturers, who have made every effort to improve their appliances, and, as a result, many forms and styles have been put upon the market. A difficulty with most of these cameras, however, is that there are too many parts to them, and that a separate carrying-box is necessary. Mr. Wm. C. Gibbs of Oakland, who is a member of the Pacific Coast Amateur Photographic Association, has devised and made several forms of camera himself, finally inventing one which needs no separate case or box, having within itself parts which, ordinarily essential to its operation when in use, yet have the further function of completing a perfect case or box, so that the camera is self-contained. This he has recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, assigning a half interest to George W. Dornin of Oakland, also a member of the association.

The engravings given herewith show the general plan of the camera, and also the details of construction and operation. Fig. 1 is a vertical section, showing the end lids open and in position for use. Fig. 2 is a perspective view showing the end lids just being opened to expose the camera ends. Fig. 3 is a front view, showing the finder support and focusing carriage. It will be seen that the back and front ends of the case, when dropped to expose the operative parts of the camera proper, serve as the supporting bed and the focusing platform respectively. The focusing carriage is arranged in a novel way and the finder is made to fold in out of the way, not being detached.

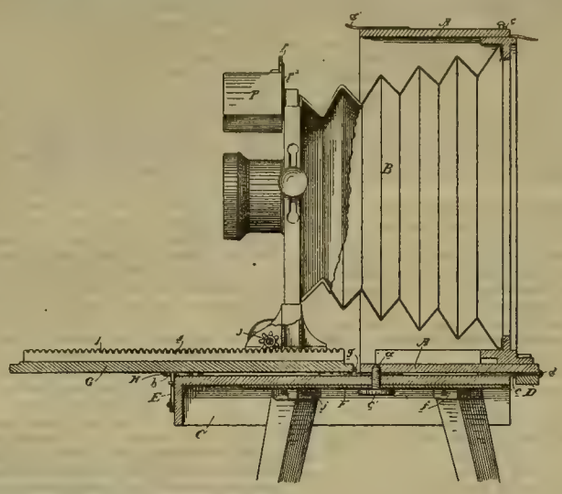

Fig. 1.—VERTICAL SECTION OF THE GIBBS CAMERA.

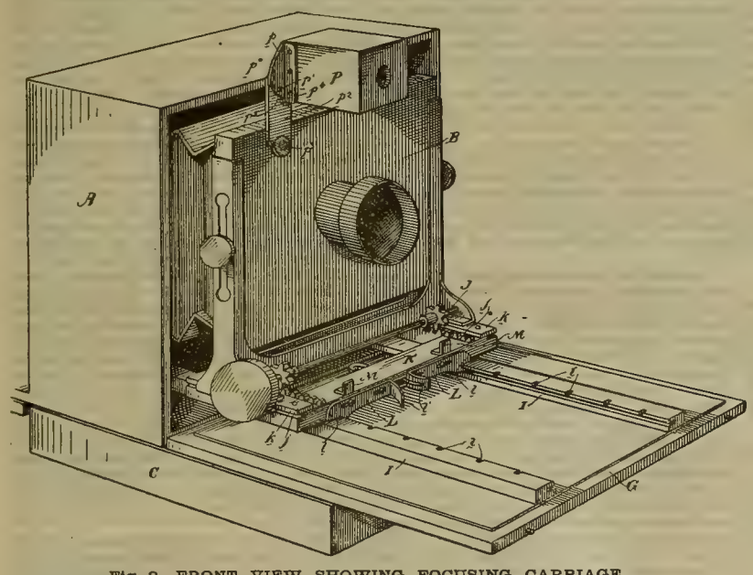

Fig. 3.—FRONT VIEW SHOWING FOCUSING CARRIAGE.

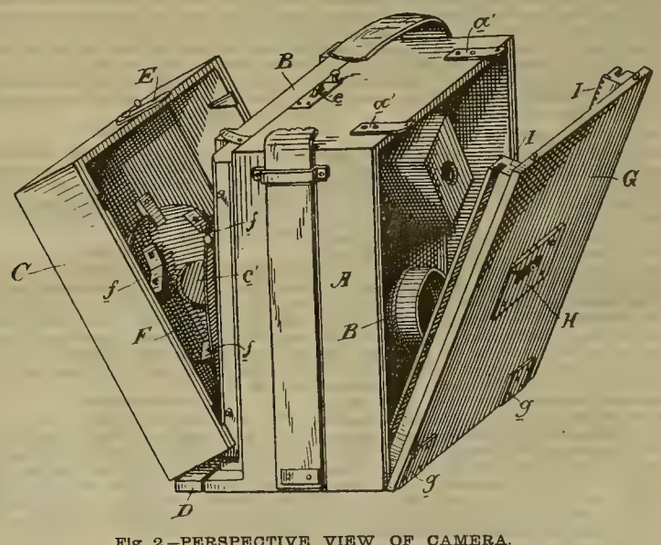

Fig. 2.—PERSPECTIVE VIEW OF CAMERA.

A is the body of the camera-box or case, consisting of a four-sided open-ended frame inclosing the ordinary parts of the camera, here represented, generally by *B*, and including on one side the ground glass, on the other the front board, the lens and its connections, and between them the bellows.

C is the back of the case or box, consisting of a flanged lid adapted to fully cover and inclose the back of the camera. This back lid is connected with the base of the body-frame by a hinged connection which will permit it to be dropped down to expose the camera back and be turned up *under* the body-frame for the latter to rest on. In the present case the connection is shown as being made through the intervention of a strip, *D*, to which it is hinged at *C*, this strip being itself hinged at *d* to the base of the body-frame. Now when the back lid is in position to cover the camera back the strip *D* lies in a horizontal position in the plane of the base of the body-frame and the back lid or cover occupies a vertical position, being secured by the engagement of a pivoted latch *E* on its top with a small catch *e* on the top of the body-frame.

In uncovering the camera back the back lid or cover *C* is dropped down to a horizontal position, turning on its hinges *c*. It does not stop here, but, the camera being lifted, this back lid is swung in down and up again, turning with the strip *D* on the hinges *d* to a horizontal position in the other direction, so that it lies under and forms a bed plate for the camera body-frame, projecting, however, forward of said frame for another purpose hereafter described.

The back lid or cover is firmly set in its position under the main box, where it serves as the bed, by a thumbscrew *c* or clamp, mounted on the lid and engaging a threaded socket *a* in the base of the box itself. This back lid is provided on its under surface with the tripod head *F*, having the usual lugs, *f*, so that this lid becomes the support or foundation for the camera when carried on the tripod.

G is the front lid of the body-frame of the camera-box or case. It is hinged to the base of the body-frame at *g*, and when in an upright position completely covers the front of the camera, being held by spring catches *a'* above. By releasing these catches the front lid may be dropped down to a horizontal position, so that

(*Concluded on page 24.*)

CORRESPONDENCE.

We admit unindorsed, opinions of correspondents.—EDS,

Amador County Mines.

EDITORS PRESS:—Ione valley, though one of the most prolific in the State, has its drawbacks, as it is in litigation between the S. P. R. R. and the Colton estate. It was originally a grant and purchased by Colton, it comprising many thousand acres that could support 3000 or 4000 families, where cattle now roam. As the railroad encourages immigration, these lands should be thrown open. In abounds in timber, gold and lesser minerals. The famous clay at Carbondale, hydraulic mines at Irish Hill, and many strong gold veins passing through the land make it one of the most valuable pieces of property in the State, to say nothing of the coal deposit.

Nowhere in Amador are there such strong croppings as 4½ miles from Ione. The ledge, 8 to 20 feet wide and some places 18 feet high, will most all prospect, and the sulphurets show a good character for the surface. There are other parallel ledges in slate and porphyry. One owned by Mr. I. W. Loomis is about two feet wide, and has milled $22 per ton. It can be traced some 3000 feet, as far as your correspondent had time to see; even the hillside pays to sluice, it being the source of Mr. Loomis' principal income. It only rests for a short time before public attention will be drawn this way as it warrants it. At Plymouth, all is again activity.

Amador

Keeps on with its usual tenor with few exceptions. The mines are all doing as usual. Many years will pass ere this little town will succumb. As the old ones pass into oblivion new ones are coming to the front. We can mention the Gover as one.

Sutter Creek

Looks in a prosperous condition, and the rebuilding since the fire has made it one of the most beautiful of mountain towns. The Wildman mine is developing greatly, to the satisfaction of the superintendent and its owners. The old Eureka days may not be far distant again. The Stewart-Lincoln and others expect good clean-ups during the winter and spring. All are well supplied with timber, wood, etc., so inclement weather will not hinder work.

The Kennedy at Jackson is running full force, and, from the happy expression on Superintendent Park's face, must be looking well.

Going south a short distance, we see a two-stamp mill pounding through the 24 hours. It is owned by three miners, who do their own work. Their mine is a paying one, though the ledge is small.

A short distance below is the New York mine. The ore is in abundance and good grade.

The Zeile is always good under able management and its never-ceasing stamps. Adjoining the Zeile mine and connecting with the famous Moore mine is a tract of land of some 80 acres belonging to Messrs. Evans and Meek Bros. Through this property three well-defined ledges pass and are opened so they can be examined. It is a rare chance for capital.

Amador Gold Mine.

Enterprise and perseverance has made this, under Superintendent Minear's administration, a mine Jackson can well be proud of. All the thousands they have paid out are as a drop in the bucket to what is to come. With their new 60-stamp mill and the mine so systematically opened, the mill can run without cessation. Few mines, if any, in the State will be able to work their ores at as low cost, and grand results may be expected.

Toward the river are many valuable properties which only need capital to make them paying, as they are developed sufficiently to allow a full investigation. Persons who have for years been interested in the Old Hardenburg are now turning their attention to the adjoining ground through which the ledge passes. It belongs to Mr. F. Sanguinetti and can be traced through his whole property of 160 acres.

Mr. Petrie of the Ilex Co., with Messrs. Tripp & Littlefield, are putting up a 10-stamp at Big Bar. The ledge in the mine is from 8 to 12 feet wide, and they will have some 230 feet of a stope, so the mine will be able to run at a very small expense. In much of the ore the gold is visible to the naked eye; everybody wishes them success. Col. W. F. Robinson owns the adjoining claim, the Cleveland, which shows an abundance of good rock.

On Esperanza creek the Zumalt Bros. are running an arastra, and each cleanup so far has been more than satisfactory.

Irishtown and Vicinity.

Messrs. Askey & Reed have completed a new ten stamp, the old five-stamp having been destroyed by fire a few months ago. The mine is a large, well-defined ledge of ore, and beyond doubt the highest grade of any mine in this or any surrounding county. It is free milling and easily worked. Beyond a doubt it will make capitalists of the owners.

Messrs. McKenzie Bros.

Have been doing a great deal of development in the vicinity, and have a very large Huntington mill, ample water-power and No. 1 ore. They expect large returns for the thousands invested in preparation; they are the owners of several claims. Some have already brought them handsome returns. They contemplate putting up large works in the near future.

Other claims in this same section only need capital to place on paying basis. At Clinton Mr. Spagnoli's mill is running on good rock from his mine. The cleanups are generally good.

At Volcano, with the exception of a mine worked by Mr. Harry Shannon of San Francisco, little is being done. He has a No. 1 property, and will astonish his friends soon. IBEX.

Calaveras County Mines.

EDITORS PRESS:—Mokelumne Hill is as well known as any town in the State, and all old Californians will remember the call when stages left Stockton and Sacramento. After the good old days of Placer, Big Bar, Middle Bar, and the numerous gulches with their varied names had ceased to pay, the town fell into a kind of Rip Van Winkle sleep, but of late, since numerous quartz mines have been developed, many of which are on a paying basis, the town has again assumed a lively aspect.

Everything was at a standstill until the copious rains started the mills and mines in full force.

In the immediate vicinity we have the Doryea mine, which has been worked the past 18 years, and has, during most all those years, been a paying investment, and from indications will be for years to come.

The Green Mountain mines, about two miles from town, are run by McSorley & Co., the shares all being owned in town. During the past 15 years this has always been a paying property and still continues so. Messrs. Fink & Co. of San Francisco are the owners of a claim at Middle Bar on which they have expended some $27,000 to thoroughly open before putting up expensive machinery. They now have a well-opened mine with a strong vein of high-grade ore which will warrant such an expenditure.

In the vicinity of from three to six miles we have the following mines drawing their supplies from "the Hill":

The What Cheer mine, which is still sinking, are putting new and larger pipe down for the mill, so now with plenty of water we shall expect good results.

The A. and B. gravel claim is sinking with eight-hour shifts, pushing their work with all speed.

At the Foot and Thompson mine at Upper Rich gulch they have graded a new road and have a new ten stamp mill in a building made for 20. Work in the mine has lately been resumed, they having an abundance of rock on hand.

The Ilex Con. Mining Co., Mr. Courtiss superintendent, has been written up fully in your columns. Some time ago on account of low water they were compelled to lay off 80 or 90 men. Immediately reports were circulated very detrimental to this mine that has spent some $350,000 in buildings, machinery and development. They happened to be at that time in very low-grade ore and the outlook was certainly discouraging. But such things will happen to all mines, particularly pocket ledges.

The McGlen is the adjoining property with good hoisting works.

Glencoe.

Messrs. Childs & Gillespie, who are the owners of the old Valentine mine, which was developed by four shafts of different depths and two incline shafts, are pushing work with very satisfactory results, making this little place quite lively.

West Point,

We will have to give in a special letter, as the mines working are too numerous to speak of separately. Lone Star, Keltz, Lockwood, Blazing Star, Water Lily, Rowe and Jenkins and Soaproot are all prosperous properties; a very large number of men are employed here, and at night the place reminds one of a frontier town by its activity.

Angels Camp.

Too much cannot be said in favor of this camp, where are located the largest mines in Calaveras county—the Nevills, Lane, Jones, Tozier, Hayward and Hobart, and the London. Most of these are dividend-paying properties, and all will be. They are equipped with the most improved machinery, as they are under able managers. Over 500 miners are employed here.

San Andreas.

The Union gold mine will assist this county in coming into the ranks of Nevada and Amador counties as a gold-producer. We may even go ahead, as quartz mining here is still in its infancy.

Sheep Ranch.

The Clarence mine has some 80 men on its payroll, with an 80-stamp mill. This is a strong piece of property, with every indication of permanency.

Our mining will not be the only attraction for the outside world, but we defy any county in the foothills of California to produce superior grapes, pears, peaches, plums, etc., than can be found in Calaveras; for health it cannot be excelled. IBEX.

QUICK WORK.—A 5000-ton iron steamship, built in four months, was launched on the Clyde a few days ago. This is thought to be the quickest work on record—a leviathan built in the time it takes a potato to grow!

Our Lumber Interests.

The past year has afforded to the lumber-mills on the Pacific Coast the longest and most profitable season they have enjoyed for many years. Quite recently, however, the prices of lumber have fallen to a very low figure, but even this has not worked any special hardship to the lumbermen, for the reason that it has greatly increased building enterprises and turned hundreds of young men in the direction of home-getting. Every family should have a home of its own. The whole State prospers from any condition of things that tends in that direction.

Sawmill men report that notwithstanding the fact that they manufactured a large amount of fencing lumber this season, they have not now on hand a sufficient quantity to supply the demands, and in several instances the mills have not had a foot on hand. Thus, notwithstanding two dry seasons, our farmers have apparently enough money on hand to improve their ranches by fencing them and building houses where none existed before.

The San Bernardino *Index* speaks of the immense amount of lumber that is being hauled into that town from the neighboring mountains, and determined to ascertain just how many mills were running, and about how many thousand feet have been cut this season. It was ascertained that there were eight mills in operation, and that their total output would aggregate 7,410,000 feet.

High up in the Sierras the mills are obliged to close down in the winter. Advices from Carson of Dec. 5th state that all the sawmills, railroads, flumes, wood and logging camps around Lake Tahoe have closed down for the season. All the men employed around the lakes have left for Carson, Truckee, Sacramento and San Francisco, where they will remain until work opens up again in the spring. The Carson & Tahoe Lake Co. sawed 25 600,000 feet of lumber in their two mills during the season, and cut 28,300 cords of wood, which has been flumed to Carson during the summer.

Puget Sound advices of Dec. 22d say that all the sawmills on the Sound, except the local mills, have shut down and will remain closed till Jan. 2d. The object is to make a "clean-up" for the year, take account of logs on hand, make estimates of the future supply of logs, and in a general way to make preparations for work next year. The past season has been prosperous, and the outlook is good.

Reports from Tulare and Fresno counties say that the lumbermen of that vicinity have had a prosperous season, and immense quantities of timber land have been bought and taken up the past season with a view to active operations in the early future. The mills belonging to the Madera Flume & Trading Co. were closed down about the last of November. Some idea of the immense amount of business transacted by the company can be gleaned from the fact that over 14,500,000 feet of lumber have been turned out by it during the season. The Soquel mill sawed 7,500,000 feet and the California mills 7,500,000 feet. Most of this lumber has been floated down the flume to Madera.

Numerous capitalists, says the Yreka *Journal*, are taking up timber land along the Klamath river in the Happy Camp section, in the southern part of Siskiyou county, with the intention of floating the timber down to the coast line, where it can be cut up and shipped by ocean to San Francisco and other seaports.

Redwood lumber is being shipped to Europe in considerable quantities. The ship India recently took a full cargo of redwood lumber for the United Kingdom. A few years ago several cargoes of this kind were sent to Europe. The last previous cargo was cleared January 24, 1887, by the Remittent, which carried 336,436 feet. The India carries a much larger cargo. Considerable business will no doubt, ere long, be developed in shipping California redwood to Europe. Large quantities have been sent to domestic Atlantic markets both by sea and overland, and with satisfactory results. Even the stumps of redwood trees have been turned to profitable account. The wood is susceptible of fine finish, and the grain and coloring make a pleasing effect. Recently (October 19th) the Norwegian bark Orion left Puget Sound for London with 456,452 feet lumber. This is the first cargo of the kind to clear from the Sound for Europe in some time.

The Humboldt *Mail* says: The Pacific Lumber Company is building a large pond, or reservoir, for holding logs about two miles above the mill. It will cover 12 acres, and will hold an enormous amount of timber.

A large shingle mill at Trinidad, Col., has been started to fill contracts for supplying several million shingles to San Francisco.

Over 500,000 feet of logs were recently tied up at Seattle by suits to foreclose loggers' liens. There were only two suits, and the amount claimed was only $129.

As an instance of quick work the Antioch *Ledger* says: The schooner Jewel recently discharged a cargo at the lumber company's wharf in time that broke the record of all former work in that line. Her cargo of 208,000 feet of lumber was discharged in 19 hours.

No more log rafts are to be permitted to go out from the Canadian seaboard forests. A fairly prohibitory duty has been placed on such enterprises at the instance of the owners of sailing vessels. This is parallel to smashing up machinery because it reduces prices and calls for less labor.

The timber-raft business has found its way into Europe. It is stated that a timber raft 700 feet long, 170 wide, carrying 170 men and worth $60,000, recently went down the Rhine; but it was nearly wrecked when passing the famous curve of the Loreiei.

The Harqua-Hala Gold Discoveries.

The Phœnix *Daily Arizonian* gives the following notes from the great gold discovery recently made in the Harqua-Hala mountains Every person returning from the district confirms the great value of the new discovery. The new camp is but three days' drive from Phœnix, and water is plentiful even in the dry season. Cochran and Davis have not yet started on their return to the camp, where they made five or six locations. A number of prospectors from Tombstone and several persons from Los Angeles are now here awaiting the abatement of the storm before starting to the new El Dorado. The mountain is about five miles in length, however, and the indications are that good mines may be discovered in any portion of it. Reports reached Phœnix yesterday that the Agua Fria was swollen so as to be unfordable, and that the Johnson-Riggen party were waiting at Elder's station until the stream should subside. They are bound for the new Harqua-Hala strike. The three owners of the original discovery are doing nothing in the way of developing their claims at present, but have realized already about $30,000, or $10,000 apiece. Parties are going to the new strike from all directions—from Yuma, Ehrenburg, Sentinel, Prescott and Phœnix. Sentinel station, on the Southern Pacific railroad, is the nearest point to the mines, but it affords neither provision, horse-feed nor teams. Besides this, the Gila river is unfordable at that point, and probably will remain so for a week or six weeks to come. After the storm subsides, Phœnix is the most available place of departure. Horses, grain and hay, supplies and provisions, are very cheap.

An enthusiastic miner writes from Harrisburg, Yuma county, to the Tucson *Star*: "I have seen a great many prospects, but I have never seen anything to compare with these. I have seen lumps of gold as big as a cup and half as big as my head. They have taken out at a low estimate $20,000 in lumps on one mine. They have a hole seven feet deep and seven feet square, and every pound that comes out will average $1 per pound. They have not struck top, sides nor bottom. Have picked up pieces of gold in going up the mountain. The dirt on the sides of the mountains will go from $1 to $10 per pan. Can find it wherever they have broken through the lime cappings. They have another mine about a mile from this. It shows up the same, and they have a big carbonate ledge on the same claim. The hole and mines show up fine. It is the biggest mine ever discovered on the coast. They say there are only about 15 extensions located."

A correspondent of the Yuma *Sentinel* is even more enthusiastic than the *Star's* correspondent. The former says: "The Gold Mountain claim is an immense body of extremely rich ore. Bowlders of float weighing from one to five tons are worth from $50 to $1000 per ton. We have picked up thousands of dollars in pure gold in pieces ranging from an ounce to over $200, the most beautiful specimens containing from $5 to $400 in gold; all this laid on the surface below the ledge, and in digging in the ledge we found the most wonderful rich ore hanging together with gold. For the last two weeks we have taken out every day very rich ore worth hundreds per ton. I have sunk down about ten feet and cut about that distance in the ore body, but found no walls yet. The Golden Eagle is also a wonderful rich mine. Cannot tell at present its full size. We have tons of ore from this mine sacked, which is worth from $500 to $1000 per ton. We have also found very rich carbonate of lead ore, running as high as 70 per cent; cannot tell at present the value of the gold and silver."

ACCORDING to the Eureka *Standard*, W. H. and S. F. Pine have applied to the Board of Harbor Commissioners for permission to build a wharf on the water front east of the east line of Carson's property. In conversation with W. H. Pine yesterday, he informed the *Standard* that it was the intention to build a new foundry and necessary building, as the present quarters are wholly inadequate to supply the present requirements of the trade, and the business is steadily increasing all the time. The wharf will be 80 feet on the water front and 100 feet deep, and a machine-shop 64x60 will accommodate all the machinery now on hand and that which is expected to arrive shortly. The foundry building will be 50x60 feet with plenty of floor. The pattern building will be two stories high, 32x40 feet. An engine is now being built with 10x18 cylinders which will furnish power. The foundry will have two cupolas, with a combined melting capacity of seven tons an hour. The contract to construct wharf and buildings has been let to H. M. Mercer and work will be commenced immediately. The improvements will cost over $7000, and the foundry when complete will be able to turn out any class of work.

De Lesseps and His Canal.

De Lesseps and his canal enterprise has for some time been recognized as one of the most picturesque figures in the world. No one thing has more largely occupied the world's attention for the past year than this great engineering effort to connect the two oceans at Panama. In a commercial point of view, it is fully equal in importance to the Suez canal. In an engineering light the work of connecting the Mediterranean with the Red sea bears no comparison to that required on the Isthmus of Panama. The Suez canal is a mere ditch through a sand plain, which was first conceived and completed some 2000 years ago. De Lesseps merely cleaned it out and created more substantial entrepots at either end. There were no engineering difficulties in the way which might not have been overcome by the merest tyro at such work.

Why even that canal should have cost $100,000,000 is difficult to explain, especially when nearly all the laborers were furnished by the enforced labor of Egyptian fellahs. Equally difficult is it to explain, especially in view of the much more magnificent engineering enterprises which have been carried to successful results in other parts of the world, why De Lesseps should have won such applause for his Suez work. The first American overland railroad, the canal and reclaiming system of Holland, the Erie canal through New York and other similar enterprises, exhibited much greater engineering skill than was called into recognition on the Isthmus of Suez. The first construction of that canal in the dim light of early history, when the world was young and science and engineering skill scarcely known, was a work of far greater magnitude than its modern renewal.

The Panama canal, neither in its conception nor in the engineering skill in its initiation, has been the work of De Lesseps. The proposition for its construction has been before the world for over 200 years, and its engineering possibility shown by actual surveys. De Lesseps has never been on the isthmus but once, and then only as the head of a junketing party. No special examinations were made, and no calculations as to the possibility, cost, or manner of the work.

De Lesseps has been simply a promoter of the scheme, without taking the trouble to give the work any serious consideration. He seems to have been peculiarly unfortunate in selecting men to let his contracts to superintend the work and to select and purchase machinery. Millions of dollars have been thrown away on machinery which, when placed on the ground at great cost, proved to be utterly worthless. Contracts have been so carelessly let as to give fortunes to the lucky contractors and pile up useless expenses against the enterprise. Stock and bonds have been sold at large discount and interest on the same paid from date, contrary to usual practice in such investments.

There has already been expended more than twice the sum which investors were assured would complete the work, and at least one-half more will still be required to finish the same. Money has been obtained under the most fraudulent assurances and expended in the most profligate manner. A large portion of this money has been drawn from people of small means who can ill afford to lose it. As the work took on a sort of semi-national character, these people, in their present calamity, naturally look to their Government to see that it is completed, so that their investments need not be an entire loss. And right here stands a lion in the way—the Monroe Doctrine—under which no European nation can be allowed to acquire any local national rights on this continent. The French Government would gladly step in and finish the work; their people demand it; but they dare not do so. They remember Maximilian and his fate. It would not do for the Government to take charge of and complete the work without establishing a government protectorate over it. That cannot be permitted by the United States.

De Lesseps' last remaining hope was taken away when Senator Edmunds introduced his late resolution into the U. S. Senate stating that this Government would look with serious disapproval upon any European government which should undertake either the control or *construction* of any ship canal across the Isthmus of Darien.

It would seem under existing circumstances that the Government of Colombia should apply to the United States for aid to complete the canal. Either some such plan must be adopted, or the canal company must raise the remaining funds required in its civil capacity. Neither the French nor any other European Government will be allowed to step in and take up the work.

Bitter denunciations are heard among the French investors in regard to what they consider the mismanagement of the affairs of the company. The most of those who have discussed the matter feel kindly disposed toward De Lesseps, commiserate the misfortune which has overtaken him, and still have hope that his fruitful brain will find some satisfactory way out of his present dilemma. The canal will most undoubtedly be completed; but in all probability the money already invested will be mostly lost. Whoever puts money into the scheme at this stage of the enterprise must be protected, whatever may befall previous investors.

Coast Industrial Notes.

THE Idaho *Register* says: Ogden parties are contemplating a flouring-mill on the Burgess Canal, about 15 miles from town. Mr. Burgess has agreed to give them all the water required. It will be a roller-mill. This will be a great convenience to the ranchers of that section of the country.

THE Gig Harbor Sawmill Co. has commenced operations at Gig Harbor, Puget sound. A boom of 500,000 feet logs has been received. Wharves will be constructed to berth eight vessels. The mill cutting capacity will be 100,000 feet daily. George Atkinson, late of the Tacoma mill, is in charge of the new enterprise.

THE Cottaneva Lumber Company are building a new chute at their shipping-place at Rockport, Mendocino Co. This chute will run from the rock at the outer end of the bridge at the same place as the old one, but will be longer, and will point in a little different direction, so as to reach deeper water.

THE Atlas Coal & Coke Company was incorporated at Tacoma Dec. 14th with a capital of $250,000. The company expects to go into the coke-making business on a large scale. It is proposed to erect 50 ovens at Wilkenson in which to prepare the coke. The Port Gordon is now on the way with 1000 tons firebrick for the construction of these ovens. The company is encouraged to expect a good demand for its product from Idaho and Montana. Formerly foundrymen and blacksmiths were about the only customers for coke, except a comparatively small quantity used in ranges. The product of the local gas companies is usually sufficient for house purposes. We get most of our foreign coke from Wales. There is occasionally a small consignment from Australia. Whole cargoes are sometimes received from Cardiff. Our imports from 1884 to 1887 were as follows:

	Tons.		Tons.
1884	10,695	1886	26,293
1885	20,611	1887	22,657

These totals show an average of 20,000 tons per annum. Our imports of foreign coke for 1888 to date have been as follows:

	Tons.		Tons.
January	3,711	July	910
February	——	August	1,443
March	1,102	September	2,322
April	1,122	October	1,162
May	818	November	560
June	1,744	December	800
Total			16,600

The light imports for the year have caused prices to rate high, especially of late, spot lots being quoted as high as $20, while for lots to arrive next year the best offers are $13 to $14. Small consignments of Puget Sound coke have come to hand from time to time throughout the past year, but the supply is certainly inadequate to the demand. The gentlemen connected with the new enterprise to be known as the Atlas Coal & Coke Co. have canvassed the field, and believe there is a good business in the manufacture and sale of coke at Wilkenson, W. T.

GOVERNOR WATERMAN is in receipt of a letter from Colonel McDonald, United States Fish Commissioner, relative to fish matters in this State, as follows: "You are of course aware that the United States Fish Commission has resumed work upon the McCloud river, with the specific object of collecting the eggs of the California salmon and hatching out the fry for distribution to the salmon rivers of your State. This work is undertaken in view of the important economic addition to the food resources of that part of the country. It is believed that this work may be conducted upon such a scale as to restore and maintain the salmon in their former abundance in all of your rivers. It is desirable, however—indeed, it is essential—that the work of the United States should be supplemented by such regulations as will permit the salmon to ascend the river in sufficient numbers to furnish the eggs for artificial propagation. This would involve the regulation of times and modes of fishing by law, and the prohibition of the introduction of sawdust and other material into the rivers, which would either directly pollute the waters, or by accumulating upon the natural spawning-beds of the fish destroy these, and make the maintenance of the fishery dependent entirely upon artificial methods. I bring this matter to your attention with a view to awakening public interest and discussion, in the hope that when the conditions for the permanence of so important a fishery are well understood your Legislature may be induced to enact the necessary laws for their protection."

THE efforts of the Southern Pacific Company to secure a good supply of water by sinking wells in the Southern California desert in the vicinity of Indio, a station on the line in San Bernardino county, have been attended with many discouragements. Little doubt is felt in the minds of the well-borers, however, that the sinking of these wells will in time be perfectly successful if the right kind of machinery be used. George Durbrow of Dalton, in the southern part of the State, has mounted an artesian plant which he thinks will render the work more efficacious than that prosecuted with ordinary boring machinery. Mr. Durbrow has charge of the Southern Pacific well-boring on the desert, and he is familiar with all the details of the work, knowing its requirements, and therefore feels well qualified to construct a machine that will prove successful in its operations. He sank one with the old machinery 756 feet and struck a stream of water that flowed 18,000 gallons an hour. Not satisfied with this, the railroad people wanted a still better flow, and ordered the well to be sunk deeper, and while that was being done the inside casing became filled with sand and has remained so ever since. Alternate layers of sand and clay were found in this well all the way down, with occasionally a little gravel. At 16 feet good surface water was reached, and at 100 feet the first flow of artesian water was struck, but this only came to within 13 feet of the surface. Indio is 20 feet below the sea level, and is considered for that reason a very good point at which to sink artesian wells.

THE North Pacific whaling fleet did only moderately well for the season of 1888. The best return was made by the steamer Orca, which reported 1700 barrels oil and 35,000 pounds bone. This steamer also made the best return in 1887, namely, 2800 barrels oil and 48,000 pounds bone. Most of the other steamers did tolerably well, the Bælena reporting 1000 barrels oil and 14,000 pounds bone. Some of the sailing vessels reported 10,000 to 14,000 pounds bone, with a corresponding amount of oil, but most of them reported less than 10,000 pounds bone. The oil and bone returned by the fleet of 1888 was consigned as follows:

Name.	Vessels No.	Oil bbls.	Bone lbs.
Pacific Steam Whaling Co.	7	5,161	79,000
Wright, Bonne & Co	9	1,282	42,200
Wm. Lewis	8	3,265	59,400
James McKenna	4	1,400	32 500
Aiken & Swift	2	1 840	26 900
J. & W. R. Wing	4	1 550	14 200
Mage & Moore	2	350	3,500
I. H. Bartlett & Son	2	550	7.500
G. Allen	1	240	4,500
J. N. Knowles	1	250	4,000
N. C. Eldridge	1	...	2,000
Order	1	215	.....
Totals	42	16,093	275,700

In addition, five of the vessels brought 14,700 pounds ivory, of which the steamer Narwhal was credited with 10,000 pounds, and the schooner Allen with 4000 pounds. Prior to 1879, most of the North Pacific whaling fleet refitted at Honolulu, but since then nearly all have come here to discharge and refit. From 1864 to 1873, both years inclusive, the receipts of whale oil at San Francisco amounted to 114,711 barrels, the largest quantity for any one year in that interval being 18,940 barrels. From 1874 to date, the fleet reporting at San Francisco has been credited as follows:

	Vessels No.	Oil bbls.	Bone lbs.	Ivory lbs.
1874	11	10,600	86.300	7,600
1875	12	16,300	157,000	25,400
1876	7	2 800	8,800	7,000
1877	20	13,900	139,600	74,000
1878	21	9 600	73.300	30,000
1879	22	17 400	127.500	32,900
1880	20	23,200	339,000	15,300
1881	26	21,300	354,500	15,400
1882	30	21 100	316,600	17,300
1883	37	13,300	160,200	23,100
1884	40	20 373	295,700	5,421
1885	43	30,143	448,075	7,066
1886	43	20,661	332,931	5,273
1887	41	32,884	603,400	550
1888	42	16 093	275,700	14,700
Totals	416	269,154	2,918,606	281,510

The fleet for 1889 has already begun to leave the port. The early vessels first cruise to the south during the winter months, heading in the spring for the Arctic ocean.

SOME improvements and novelties have been introduced in the new cable-railway system of Los Angeles. The work was begun under the presidency of John F. Crank, but a Chicago company now has control of the enterprise, though it is still headed by Mr. Crank. The system will be most complete in its various ramifications, being fully 18 miles in length. The main line will run from East Los Angeles, along Main and Spring streets, to a point beyond Washington Garden. Work is now being pushed as fast as men and money can do it, and it is likely that the lines will all be completed and cars running over them by February 15th. There are now being built in this city two pairs of engines to be used as a part of the power for pulling the cable. The engines will be of the compound type, using the steam expansively. A Chicago firm is building a third engine of the same kind, which will be used by the company. The boilers will be equipped with mechanical stokers.

EMPLOYER AND EMPLOYE.—There are certain rights existing between employer and employe, which both are bound to respect, and it is only when there is a breach in these that there is any cause for trouble between the two parties. And when once this rupture occurs, it is very apt to be widened by the feelings and words that naturally arise. The greatest cause for trouble often arises on the part of the employe; and, in endeavoring to vindicate himself, he forgets that there are others, whose rights are equally important and just with his own. More caution and less hotheadedness on both sides would often avert what otherwise proves a break in the pleasant relations that should always exist between employer and employe, and without which neither realizes or enjoys the full share of profit, which is his just due.—*Practical Mechanic.*

The English Watch Industry.

An interesting illustration of the capabilities of the English watch trade as a manufacturing industry has recently been brought to our notice. As it will serve to show our readers abroad how unfounded are the statements often made that "no such thing as an entire English watch" exists, we give the following particulars of the instance referred to: When the committee appointed by the House of Commons were taking evidence to guide them in revising the clauses of the Merchandise Marks bill of 1887, they were informed, as the public have also been so frequently told, that it was impossible to make watches in England without the assistance of foreigners, or imported parts of watches, especially complicated watches, such as perpetual calendars, repeaters and chronographs. Upon hearing this statement, Captain Penton of the House of Commons communicated with Mr. S. A. Brooks, the chairman of the London Watch-Trade Association, to verify the assertion. Mr. Brooks consulted a firm of watch manufacturers who took great interest in the Trade Marks bill, and one member of which has given evidence before the committee.

In the result Captain Penton was informed that complicated watches could be made entirely by Englishmen, and on receiving this reply he gave an order for two watches—a gentleman's and a lady's—the former to be a minute repeater and perpetual calendar, and the latter a minute repeater. The order was placed with instructions to make two of the finest watches which could possibly be produced, and of English workmanship throughout. Recently they were completed and delivered. Both have fusee-movements in massive cases. The larger is a full hunter; the other a sight or half-hunter. Both are keyless, the keyless work, repeating work and perpetual calendar having all been made by English workmen. The watches are beautifully jeweled, with finest finished, double-cup trumpet-holes to escapement, the fusee-holes being of sapphire solid stone pipe, out out square and set in steel. The cases are richly enameled with arms, crest and monogram in appropriate colors, and the lady's watch has a wreath of forget-me-nots and lilies of the valley enameled round the circle of hours outside the case, and a spray of moss roses on the dial, which shows through the opening of the sight-hunter. It would be difficult to find two more splendid and elegant examples of English workmanship, and Clerkenwell is to be congratulated that it has manufacturers public-spirited enough to take up this complicated branch of the watch trade, and thus to resuscitate one of the oldest London industries.—*English Paper.*

THE PERUVIAN NITRATE DEPOSITS.—Along the Peruvian coast, stretching for hundreds of miles, are the famous beds of nitrate of soda, which purified is saltpeter. These deposits, more profitable than silver or guano, were discovered accidentally by a vagrant Englishman named George Smith, but were not operated to any extent until recent years. Now, nitrate, having been found a valuable component of a hundred chemical forms, is in demand the world over, and millions of dollars' worth is shipped from the ports along the coast annually. Before its value was fully known, a number of far-sighted men located "claims" after the fashion in vogue in mining camps everywhere, and then the Government stepped in and forbade any further pre-emption. But the original locations cover enough of the deposit to supply the market a century or two, and to keep up the prices they have formed a pool, a monopoly combined, under which they charge from $2 to $3 per hundred weight for what costs them about 15 cents. There is apparently no limit to the stuff, the bed stretching up and down the coast for 300 or 400 miles.

RESIN ON THE BRAKE.—The Gould and Curry boys who are running cars on top have quite a grade to run on from the works to the dump. They have brakes on their cars, and ride down at a good jog, but often it is difficult to restrain the car by applying an iron brake against an iron wheel. To give more power to the brake, they have used sand, which worked pretty well, but Joe Blakely, day before yesterday, tried to improve upon sand, and stealing Zimmer's resin, he applied it liberally to the brake of his coach. Gathering an audience around him to see how it worked, he set sail for the dump. The iron heating melted the resin and made a fine lubricating oil, and Joe sailed like a shot. He struck the stopping-post and the car stopped and immediately changed its shape, and Joe went on down the dump like a mass of pork. The audience brought the pieces to town and had them carefully sewed together, and hopes are entertained that Joe will be himself again in time to accept a deputyship.—*Virginia Enterprise.*

THE San Diego *Sun* says: The Gold King mine, near Julian, is looking remarkably well. At 70 feet from the surface the vein is 12 inches wide, and the ore runs as high as $60 to the ton.

WHERE a heater is used, a pump is more economical as a boiler feed than an injector; but an injector is always preferable where there is no heater.—*Safety Valve.*

THE Carson *Tribune* says there are more idle men in Virginia City than for many years, and every business man is complaining of hard times.

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SAN FRANCISCO
Saturday Morning, Jan. 12, 1889.

TABLE OF CONTENTS.

EDITORIALS.—The Gibbs Camera; British Columbia Mines, 21. Passing Events; Academy of Sciences; Greenstone; Oil Fuel for Mining Plants, 24. Smith's Automatic Oiler; Photographic Results, 25.
ILLUSTRATIONS. — The Gibbs Camera, 21. Smith's Patent Automatic Oiler; The Inner Corona; The Outer Corona, 25.
CORRESPONDENCE.—Amador County Mines; Calaveras County Mines, 24.
MISCELLANEOUS.—Our Lumber Interests; The Harqua-Hala Gold Discoveries, 22. De Lesseps and His Canal; Coast Industrial Notes; The English Watch Industry, 23. Electricity and Plant Life, 27.
MECHANICAL PROGRESS.—Imperfections in Tin Plate; How Sheffield Cutlery is Made; Is the Planer a Necessity; Tube-Making as a Lost Art; Three Hundred Miles an Hour by Railroad; Ten-Inch Steel Target Penetrated, 26.
SCIENTIFIC PROGRESS.—Oil on the Waters as a Preventive of Fogs; The Mysteries of Vision; Terrible Volcanic Disturbance; The Duration of Lightning Flashes; When are Petroleum Vapors Explosive; Poteline; The Resistance of Snow to Projectiles, 28.
USEFUL INFORMATION. — Feather-Bone: A Peculiar Industry; A Plumber's New Trick; The Flow of Liquid Through Pipes; Varnish from Sugar; A Long Line; Draft Over Different Pavements; Use for Oily Ropes; Metallic Pens Not of Modern Invention; For Removing Old Varnish, 27.
GOOD HEALTH.—Points About Pneumonia; How to Breathe When Reading; Different Phases of "Mind Cure;" Effect of Petroleum on the Human Body; An Ill Turn, 27.
MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 28-9.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 32.

Passing Events.

The mining excitement just now prevailing is at Harqua Hala, not far from Phœnix, Arizona. A great many miners are leaving for the district, and very rosy reports are received concerning the mines. However, thus far only one "ledge" has been found, and the owners are trying to sell that, although they took out $20,000 in sinking a few feet.

The results of the observations of the solar eclipse of last week, so far as known, are very satisfactory, especially in the matter of photographs. During this week many of the Eastern observers have been in San Francisco, and all express themselves well pleased with the results they were able to accomplish.

The ore resources of the Con. Cal. and Virginia mine on the Comstock are marvelous. During the past two years over 300,000 tons has been extracted, producing above $7,000,000 in bullion. Notwithstanding this tremendous drain, the mine is now still yielding a daily average of 400 tons of ore, the area of which is added to by frequent new discoveries in advancing explorations.

Prof. Pickering of Harvard is here and will soon go to Los Angeles, in pursuance of an arrangement with the University of Southern California to make a study of Wilson's Peak, upon which it is proposed to construct a greater telescope than the famous one on Mount Hamilton, that under consideration to have a lens 40 inches in diameter, while the Lick lens is but 36. At Wilson's Peak, Prof. Pickering will mount a 16-inch telescope, with which he will make observations to test the conditions. He is also to find a suitable location to place a 24-inch telescope for astronomical photography.

Greenstone.

Many of our mining men use the terms greenstone and diorite as if they were totally different rock, which in many cases is misleading.

Greenstone is an old and well-known name, a translation of the German "Grunstein" and may be taken as synonymous with the French diorite. It consists of a mixture of feldspar and hornblende, and varying in texture from fine-grained compact rock in which the crystalline state of the minerals is barely discernible with a lens, to a coarsely crystalline aggregate—color dull green, varying from light to dark green or almost black.

In Mr. Frank Rutley's little work on the "Study of Rocks," under the head "Diorite Group," he says: "The term 'Greenstone,' which in its older signification embraced basalt, diabase, gabbro, diorite, etc., has subsequently been restricted in its application, and employed as a synonym for diorite. Since, however, the name greenstone is almost meaningless, it seems desirable either to discard it, or still better, to use it in its original sense as an ambiguous and comprehensive term, useful in field geology, but otherwise only admissible as an expression of comparative ignorance, such as may safely be employed in the case of rocks of a certain type, which have reached so advanced a stage of decomposition, and in which the constituent minerals are so poorly developed, that it is no longer safe or possible to hazard any opinion concerning their precise normal mineralogical constitution."

"Diabase" may be regarded typically as a crystalline-granular admixture of triclinic feldspar and augite, usually with more or less magnetite and titaniferous iron. Some of these rocks contain quartz and they are consequently divided into quartz diabase and quartzless diabase, or diabase proper. Chlorite has hitherto been cited as one of the essential constituents of the rock; but Rosenbusch very justly observes that if the chlorite matter in diabase be, as it no doubt is, a secondary alteration product, it then has only a "pathological significance," and cannot therefore rank as an essential constituent. That the viridite (chlorite, spichlorite or chloritic matter) in diabase is a product of alteration is an opinion now very generally held.

The term "porphyry" is applied by many of our mining men to nearly all igneous rocks except granite. Now the term "porphyry" without addition or qualification denotes par excellence "quartz porphyry," a rock with quartz-felsitic base, and crystals of feldspar and quartz in acid rock containing from 70 to 80 per cent of silica.

"Wache"—"Greywacke" (Ger. gruwacke) is the name given to a somewhat decomposed state of igneous rocks, poor in silica. The mass is soft, almost earthy, of a brown color, its mineralogical structure quite unrecognizable, and only to be traced by transitions from the fresh state of the original rock. Such rocks are designated "wackenitic," as wackenitic dolerite, etc.

Academy of Sciences.

The annual meeting of the California Academy of Sciences was held on Monday evening, the election being held during the same day. H. W. Harkness was elected president, defeating George Davidson, who headed the opposition ticket. The following officers were elected: H. W. Harkness, president; H. H. Behr, first vice-president; Geo. Hewston, second vice-president; F. Gutzkow, corresponding secretary; J. R. Scupham, recording secretary; I. E. Thayer, treasurer; Carlos Troyer, librarian; J. G. Cooper, director of museum. Trustees—C. F. Crocker, D. E. Hayes, S. W. Holladay, G. C. Perkins, E. J. Molera, Irving M. Scott, John Taylor.

By 8 o'clock there was a large attendance of members. Dr. Harkness called the meeting to order. The treasurer made a report of the financial transactions of the academy during the past year. The rent of the Market street property amounted to $4671, and $1183.50 was received from dues and $1200 from interest. A loan of $5000 was also received from the Lick trustees. There is on hand in the general fund $2185 04; in the current expense fund, $2936.06; Crocker fund, $751.

The librarian reported 2647 publications made during the year and 651 volumes completed.

Curator Bryant of the department of mammals and birds made an interesting report, stating that his department was in a bad condition. He had prepared a plea to sportsmen and others for fresh subjects, which, however, had not been published, because if the subjects were received there was no place for them.

C. F. Crocker, president of the Board of Trustees, also made a report, reviewing the action of the trustees in relation to the Market-street and First-avenue property of the academy and the new academy building.

After President Harkness had presented his report, in which he made a general review of the work of the academy for the year, Mr. Stevens presented the report of the Election Board. Dr. Harkness declared the regular ticket elected and the meeting adjourned.

Oil Fuel for Mining Plants.

In view of the suits instituted by the Government against mining companies in this State and Nevada to recover value for timber used by them for fuel and mining purposes, it is probable more care will be used in future as to sources of timber supply. It is possible that in some instances the privilege of cutting wood on the public domain has been abused, though there is a general feeling of indignation in the mining community at the commencement of the suits. In most cases no other fuel except wood is available in the mining districts, and nothing but wood can be used for mine "timbering," but in a few instances oil is being used for fuel. The Silver King Co. of Arizona has gone to considerable expense in this connection. In well No. 2 the main addition made last year to the plant has been the erection of a new engine, and the institution of a complete system for the transportation and consumption of crude oil for fuel. The scarcity and increasing value of wood has made the fuel question so serious that a change was imperative. Experiments in 1887 showed coal to be entirely too expensive, and attention was directed to the use of oil. The first requisite to make its use as economical as wood under the old conditions, was a condensing engine. This was obtained from Messrs. Fraser & Chalmers, being a vertical compound-condensing engine of 175 horse power, twin cylinder pattern, and Corliss gear. It was put in motion, replacing four high-pressure engines formerly in use, proving most economical, a test under conditions of disadvantage to the new engine, showing a saving of 28.38 per cent in fuel over previous consumption.

Following the completion of the engine, the necessary arrangements for the use of oil were made. At Casa Grande, the railroad point, 800 feet of trestle, with double-inclined approach, was built on embankment adjoining the main S. P. railway track. Adjacent to and below level of the trestle, two storage-tanks of combined capacity of 11,000 gallons were located. At a still lower level the transportation wagons come in and receive the oil through piping, the entire arrangement of unloading cars and loading wagons being by gravity.

The oil is carried in wagon-tanks of 1000 to 1300 gallons capacity to the mills, where they are discharged by pipe line to three storage-tanks of 14,000 gallons capacity, which are located across the creek from the mills as a matter of safety. From the storage-tanks the oil passes by gravity to a supply-tank and pump which forces the oil directly to the burners. The working of the system has been most satisfactory, and the fuel cost as low as formerly, so that the mill-work is now independent of a future scarcity of wood, and any interference from the Government in the matter of fuel.

Wood, being cheaper at the mine, is still in use, the year's consumption amounting to 3711.57 cords at No. 1 shaft, and 1008.77 cords at No. 2 shaft. The mill fuel consumed included 3441.35 cords for steam, 360 cords at the lower creek pumping station, 592.4 cords for roaster and drier work, besides 496,500 pounds of oil used the latter half of the year at the boilers.

A LARGE CASTING.—On Monday last the huge stern-post of the war vessel San Francisco was cast at the Pacific Rolling Mills. At 2:30 the furnace containing the liquid metal was tapped and 29,000 pounds was poured into the hot pot. When the stream ceased, and the huge pot was filled, it was moved along a truck until the bottom was over the mouth of the mold, when the casting was completed.

The Gibbs Camera.

(*Continued from page 21.*)

it then lies and is supported directly and firmly upon the back lid, *C*, which has been turned forward to serve as a bed, as heretofore described. In this position the front plate serves as a focusing platform. In order to hold it solidly and firmly in this position, Mr. Gibbs makes use of the pivoted latch *E* of the back lid, causing it to engage a catch in the front lid *G*. This engagement, though it may be of any suitable character, is here shown as being made by a slotted plate, *H*, with which the notch of the latch engages, and is pressed thereto by a spring-actuated toe-piece operating behind the slot. The engagement is, therefore, automatic, and the disengagement is effected readily by pressing back the latch to relieve its notch of the slotted plate.

The inner surface of the front lid *G*, which becomes the upper surface when said lid is laid down, carries the tracks *I*, upon which the front of the camera is drawn out for focusing, its adjustment being effected by means of the common device of the pinion shaft *J* and racks *j*. Instead, however, of this simple form of adjustment, Mr. Gibbs uses, especially in larger cameras, the following construction: Upon the tracks *I* is mounted and adapted to slide a carriage frame, *K*, having on each end the guides *k*, upon which the base of the front-board of the camera is mounted, and is adjusted by means of the pinion shaft *J* on the camera and the racks *j* on the carriage frame. In the inner edges of the tracks *I* are made notches *i* at intervals, and upon the front of the carriage frame are arranged the spring-controlled oppositely-working sliding latches *L*, the ends *l* of which are adapted to engage the notches *i* of the tracks in order to hold the carriage frame solidly in position. The latches are readily operated by means of adjacent thumb-pieces *l'*.

Now it will be seen that this construction provides for the primary or general adjustment of the bellows by pulling out the carriage-frame *K*, with the front board and lens, to about the focus, as near as can be judged. Then the more accurate adjustment, while focusing, is effected by the pinion shaft operating on the racks *j*. This effects a saving of time over the ordinary method, and where the work being done requires the same focus the carriage may be drawn out directly to that focus at once and held by the spring latches. *M* are safety stops on the carriage-frame for limiting the adjustment of the camera front on said frame. By thus having the tracks on the front plate *G*, the inventor avoids having a separate track-frame such as is usually employed.

P is the finder of ordinary construction used in instantaneous work, etc., for getting the image in the proper place on the plate. Mr. Gibbs' improvement in this connection consists in means for mounting it, whereby it may be turned to position for a vertical or horizontal picture. It has secured to one of its sides a plate *p*, which is pivoted at *p'* to a plate or arm p^2, which is itself pivoted at p^3 to the camera front-board. The edge of the plate *p* is cut out to form terminal shoulders at p^4, which, by coming in contact with a fixed pin p^5, in the arm p^2, limit the movement of the finder in either direction, and hold it in either a vertical or a horizontal position as it is turned on its pivot at *p'*. The turning of the arm p^2 on its pivot moves the finder down to be inclosed by the case or up above said case for use.

In a camera, the focusing of which is effected by the backward movement of the bellows, it is only necessary for the manufacturer to reverse the lids *C* and *G*, making the former the front lid and the latter the back one.

It will be seen that by the construction of the camera as described, Mr. Gibbs provides what may be termed a "self-contained" apparatus—that is to say, there is no necessity of a separate case or box. The parts of the apparatus which are necessary for setting it up preparatory to its use are parts of the inclosing box or case and have the double function described. There are no separate pieces to be mislaid or forgotten, no pieces to shake loose or rattle; but the apparatus as a connected whole is complete in itself whether in use or closed up. The construction of the "box" is such that the lens is at all times in position on the front board. It is thus in a safe carrying-

place out of danger of accident of any kind. Its permanent position causes a saving of time in setting up the camera for use. This is intended for a serviceable outdoor camera, which can be carried in a wagon, the cars, or on a boat without danger of breakage.

Quite a number of these cameras have been made here and are in use. They are very compact and convenient. The improved instrument is the result of several years' experience with cameras in outdoor work, during which time the inventor has been able to see the defects in the ordinary "boxes" and the inconveniences arising therefrom.

Smith's Automatic Oiler.

Some little time since, J. T. Smith of this city patented through the MINING AND SCIENTIFIC PRESS Patent Agency an automatic oiler for machinery, shafting, loose pulleys, wrist-pins, etc. The wool packings and spiral spring within the tube regulate the flow of oil; by the use of the thumb-screw on the top end of the tube the packing and springs within can be compressed or slackened as required, so as to supply the required amount of oil where they are used. The cups, when properly filled, will with one filling last many months. This automatic oiler feeds oil only by the revolution of the machinery. Numbers of these oilers are now in use in this city and elsewhere in mills and factories and have given excellent satisfaction, saving oil and keeping bearings cool and well lubricated. They only feed when the machinery is in motion. It is also adapted for oiling axles of trucks and all kinds of vehicles.

Several different styles of these oilers are made to meet special requirements. The cuts given herewith show some of these forms. Fig. 1 is a plain oil cup, with tube in center, the end of which is given as resting lightly on bearing or shaft. The filling in the interior represents the wool-packing and the spring, these being compressed by the thumb-screw, which regulates the supply of oil as required.

Fig. 2 is a plain oil cup with the tube on the side. This is so as to allow it to enter where the oil-hole is near some obstruction. The packingland spring are the same as in Fig. 1.

Fig. 3 shows the tube alone, with thread on top and outside, the cap screwing down with the thread on the interior of tube. This oiler is used expressly for oiling the axles of vehicles, and screws down flush with the outside of the hub. With one filling it is claimed this will oil an axle for from one to two months.

Fig. 2 *B* is glass, mounted with brass, and represents a cup to be used on a steam engine. The conical-pointed stem passes through the spiral spring and penetrates the wool packing below. The object of this is to hasten the flow of oil. In case of necessity, by turning the screw back the conical point of the stem will leave a space in the packing by which the oil flows quickly.

Fig. 4 shows a long tube with an interior compressing tube. The object of this is to conduct the oil through any length of tube to the required spot. The tube in the interior, pressed by the thumb screw above, will compress the packing in bottom of tube and regulate the flow of oil the same as though the tube was short.

Fig. 5 shows the loose pulley cup, ready for use, with thread to screw into hub of pulley, the end of tube touching the shaft, as in all other cases. The packing is the same as in Figs. 1 and 2.

Fig. 6 represents a brass engine cup with the interior arranged precisely as described in Figs. 1 and 2 or in Fig. 2 *B*. These oilers are manufactured in San Francisco by J. T. Smith & Co., 31 Commercial street. State rights in the patent will be sold or the oilers themselves can be purchased. Hundreds can be seen at work in the principal cities in California and at the mills in Minneapolis, Minn.

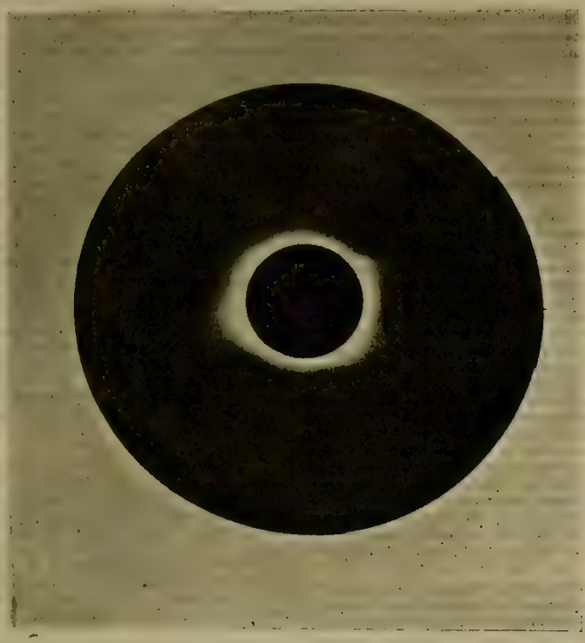
Photographic Results.

Although all the negatives have not yet been developed which were made by the photographers during the recent solar eclipse, enough have been to show that marked success has been made. The largest are those made with the 13½-inch refracting telescopic camera of the Harvard Observatory party. They are excellent and show much detail. The Pacific Amateur Photographic Association made in all 164 negatives, many of which have been developed. The largest made by any of this party were those of Mr. Burckhalter of the Chabot Observatory. His images are thirteen-sixteenths of an inch in diameter. He worked with a camera made from a 10½-inch reflecting telescope, so the plates are necessarily somewhat "fogged," but not enough to spoil them.

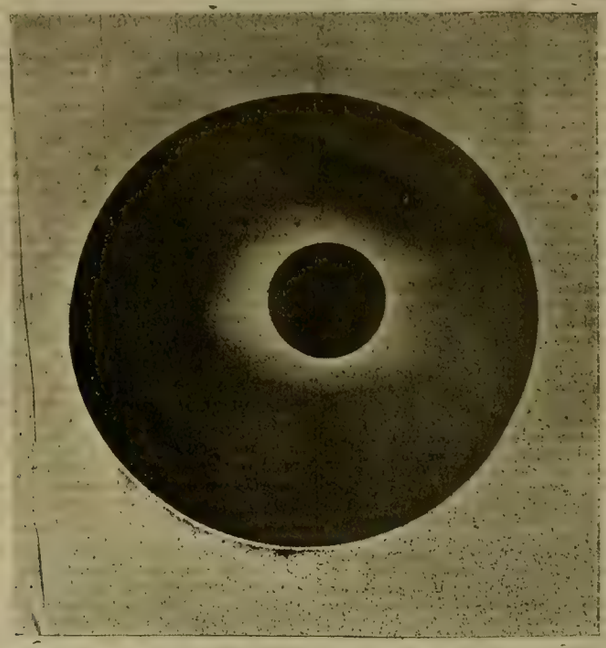
We give on this page two cuts made from prints of the corona during the total phase of the eclipse. Some detail is necessarily lost. In fact the "prints" from the negatives are by no means as good as the negatives themselves, showing less detail in every way. The long fine rays or wisps of light which show plainly in the negative are more or less lost or become confused in one mass of the prints.

Long since Prof. Langley thought that he saw with the eye that these wisps or rays of light of the corona were each formed themselves of closely-lined wisps, and he has been anxious for some proof of this. The negatives made show plainly that he was right in his theory. The outer ends of the outer corona are so fine that they scarcely show in the prints, though plain in the negatives.

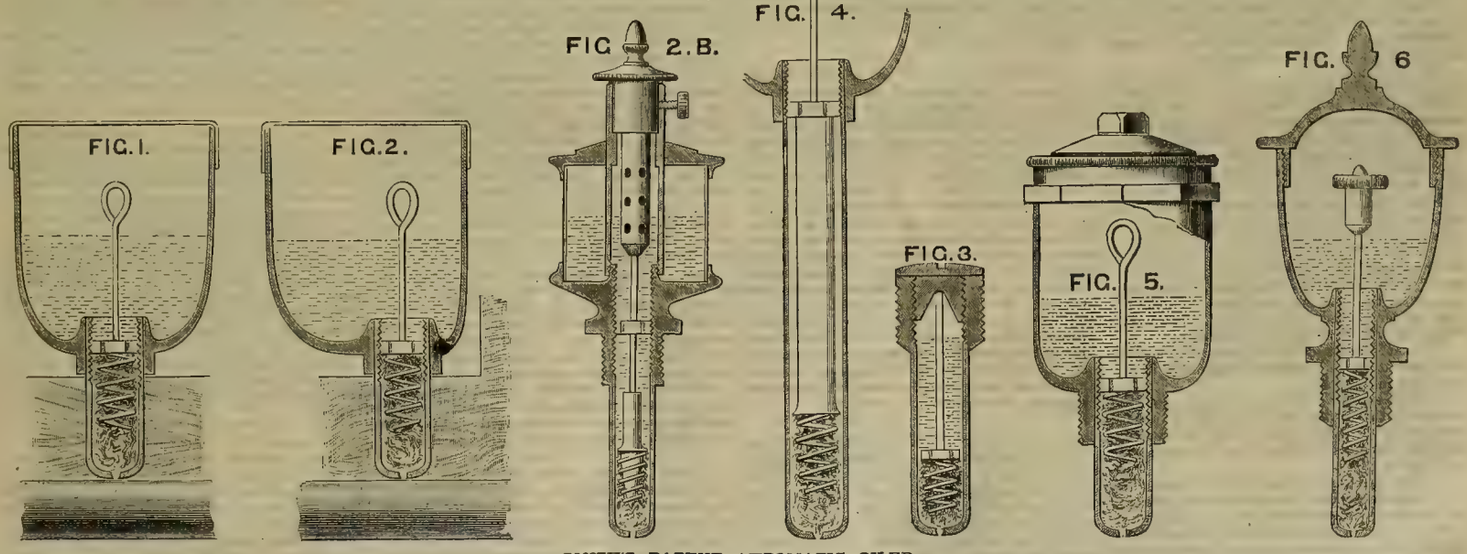
The experts in the photographic ranks conclude from their experience that the plates should be exposed for different lengths of time on inner and outer corona. That is, one that will be correct for outer corona will not be for the inner, and vice versa. The best general result will be given on a quick plate exposed for three seconds. When the comparative sensitometer tests are completed, after the occurrence of the next full moon, the exact photographic value of the light of the corona will be determined, which will be of value to future observers. Careful records of the exposure, etc., of each negative made have been kept by the observers, so that when all are collected and compared deductions can be drawn which will simplify the photographic work during future eclipses. Photography never played so important a part in an astronomical event as on this occasion.



THE INNER CORONA.



THE OUTER CORONA.



SMITH'S PATENT AUTOMATIC OILER.

THERE is talk of introducing the Russell process on the Comstock.

MECHANICAL PROGRESS.

Imperfections in Tin Plate.

All persons who are familiar with tin plate must be aware that very soon after use, and not infrequently before use, distinct black spots, as of rust, appear at various points on the surface. These spots are not only unseemly in appearance, but are points where small holes are apt to appear. These holes are sometimes infinitesimally small, but sufficient to work great damage and loss, especially in canned goods, and the importance of preventing their occurrence cannot be over-valued. It has been stated that "a plate which could be guaranteed free from black spots would command the maker's own price." It is very generally acknowledged that this defect is becoming more and more prevalent.

The cause of the appearance of these spots has long been a matter of serious inquiry. The United States being the chief consumer of tin plates, their quality here is a matter of very great importance, and the trade of this country has been especially earnest in a study of the phenomenon, but hitherto with but little satisfactory result.

The subject has recently been taken up by Herbert S. Sutton of England, who read a paper descriptive of his investigations before the late meeting of the Swansey Society of Mining and Metallurgical Industries. In that paper he says: "Considerable diversity of opinion has prevailed as to the cause of 'black spot,' one manufacturer holding it to be due to some condition in the tin used, another to the acid used in the 'pickling,' by others it has been attributed to the grease employed in the initial stage of tinning, and by some to a sort of galvanic action set up during railway and other transit of the finished plate. The opinion I have formed is that it arises from neither of these, but that it is the result of an element in the iron out of which the plate has been made."

The same writer describes the defect as follows: "A box of tin plates, after passing usual scrutiny of the assorting-room, may be sent out, properly packed in a dry box, and even with sheets of tissue paper between each plate, yet, on reaching its destination, although the journey be a short one (I know a case in which the journey was only 12 miles by rail), on being opened will often present on the surfaces of many of the plates a small spot about the size of a pin's head, and sometimes larger. As a matter of mere appearance, these markings might possibly in many cases be of little importance, but on examination it is found that they are due to the fact that the tin coating which had covered them is gone, and that a certain element upon the surface of the iron of a dark color is exposed. This is black spot. The tin being removed, oxidation of the iron soon begins, and what might have been disregarded as a mere matter of appearance soon becomes a hole, which vitiates the article wholly."

Mr. Sutton in the course of his investigations claims to have obtained the positive result that the cause of the black spot was the presence of a foreign body, which became incorporated in the iron in the course of production, to which the tin would not adhere, and was in no way superficial or upon the tin coating as has been asserted. He says: "I found this body to be of a graphitic nature, which may generally be described as a compound of carbon, silica and iron, and of a very infusible nature."

Mr. Sutton continues: "It is a known fact in metallurgy that graphite can be artificially produced, and it is certain that both in the smelting of iron ores and in the treatment of metallic iron this element *is incidentally produced*. If the graphitic element which I have indicated be the producing cause of black spot, and, further, if it be attendant upon the production of pig iron as well as in the manipulation of it for tin-plate purposes, the question fairly arises, Did it occur when cold blast iron was used? We will take the cold blast iron to be the type of the highest quality, especially if made from argillaceous ironstone. So far as I can learn, the ores produced from this class of iron are not subject to black spot." The writer winds up with the following summary:

1. That black spot in tin plates is caused by the presence of a graphitic compound in the iron forming its body.

2. That the tin coating of the plate does not adhere to the surface offered by this compound, but is merely carried over it by its own continuity, and readily breaks away by concussion or friction.

3. That the graphitic compound is producible, and no doubt often is produced in the smelting of iron ores and the manufacture of pig iron.

4. That it is also producible in the manufacture of tin plates when the pig iron employed is subjected to great heat in connection with siliceous or impure fuel.

5. That its formation is less frequent in the methods by which steel bars are made, and that when it does occur herein it is probably due to the use of pig iron in which it has been primarily produced in the blast furnaces.

THE OLDEST PIECES OF WROUGHT IRON now known are probably the sickle blade found by Belzoni under the base of a sphinx in Karnac, near Thebes; the blade found by Colonel Vyse, imbedded in the masonry of the great pyramids; the portion of a crossout saw exhumed at Nimroud by Mr. Layard—all of which are now in the British Museum. A wrought bar of Damascus steel was presented by King Porus to Alexander the Great, and the razor steel of China for many centuries has surpassed all European steel in temper and durability of edge. The Hindoos appear to have made wrought iron directly from the ore, without passing it through the furnace, from time immemorial, and elaborately wrought masses of iron are still found in India, which date from the early centuries of the Christian era.

How Sheffield Cutlery Is Made.

The Sheffield cutlery—one of the glories of England—is not made by machinery; it is chiefly made by hand. There are at Sheffield a few firms which manufacture cutlery right through from the making of steel to the finishing of tools, and employ wage-workers, and yet even these firms—I am told by my friend, E. Carpenter, who kindly gathered for me information about the Sheffield trade—let out some part of the work to "small masters." But by far the greatest number of cutlers work in their homes, with their relatives, or in small workshops supplied with wheel-power, which they rent for a few shillings a week. Immense yards are covered with buildings, which are subdivided into series of small workshops. Some of them cover only a few square yards, and there I saw smiths hammering, all the day long, blades of knives on a small anvil, close by the blaze of their fires. Occasionally the smith may have one help, or two. In the upper stories scores of small shops are supplied with wheel-power, and in each of them three, four or five workers and a "master" fabricate, with the occasional aid of a few plain machines, every description of tools—files, saws, blades of knives, razors, and so on. Grinding and glazing are done in other small workshops, and even steel is cast in a small foundry, the working staff of which consists only of five or six men. When walking through these workshops I easily imagined myself in a Russian cutlery village, like Pavlovo or Vorsma. The Sheffield cutlery has thus maintained its olden organization, and the fact is the more remarkable as the earnings of the cutlers are very low as a rule; but even when reduced to a few shillings a week, the cutler prefers to vegetate on his small earnings than to go as a waged laborer in a "house." The spirit of the old trade organizations, which were so much spoken of five-and-twenty years ago, is thus still alive.—*The Nineteenth Century.*

IS THE PLANER A NECESSITY?—AND IF SO, WHY?—The *American Engineer* asks: Why is not the planer a better machine than it is? Why has not this very essential tool been brought to that state of perfection that other great labor-saving machines have attained? Builders of them have not paid that attention to this hard-worked and tireless piece of machinery that they have to other wood-working tools. The demand for a smoother to do the very smoothest of surfacing is a want which has long been felt, and we notice that such a machine has been recently devised by the Egan Company of Cincinnati, Ohio, and exhibited at the late centennial exhibition in that city. This machine is said to work off the surface of any wood to a perfect polished surface as smooth to the touch as glass. The machine attracted much notice, and was awarded a special medal. Such a machine must prove of great service in all wood-working shops.

TUBE-MAKING AS A LOST ART.—It is wonderful how an art or system of manufacture may be lost sight of for centuries. Tube-making is now one of the most important branches of the iron and steel trades. Less than a century ago iron pipes did not practically exist in Great Britain, and yet it is undeniable that the use of pipes dates back to a very early period. In a description of the palace of Abdurrahman III, extant about A. D. 750, and situated at Zehra, in Spain, we find that metal pipes were used to convey both hot and cold water to the marble baths. A year after the battle of Waterloo iron flange pipes were cast in 2½-feet lengths, and packed at the joints with old hats. In 1811 and 1817 patents were taken out for welding barrels of firearms, and in 1824 Mr. Jas. Russell took out a patent for constructing iron tubing, but about a year after Mr. Whitehouse took out a patent for an improved system, which was the beginning of our great tube industry.

THREE HUNDRED MILES AN HOUR BY RAILROAD.—A railroad is being constructed in Baltimore, the speed upon which is expected to be 300 miles an hour. It is not for passenger travel, however, but for parcels. The cars will be driven by electricity through a tube two feet in diameter, and are expected to be perfectly under the control of the operator. If the experimental line now building should be a success, a line will be built, probably, between Baltimore and Washington.

TEN-INCH STEEL TARGET PENETRATED.—An important experiment was successfully made at the Naval Academy proving ground at Annapolis, on the 21st ult. A steel-pointed iron projectile weighing 250 pounds was fired from one of the new steel breech-loading rifled guns of the new cruiser Chicago, which penetrated a steel target ten inches thick and cut through a solid oak back. The experiment is considered as likely to have an important bearing on modern naval warfare.

SCIENTIFIC PROGRESS.

Oil on the Waters as a Preventive of Fogs.

Brand's Dictionary of Science, Literature, and Art, under the head of "Fog," says:

"Fogs in general are the consequence of the nocturnal cooling of the atmosphere. The air, by its rapid cooling, becomes surcharged with moisture, a part of which, being precipitated in the form of a cloud, gives rise to the ordinary fog. During the day the heat of the sun generally disperses the fog, because the quantity of moisture which the air is capable of holding becomes more considerable in proportion as its temperature is increased. In calm weather the surfaces of rivers, lakes, etc., are frequently in the morning covered with fog. The reason is this: During the night the air is cooler than the water; the strata of air in contact with the water are constantly heated, and become saturated with moisture. The mixture of the vapor with the air, together with its elevation of temperature, renders the air specifically lighter. It rises in consequence, and, mixing with the cold air in the superior strata, is cooled, and precipitates its moisture," etc.

In commenting upon the above, a correspondent of the *Scientific American* says:

It is obvious that the above explanation applies equally to the giving off of visible vapor —the "smoking," as it is commonly called, of hot water when standing in any uncovered open vessel.

Now, in this case, as I have found by experiment, though no doubt any practical scientist could have assured me of the result in advance, it needs but a small quantity of oil poured upon the "smoking" water to arrest at once the process of its visible vaporization.

Reasoning from this fact, I should suppose that there might be other uses for pouring oil upon the water than the quieting of the waves. I take it for granted that the fogs most dangerous to navigation are precisely those still fogs due to sudden though slight changes in the relative temperatures of the water and air, which are illustrated upon a small scale in the "smoking" of hot water in an open basin, and which can be prevented or stopped by the use of oil.

Again, if oil is effectual to prevent the vaporization of water, why may it not have a possible most valuable use in river or seaport settlements, to arrest the spread of malarial diseases, and even of yellow fever?

THE MYSTERIES OF VISION.—Emil Sorel, in *La Nature*, says: "There are days on which, in certain weather, and despite the curvature of the earth, the distance of visibility is doubled, or more than doubled. This phenomenon is explained to us by a well-known law of physics. If we throw a coin into an empty vessel, it will be hidden by the edge of the latter, at a certain distance; but if we fill the vessel with water, the coin will become visible. We have here a case of refraction, such as is explained in elementary works on physics. Every one also knows the theory of the mirage put forth by the celebrated Monge, who explains the phenomenon as due to a diminution of the air's density in contact with the superheated earth. A contrary theory will explain the mirage at sea. While the sun is making the atmosphere intensely hot, the sea and the strata of air in contact therewith remain relatively cold, and these strata become superposed in the order of their density. A luminous ray emanating from the sea will pass from one stratum into another of less density, there will be a refraction, and an object beneath the horizon will be seen above it. This theory supposes two conditions, to wit, a heating of the atmosphere, while the sea and the earth remain relatively cold, and a calmness of it to permit its strata to become superposed in the order of their density. It is precisely when these two conditions are fulfilled that the phenomenon of the mirage occurs. On such days ships rise instead of descending in measure as they recede. As the horizon is perceived by direct visibility, a ship is finally seen above the horizon as if it were suspended in the air. It is the famous 'phantom ship,' familiar to sailors—a visible ship in its natural upright position. If atmospheric conditions were favorable, a second ship would be seen above the first, etc. Certain mariners worthy of credence have assured me that they have seen as many as seven superposed ships.'

A NEW PROCESS for the rapid generation of hydrogen is described in a recent impression of the French journal *La Nature*, which appears to be well worth the attention of those interested in the subject. From the account of the process referred to, the purpose of the invention is presumably to generate the gas for the inflation of balloons for military uses. It is as follows: We are informed that Messrs. Majert and Richter have devised, had constructed, and successfully experimented with, at Berlin, an apparatus that does away with the inconveniences of former processes. The hydrogen is obtained by heating a mixture of slaked lime and powdered zinc, the carriage of which on a campaign is rendered easy by inclosing it in tin cartridges. The water of the slaked lime is decomposed by the zinc, and, as a result, there is obtained a pure gas, free from arseniated hydrogen, which is so dangerous to man, and from sulphuric acid, which is so injurious to the balloon. The apparatus for producing the gas is heated by any combustible whatever. It is in the form of a small locomotive, and is easily drawn by four horses. In front, there is a seat for two men, which can be removed in a minute and be replaced by a chimney. The fire is started, and in six minutes the cartridges are red-hot. As soon as this temperature is reached, the cartridges are introduced into the retort, and five minutes afterward the production of hydrogen goes on normally. With 120 cartridges, about 390′ per hour are obtained. A military balloon of ordinary dimensions can, therefore, be inflated in three hours.

TERRIBLE VOLCANIC DISTURBANCE.—Scientists are not done with the study of the great volcanic disturbance at Krakatoa in 1883. The long-looked-for report of the scientific commission which investigated the great volcanic eruption of Krakatoa in 1883 has at last made its appearance, and it seems strongly to confirm the theory that the famous "red sunsets" of that time were caused by the canopy of dust and steam thrown up by the tremendous convulsion of nature. So great was the explosion of the burning mountain that the noise was heard over one-thirteenth of the total surface of the earth. At Bavaria, 30 miles away, buildings were wrecked by the concussion. In Ceylon, 2000 miles away, a sound as of heavy guns was heard. At Rodriguez, nearly 3000 miles away, it was distinctly heard, like the roar of distant artillery. The sea wave caused by the upheaval was perceived as far away as the English Channel, while a great atmospheric wave swept three times from Krakatoa to the antipodes and back again. Fully 1⅛ cubic miles of rock were hurled into the air, some fragments reaching a hight of 17 to 23 miles. It is not difficult to believe that enough of this dust and vapor were wafted to this side of the world to produce the beautiful phenomena that were the wonder and delight of every observer of the sunsets. And yet it is but reasonable to suppose that this was but a mild phase of volcanic energy when compared with that which so often must have shaken the earth and sea during the great volcanic period which occurred about the time that man first made his appearance on the earth.

THE DURATION OF LIGHTNING FLASHES.—It is well known that the lightning flash, or the spark between the terminals of an influence machine, exists for so short an interval of time as to be beyond measurement by any ordinary means. But notwithstanding the acceptance of this knowledge the peculiarities of some of the flashes photographed have been supposed to be due to the camera, or the sensitive plate, being at the time in a state of vibration. To test this line of thought, Mr. James Wimshurst, according to *Engineering*, has made a dark slide for his camera, in which is fitted a train of clockwork carrying a disk, upon which is an arrangement for holding the sensitive plate. When all is complete for photographing a flash the clockwork is wound up, the sensitive plate then rapidly acquires great velocity, which at the maximum reaches 2500 revolutions per minute, and with the plate rotating at this speed the spark is photographed. A photograph taken under these circumstances in no way indicates movement in a sensitive plate, for the photograph throughout its length is as sharp and as clear as though the plate had been at rest. The experiment is interesting, for it not only shows the infinitely short existence of the spark, but it also shows that chemical change in the sensitive film takes place in an equally minute interval of time.

WHEN ARE PETROLEUM VAPORS EXPLOSIVE?—Since the recent explosion of a petroleum vessel in Calais harbor, experiments have been made to determine what proportion of petroleum vapors mixed with a given amount of air will form explosive compounds. In mixing ordinary illuminating gas with air it is found that one part of gas to eight of air gives the most violent explosion, and with the vapor of the volatile portion of petroleum nearly the same observation is made. With one part petroleum vapor to five of air no explosion takes place. With six parts of air there is a feeble explosion, and with from seven to nine parts a very violent one. With 12 parts of air the detonation is still violent, but with 16 parts it becomes feeble, and with one part vapor to 20 of air there is ordinarily no explosion.

POTELINE.—This is the name of a mixture of gelatine, glycerine and tannin, to which sulphate of barium, or of zinc, may be added, and which may be colored by vegetable colors. It may be kneaded while warm. When cold it may be used for numerous purposes. It can be turned, filed, bored, polished, and can be used for hermetically sealing bottles, etc. The proportion of ingredients varies according to the uses. For sealing bottles, of course, it must be used liquid. Potel, the inventor, uses it with success for preserving meat, by applying it liquid, at a temperature of 50° to 60° C.—*Jour. de Ph. d'Als.-Lorr.*

THE RESISTANCE OF SNOW TO PROJECTILES.—In Norway it has been discovered that snow offers a considerable resistance to projectiles. A colonel had a snow-trench 2 meters 50 centimeters thick built, and three shots were fired at it from a distance of 33 meters. The balls only penetrated to the distance of 1 meter 20 centimeters, and were found entirely shapeless.

USEFUL INFORMATION.

FEATHER-BONE.—Among the various substitutes for whalebone that have been introduced, the latest is what is termed feather-bone, made from the common feather or quill of the chicken, goose, turkey, etc., the larger ones only being used, especially such as are thrown aside by the feather-duster makers. In this process, the quill is first stripped of its plumage, which latter is saved and used for making mattresses, and then run through a small machine, consisting of two rollers, a knife splitting it in the center, the pith being next removed by a small rasp-like wheel. The quill now passes to a machine comprising two sets of fine circular knives running together, by which it is slit into small sheets, the length of the quill; these are taken to the winder, a small funnel-shaped machine with winder attached—a sort of thread spool at the mouth of the funnel—on which the quill shreds are wound together in a compact roll of one-sixteenth to one-eighth of an inch in diameter In this condition it is used to produce the bone, three or more being wound together by a similar machine, except that, instead of being singly wound, the winding is doubled by having two winders running in opposite directions. These are then stitched together lengthwise between the cords, by means of a common sewing machine, making it very compact and fine.

A PECULIAR INDUSTRY.—Under the above head a current paragraph gives the following particulars of the product of the castor bean: The oil is especially adapted for lubricating all sorts of machinery, clocks, watches, etc ; and it is an excellent lamp oil, giving a white light far superior to that of mineral oil, petroleum, rapeseed, linseed, and all other oils, whether vegetable, animal, or mineral; it also gives very little soot, and, all things considered, has been pronounced the cheapest oil known. All the great perfumers of London and Paris use castor oil for the manufacture of golden oil, so well known for its property of keeping the head cool, and the skin and its pores, as well as the roots of the hair, soft and open. The oil is used for textile fabrics to fit them for dyeing or printing, for which purpose the Indian dyers and printers invariably employ it; and it is one of the best oils for dressing tanned hides and skins of all kinds, on account of its imparting to them such a degree of strength, durability, tenacity, and beauty. From the oilcake, in addition to its other uses, a gas is obtained which gives a superior light, some of the stations on the East India railway being illuminated in this way. The oil dissolves completely in alcohol, and this, incorporated with a solution of copal, makes a varnish which, it is said, is very useful in polishing all kinds of first-class furniture, carriages, picture frames, cloths, canvas, etc.

A PLUMBER'S NEW TRICK.—The *Sanitary News* describes a plumber's new trick, which has been first discovered in Milwaukee, but may be known elsewhere, so that architects and inspectors will do well to be on their guard against it. In Milwaukee, as in many other towns, all soil pipes put up in dwelling-houses must be tested by filling them with water. A certain firm, knowing that a defective pipe had been used, contrived to plug it with clay, so that the water applied for testing it did not enter the pipe at all. It is not stated how the inspector happened to find out this ingenious deception, but plumbing inspectors become wonderfully expert in observing suspicious indications, and the offending firm was reported and punished by having its license revoked until the defective pipe should be replaced by a new one. Most persons will say that the revocation of the license ought to have been made permanent.

THE FLOW OF LIQUID THROUGH PIPES.—A cylindrical pipe flowing full, discharges less than the same pipe when only filled through a segment whose arc is 281° 30 minutes by 2.5 per cent, while the velocity is less by 9 5 per cent, the hydraulic inclination being the same. The full section discharges less, and also with less velocity, in other forms of pipes as well as in cylindrical. The scouring power of circular pipes flowing full is therefore less by nearly 10 per cent than that of the same pipes filled through an arc of 281° 30 minutes, a new element to be considered in the arguments for and against circular pipe sewers.

VARNISH FROM SUGAR.—The *Scientific American* advises the use of a varnish of sugar. This is made as follows: Dissolve equal parts of white and brown sugar in water to a thin syrup, add alcohol, and apply to hot glass plates. The film dries very readily, and furnishes a surface on which it is perfectly easy to write with pen or pencil. The best ink to use is India ink, with sugar added. The drawing can be made permanent by varnishing with a lac or mastic varnish.

A LONG PIPE LINE.—The completion of a pipe line from the Lima oil-fields to Chicago and the successful transportation of oil through a line 200 miles long with the propulsion of one mammoth pump, is regarded as a triumph of engineering skill and enterprise.

DRAFT OVER DIFFERENT PAVEMENTS.—Mr. Rudolph Hering, C. E., is authority for the statement that the load which one horse can draw on an asphalt pavement will require two horses on the best Belgian block, three horses on ordinary Belgian block, five and one-fifth horses on good cobble-stone and seven and four-fifths horses on bad cobble-stone.

USE FOR OILY ROPES.—The old oily ropes gathered up around oilmills, etc., are now utilized in the manufacture of heavy manilla paper, such as is made into bags for grocery-stores. Cables that have been used in boring an oil well are considered especially valuable. The collection of these worn-out ropes throughout the oil regions of Pennsylvania and Ohio has become quite an industry among the representatives of paper manufacturers.

HANDLE KEROSENE, benzine and gasoline by daylight only. Where gasoline is stored, see to it that there is ventilation from beneath, as the vapor from it, which is heavily explosive, is heavier than air, and will not ascend, but must be allowed vent below. If these precautions are observed closely, the danger of fires from these inflammable fluids will be reduced to a minimum.

STEEL WIRE MATS, a new article in metallurgical industry, are fast coming into use. They are made from steel wire, with steel frame and steel braces, all perfectly galvanized, and are wear and weather proof, are self-cleaning, require no shaking, and by the slightest scrape, snow, ice, mud, clay and water are wiped out of sight.

METALLIC PENS NOT OF MODERN INVENTION. At Acosta a Roman metal pen has been found. It is a bronze pen slit in exactly the same fashion as the present steel pen. The Dutch invented a metal pen in 1717, but it was not until many years later that the hand-screw press, which made the first cheap steel pen, came into use.

FOR REMOVING OLD VARNISH.—A mixture for the removal of old varnish has been patented in Germany by a Mr. Meyer. It is obtained by mixing 5 parts of 36 per cent silicate of potash, 1 of 40 per cent soda lye, and 1 of salammoniac (hydrochlorate of ammonia).

CASTOR-OIL LEAVES, fresh from the plant, bruised or rubbed in the hands, and then stuffed tightly into a stiff boot or shoe and left to remain for 12 or 24 hours, according to the character of the leather, will render the same quite supple—so it is said.

A GERMAN is reported to have invented a paper that resists the action of both fire and water. Asbestos, aluminum, sulphate, chloride of zinc and resin soap are the ingredients.

THE largest carpet in the world has been on exhibition at the Cincinnati exposition. It contains 2700 square yards.

GOOD HEALTH.

Points About Pneumonia.

According to a medical contemporary, Dr. Gouverneur L. Smith of New York has just given some interesting and startling facts in regard to pneumonia. Dr. Smith points out that the disease is becoming worse every year, increasing rather than decreasing, both in the number of cases and the percentage of mortality. The statistics of the Pennsylvania hospital show that the mortality from pneumonia there advanced from 15¼ per cent in 1847 to 31 per cent in 1886. Similarly, in the New York hospital the ratio of mortality from this disease is more than double what it was in 1878. Thirty or forty years ago it was regarded as serious, but it did not excite anything like the alarm it does to-day. Dr. Smith is rather inclined to believe that the medical art, instead of progressing in its treatment of pneumonia, has actually gone back, and holds that the old methods of treating the disease at the time it was less deadly have been abandoned for methods more finical, but less efficacious.

Symptoms of Approaching Pneumonia.

Dr. J. B. Johnson writes in the *Medical Summary* as follows:

The approach of pneumonia is not always without warning. There are usually certain feelings or sensations of the body which tell, with greater or less certainty, that an attack is beginning. An individual, for a day or two prior to the actual invasion of the disease, feels badly in a general way. These bad feelings consist of a chilliness of the whole body, and if his clothes be at all damp with perspiration he feels cold and uncomfortable. He is feverish, and yet it seems impossible for him to get warm. This feverishness is attended with great chilliness, which increases when he is exposed to a draft of cold air.

As evening approaches all these bad feelings are increased, and when night comes on he has pains in his back and limbs, accompanied by a slight cough and unnatural frequency of breathing, with unusual quickness of the pulse and a feeling of uneasiness or oppression about the chest. His sleep is disturbed by chilliness, restlessness and unpleasant dreams. The warmth of his bed and bed-chamber may cause a slight cessation of his bad feelings, and in the morning, feeling better, he goes out attending to his business, only to have all his bad feelings return with increased force at the approach of the coming night.

Should he heed the warning implied by the return of his bad feelings and confine himself to an equal temperature of about 65 degrees, and partake of copious drinks of hot tea, coffee or milk, he may possibly avert an attack of the disease. But, unfortunately, he is apt to neglect to do this, and his going about is only arrested by an actual invasion of pneumonia, which usually comes on in from one to three days.

HOW TO BREATHE WHEN READING.—M. Legouve tells the anecdote of Talma watching the actor Dorival from the prompter's box until he had discovered his secret, which consisted in always taking a fresh breath before the last one was quite exhausted, and in doing his best to conceal the beginning of each phrase by starting whenever he could on an a, e or an o—"that is to say, at the point where the fact of the mouth being already open makes it possible to take breath lightly without the action being perceived." Again, Delle Sedie, the celebrated singer, could run up and down the scale in front of a lighted candle without the flame wavering. "How is this done?" It is because he employs exactly the quantity of breath needed to carry the sound of the notes. If you or I were to try it we should simply waste our breath. In the chapter on "Pronunciation" M. Legouve insists, and the point can scarcely be too much pressed, on the value, the absolute need, in fact, of clear articulation as opposed to mere exertion of voice. This he illustrates by a story of Bouffe when he was playing Pere Grandet in the "Fille de l'Avre." When he came to the most touching scene of the piece, when the old miser finds that he is robbed, the actor began to scream out the words as he was accustomed to. At the end of a few minutes the sound died away on his lips, and he was compelled to continue in a murmur. What happened? That he was a thousand times more true and more touching than before, because he was obliged to make up for weakness of voice by force of articulation. It is true that one cannot speak without a voice, but voice alone has so little to do with diction that there are readers, orators and actors to whom the very extent of their voice is a drawback. Unless they are skilled in articulation the volume of sound devours the sense.

DIFFERENT PHASES OF "MIND CURE."—Now that all forms of mental healing are much talked of and largely adopted, it might be well for the public to know that the disciples of the different schools resent the common practice of outsiders bulking them all under the head of "mind cure." Mind enters into each one, to be sure, but in different forms and through different doors. They who practice "Christian science" draw healing force from the Infinite Mind, and consider their own minds as at most a mere telegraph line through which the vivifying power reaches the patient's mind. Plain "mind cure" works by the operation of the healer's individual mind on the subject, and partakes of what is known as mesmerism or hypnotism. "Faith cure" and "prayer cure" are one and the same, both relying upon faith to override disease. If any one doubts that the healing of disease by mental methods is going on briskly in this city, let him drop into the offices of some of the best-known practitioners and see the collection of patients waiting hour after hour in order that each may get a treatment. Nine o'clock is the hour for beginning the business of healing. An hour before that, six and eight patients are in readiness to get their slice of life and health as drawn from the infinite source of all life and wholeness. From that time on until the office closes at night it is never empty, and most of these reach a point when they declare themselves healed.—*New York Press.*

EFFECT OF PETROLEUM ON THE HUMAN BODY.—A German physician has recently issued a report of his observations on the effects of petroleum on the human body. The facts on which his conclusions are based have been gathered during extensive travels in the American petroleum districts. He found that a skin disease was very prevalent among the workmen who were employed at the wells, and on closer examination he concluded that the disease especially attacked those who were engaged with the heavier and more inflammable oil. Numerous cases were discovered of large quantities of petroleum having been swallowed, with the result of violent affections of the stomach, kidneys, and nervous system. In one case where a glassful of petroleum had been drunk, the greatest difficulty was experienced in preventing the patient from falling asleep, an eventuality which is especially fatal in such instances. Symptoms of poisoning could also be traced after a lengthened period of inhalation of the vapor, but the symptoms were only noticeable when the subject was in a bad state of health.

AN ILL TURN.—The people at large are too ignorant, too much afraid of pain, too unwilling to deny transient enjoyments or to be governed by hygiene, to pay physicians for wisdom if they tell them they need nothing but cleanliness, exercise, and moderation. They turn to the quack, the patent-medicine bottle, the paregoric, Jamaica ginger (another name for spiced rum), patent gas, or any one of the thousand ways of trying to escape the penalty of continuing to act as though nature's laws were a fraud. —*Christian Advocate.*

Electricity and Plant-Life.

From time to time, of late years, says the *Scientific American*, experiments have been made of the effect of the electrical light on flowers and plants, with results seemingly the same, to wit, feeble efforts of some plant to prolong their periods of bloom into the night and then premature decay. One has only to study their actions, as observed, to conclude that even plants need rest, or to be more precise, they seem to thrive best under the conditions which Nature has imposed—the period of darkness and the period of the light which is heat as well, or else that the family of plants, as they now are, sprung from these exact conditions, and will not thrive without them. It is the nature of some flowers, as every one knows, to open at one period of light and close at another; of others to open only at night and close before or at the moment when the orb of day tops the horizon. So strictly do some of these follow their unwritten laws, that floral clocks have been constructed, so that one may step out into his garden, of a bright day or clear night, and learn the time by the condition of bloom on the floral dial.

Prof. Wollney of Munich, satisfied by experiment that electrical light will not advance or improve plant growth, recently tried the effect upon them of the current itself. We quote the following, being the means employed and its result:

He "took patches of ground 12 feet square, separated by boards penetrating the earth to the depth of a foot. In one case he applied two earth plates and interposed five earth cells; in another he inserted an induction apparatus; and in a third, a plate of copper at one side and a plate of zinc at the other side to form a natural battery. Peas, potatoes, carrots, etc., were planted on these and other patches; but the electricity, whether of high or low potential, seemed to have either no influence or a bad one upon their growth."

Plants being full of sap, and sap a fairly good conductor, every fiber must have been reached, and, so far as the professor was enabled to perceive, the only effect of the current was to provoke a perturbation on the protoplasm.

Waste in Power.

With high-speed machinery and shafting driven at 300 turns per minute, it takes but a small resistance to waste a large amount of power. A load of only ten pounds on a three-foot wheel will call for one-horse power from the coal pile, and a light belt left dragging on the pulley will offer more than ten pounds resistance. The Emerson power scales were recently applied to a pulley where the belt when thrown off and hung up out of the way would rest on a short arc on the driving-wheel, and it was found that this pulley required more power than was used on the machine it drove when the belt was in motion. Leather has a wonderful clinging tenacity, and wherever it is allowed to drag on the framework or guide-bars, or in some of the belt-holes when the bolt gets slack, more or less power will be absorbed, though the wear of the belt may not be noticeable. We have seen the set-screw of a pulley slip and draw the shaft along in the bearing till one of the larger wheels rested against a floor beam, the rim cutting into the wood and the beam, making use of the friction brake in absorbing power till the line of shafting was brought into place. Belts that have been overstretched by having more to do than they are able to manage are not apt to run true on the pulley, and where the faces of the wheels are no wider than the belt they must not run very close to the framework, as the projecting edges of the belt may strike and offer a large amount of resistance. When there are indications of frictional resistance by the room becoming filled with the fumes of belt grease, there is a chance for some one besides the fireman to make a saving in coal, if it is nothing more than to remove the oiler's ladder that is grinding its way into the space between the fly-wheel and brickwork.—*Exchange.*

The *Safety Valve*, in commenting upon the above subject says: "If a belt be thrown over a stationary pulley and one end loaded with 100 pounds, it will be found that on an average it will take 400 pounds on the other end to make the belt slip. There is no certainty about quantity, however. Under exceptionally favorable circumstances of belt and pulley, it may take 1000, and under very unfavorable conditions it may slip with only 200 pounds.'

BLAST FURNACES THERE AND HERE.—Of the 877 blast furnaces in Great Britain, 425 were in blast two months since, and 452 were out. On the same date 298 furnaces, with a capacity of 126,082 tons per week, were in blast in the United States, and 296 were out, with a weekly capacity of 82,147 tons per week.

THE ELECTRICITY in a flash of lightning would seem from a careful scientific observation to be much less than is generally supposed. Prof. Kohlrausch has recently estimated that quantity. He finds that from 7 to 35 flashes would be required to keep an ordinary incandescent lamp alight for an hour.

A TALKING NEWSPAPER, or a daily composed of phonographic records, is the latest idea with which the New York *World* credits Mr. Edison.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

VALPARAISO.—*Dispatch*, Jan. 5: The Huntington roller-mill at this mine is giving good work. In two weeks 104 tons of rock were crushed. The last cleanup netted over $1500.

DRYTOWN CON.—The work on this property is moving along steadily. They will haul their pipe next week and put it in place at once. The directors will meet in a few days and give the contract for the water-hoist. They will push work to all possible speed and expect to see the bottom of the 300-foot shaft in about three months, where there is a 5½-foot ledge of ore that did pay $1.70 per ton in free gold and 1½ per cent sulphurets that are worth $90 per ton, at the last working 12 years ago. From the surface down to the 250-foot level the ore averaged $10 per ton and the sulphurets worked over $100.

NEW YORK MINE.—This mine, which is southwest of Jackson about three miles, is looking well. The superintendent, Mr. Anderson, showed us some rock this week which looks good. This mine is worked by a tunnel which is in 426 feet, with a depth of 200 feet from the surface. The ledge is 20 feet wide and all of the rock is good milling ore. Four men are kept constantly at work. As soon as the wet season is over a large mill will be built on this property.

READ & ASKEY.—The new 10-stamp mill at the Read & Askey mine was started last Monday morning, on good ore from north tunnel. The tunnel is now in 300 feet and shows a ledge from four to five feet wide. The rock will average about $15 per ton. The McKenzie mill is idle and will so remain for about two months. Lack of water is the cause of the standstill.

GOVER.—They turned the water into their new pipe Saturday, which leaks like a sieve. It will take some days to get the joints sufficiently tight to carry enough water to run with. The mill has closed down to make the connection, and will start up Sunday. They will turn water on the hoist in about two weeks.

OVERPLUS.—This mine is idle for a few days, as Mr. Goodman is in San Francisco. The ore is very hard, and the mill was closed down one-third of the time for repairs. The last 10 days' run turned out $1000 in free gold and sulphurets.

COSMOPOLITAN.—They are still pushing the east crosscut ahead; face of drift is hard slate; the ore body cut is 35 feet wide. The south drift is in 45 feet, the face is soft slate.

NORTH STAR. — It is reported that they have stopped sinking the winze on this property, and are driving the tunnel south as before with good indications.

COSMOPOLITAN MINE.—The shaft is down 500 feet, and a crosscut 38 feet and is not through to the hanging-wall. There is a good outlook for a mine.

NORTH CAROLINA.—They are still taking out ore and filling up the mill. They wish to get 250 or 300 tons ahead of the mill before starting.

ALPI MINE.—The company organized to work this mine has been incorporated.

Calaveras.

INDIAN CREEK.—Calaveras *Prospect*, Jan. 4: From Indian Creek we learn that a large spring of water was struck in the lower level of the Esmeralda mine, causing the temporary suspension of work in that level and filling the shaft for more than 100 feet. The spring has now greatly decreased and, once the accumulated water has been hoisted out, will be easily taken care of. A number of promising prospects are being found in this locality, notably two locations by George Hengen and one made by Maroc, the Australian. Some of the rock from one of Hengen's claims is remarkably rich in free gold for rock that is not pocket.

MURPHYS.—Cor. Angels *Record*, Jan. 1: There is little mining news at present. The usual amount of prospecting is being done, but no new developments are recorded. The Norfolk company continues to prosecute its work with vigor, adding a few men from time to time as they have room for them.

Fresno.

BITUMINOUS COAL.—Fresno *Expositor*, Jan. 2: "Yes," said Thomas E. Hughes this morning, "we feel very much encouraged over our coal developments in the Coast Range. We have had five men prospecting for coal for several months and we have succeeded in locating three well-defined veins which promise an abundance of fuel. The largest vein is five feet thick, the next three feet, and the smallest 16 inches. It is bituminous in its nature and strongly resembles the Seattle coal, only I think it is a better heat-producer. That has not yet been determined. We are prospecting now to see what is in the range. Our company stands ready to assist in building a railroad across the country to the coast. We are ready at any time to give $30,000 toward the construction of such a road." Mr. Hughes showed a specimen of the coal. It was hard, of very bright color, and no amount of hand friction would soil the fingers. An unlimited five-foot vein of bituminous coal in the Coast Range opposite Fresno means everything for the people of this fertile section. In conversation with another member of the company he stated that the vein was well defined and promised handsome yields. As soon as the weather settled so they could get into the mountains, it was probable a large force would be put to work getting out the fuel.

Inyo.

GOLD ORE.—Inyo *Independent*, Jan. 5: For some time past Isaac Hitchcock and his brother-in-law have been at work opening up a mine in the Alabama hills near Lone Pine. They now have a quartz ledge opened about 200 feet. The ore carries gold and copper. Worked in an arastra the ore is said to yield $60 per ton in gold. It carries a high percentage of copper. Some parties at Independence are interested in the mine. It is intended to ship a carload of ore to Dayton to be worked for the copper and see if it will pay to continue the shipment.

BORAX.—Trudo, McAfee and Carson have Indians at work making a road from Saline valley up to Cerro Gordo. The object in making the road is to reach a borax deposit in Saline valley and bring the borax to Keeler. The length of the road from the borax swamp to Cerro Gordo is about 18 miles; from Cerro Gordo to Keeler the distance is nine miles. The road crosses the Inyo range of mountains. The borax is described as being very extensive.

BEVERIDGE.—Tom McDonough heard a few days ago that parties were taking rich ore out of his mines over in Beveridge. He has gone over the Inyo mountains to see what was going on. Mr. McDonough usually comes in from his mine in the winter and stays in the valley until spring, not leaving any one at the mine.

Los Angeles.

A FAILURE.—Newhall *Times*, Jan. 5: It now seems as if the Cora Belle Mining Co. is defunct. Several attachments have been levied on the machinery at the mine, and the land will be levied on next week. We will not attempt to give the reasons for its failure, for if the reports we received from the mine were correct, it must have been bad management that caused it.

Mono.

A NEW OUTLET NEEDED.—Homer *Mining Index*, Jan 7: A connection should be made between the May Lundy and Great Sierra wagon-roads. This will give Mono county another outlet, a short cut through Lundy and Tioga to railroad, cheaper fares and freights, and at once open up one of the richest and most extensive mineral belts in the State, the grandest scenery of the Sierra, and by far the largest forest of sugar-pine timber on this coast.

LOCATIONS.—Comparatively few locations were made in Homer district last Tuesday. Time was when they would have been numbered by the score.

OLD DIGGINGS.—But one claim was located in Old Mono Diggings on New Year—the Northern Light, formerly known as the Bulwer. It is situated immediately north of the Rattlesnake mine, on the same lode. Paul Wallenberg was the locator.

GREAT SIERRA.—Wm. P. Onkst, superintendent of the Great Sierra, has left at this office samples of ore from the Golden Crown mine, Mount Gibbs, averaging $480 per ton, silver. Some portions of this ore assay more than $1000 per ton. The vein from which this was taken is eight feet wide, with ten inches of rich ore in the center.

San Bernardino.

ORO GRANDE.—San Bernardino *Index*, Jan. 2: A gentleman who arrived from Oro Grande yesterday, says the camp is quite lively. There are about 200 men at work at the limekilns, in the quarries and in the mines. The four limekilns are kept running to their full capacity night and day and for the 24 hours turn out about 275 barrels. The mines are working a large number of men and some good ore is being taken out. The ten-stamp mill is at work night and day on ore from the mine of Horace Adams, which is located about six miles east of Oro Grande. The ore is of high grade, and is paying well.

Shasta.

LOWER SPRINGS.—Cor. Shasta *Democrat*, Jan. 2: J. Penrose and John Walton are working on the old Walton & Vickers mine. They are getting $6 a foot for sinking a shaft. This mine is located about 200 yards from the old Shasta road, on the right-hand side coming up. The Wiser boys have not sold out yet, but still continue to keep going. They have a nice ranch which is well worth the price they ask for it. Their place has many good ledges on it which go with the farm. They have a mine called the Spanish Ledge, which shows up splendidly in free gold. Mr. Holly is the possessor of another lump of gold, which weighs $52.31. Mr. White is still progressing on his mine. He is very confident that he will "strike it rich" and we believe he will. Mr. Frick is taking out good rock west of Miller's on the Ida May mine.

Sierra.

FOREST CITY.—*Mountain Messenger*, Jan. 5: Mott and Cadman have been taking out some rich dirt lately, up on Kanaka creek. Their last cleanup netted $100 per man for the week's work. They have four men employed. J. Pearson has struck good pay down Kanaka creek not far from the Red ledge.

BUFFALO.—The owners of the Buffalo quartz mine, Hog Canyon, are pushing things with a rush and have just completed their ten-stamp mill. All buildings and track are finished, and two gangs of miners are taking out quartz on the north and south sides of the creek. The Buffalo company are anxiously waiting for water to crush rock, when, shortly, we may expect returns that will gladden the hearts of the shareholders.

Siskiyou.

SCOTT BAR PLACERS.—Yreka *Journal*, Jan. 2: The placer claims in this vicinity, with the exception of that of Martin Andrews on the Klamath, have generally been paying well this fall and winter.

Tuolumne.

BUCHANAN.—Tuolumne *Independent*, Jan. 5: The Buchanan mine commences the new year under most favorable auspices. The chlorination furnace is working night and day, to the satisfaction of the company, under the direction of Mr. A. Maltman. The mill is running to its full capacity. Sinking has been resumed from the 700-foot level. A new ore chute has been discovered, which promises to be richer and larger than the present one. Mr. Stephen Moore, one of the most experienced and best known mining men on the coast, has been appointed sup't. J. T. Murnan resumes his former position in charge of the office, and Thomas McGovern looks after the store. In a few months the Co. will have more men on the pay-roll than at any previous time. Everything moves like clock-work, and improvements of value, which reduce the cost of working—a progressive economy—are being continually adopted as mining science stamps upon them the seal of success.

NEVADA.

Washoe District.

CROWN POINT. — Virginia *Enterprise*, Jan. 3: Have stopped the 700 No. 3 west crosscut and resumed work in the south drift, which was advanced 29 feet. The face is a mixture of quartz and porphyry.

HALE & NORCROSS.—On the 500 level the north drift is now extended 100 feet and continues in good ore. Are advancing stopes in this body in ore of good quality. On the 600 level the west drift has passed through two feet of rich ore. Its face is now in low-grade ore, quartz and porphyry. On the 1300 level have started an upraise 100 feet south of the shaft. This upraise is in fair-grade ore. From the station on this level have started a drift north, which is advanced 10 feet. During the week have hoisted 1053 tons of ore, and have shipped to the Mexican mill 1062 tons, and have milled 1135 tons. Average battery assays were $24 per ton. Have bullion on hand and previously shipped this month amounting to $87,488.53.

SAVAGE.—On the 400 level the main west drift has been advanced 16 feet, making its total distance from the shaft 315 feet. Are extracting ore from the stopes in the north and south drifts on this level. On the 500 level the main west drift has been extended 23 feet, making its total distance from the shaft 235 feet. The last 10 feet of this shows some stringers of good ore. Are extracting ore from the east crosscut; also from the old stopes and the south drift on this level, and from Nos. 2 and 3 crosscuts on the 600 level. During the week have hoisted 488 tons of ore, and have shipped to the Rock Point mill 333 tons and have milled 355 tons. The battery assays average $17.04 per ton.

SEG. BELCHER.—The south joint, 1100 drift, is out 291 feet, having advanced 48 feet during the week. Monday a clay wall was struck, and through it has been found a body of quartz which penetrated four feet. It is running southeast and northwest, and dipping about 60 degrees to the east. The quartz yields some fair assays, but is low in grade on the average. It is hardly possible that this is the same quartz which was prospected in the 1300 raises.

BEST AND BELCHER.—On the 300 level the north drift started 25 feet west of the winze has been advanced 14 feet; total length, 104 feet. Formation porphyry, with streaks of quartz. In the incline winze at a point 50 feet below the 300 level, east crosscut No. 2, started 25 feet north of east crosscut No. 1, has been advanced 16 feet. Formation, porphyry and quartz showing some value.

CONFIDENCE.—The raise from the 1200 to connect with the 1100 level is up 125 feet, 20 feet having been added during the week. The top of the raise shows ore of fair quality. The south drift on the 1300 level is in 34 feet, 17 feet having been added during the week. The vein shows quartz giving low assays. Shipped 100 tons of ore daily; average battery samples, $28.46.

BELCHER.—The 200 north drift advanced 22 feet since last report, and is now out 310 feet from the shaft. The face is in porphyry mixed with low-grade quartz. The 150 drift to meet it advanced 30 feet and struck an old drift in a fair condition, leading into the Crown Point and Belcher line.

JUSTICE.—The raise above the 490 level is up 57 feet, having advanced 13 feet since last report. The top of the raise shows two feet of milling ore. The west drift on this level is out 246 feet. The 370 level station is completed, and a north drift has been started from it.

IMPERIAL.—No. 1 crosscut on the 1100 level is out 88 feet, 7 feet having been added during the week. Stopped work on this crosscut and started No. 2 crosscut 100 feet north of No. 1, and advanced it four feet, the face showing vein material.

ALTA. — Have received over $25,000 from the running of concentrates at the Reno Reduction Works in December. The new plan of amalgamation and concentration is very satisfactory. The mine looks well.

GOULD AND CURRY.—On the 200 level the north drift 100 feet from the top of the upraise from the 300 level has been extended 33 feet; total length, 153 feet. Formation, hard porphyry.

YELLOW JACKET. — Shipping daily 100 tons of gold-bearing rock to the Santiago mill, and prospecting in upper levels.

CHALLENGE.—Shipped during the week 130 tons of ore daily to the Brunswick mill; battery samples, $28.46 per ton.

BALTIMORE.—Still drifting on the 350 level, and saving ore taken out for reduction.

CHOLLAR AND POTOSI.—There is merely progress to report in the work of exploration.

ALPHA.—Drifting north and south on the 500 level.

BULLION.—Still sinking the winze below the 640 level.

ANDES.—Drifting on the 240 and 350 levels.

Bullion Hill District.

ARRANGING FOR A BOND.—Eureka *Sentinel*, Jan. 5: Mr. Cassidy has been endeavoring to bond the Silver Gray mine of Bullion Hill district, Lander county. The Silver Gray is the property of Dave Cozzens of Battle Mountain. It is said to be one of the best mines in that section. The ledge is well defined and the ore of high grade. The parties had about agreed upon the terms of the bond at latest accounts. The figures are understood to be well up toward a hundred thousand.

Eureka District.

A GOOD ASSAY.—*Sentinel*, Jan. 5: Spots and blotches of heavy galena have been met with from the very start in the new Diamond tunnel. A sample of it sent over to Mr. McIntosh, at Salt Lake, assayed 59 per cent lead and $127 to the ton in silver. Of course it is only important as showing that the lime is highly mineralized at that point. To this extent it is very encouraging. Indeed every person who has seen the Diamond bonanza believes that it is one of the most valuable discoveries ever made in this district. Three or four months' work may tell an important tale for the future of this camp. The work going forward in the Diamond this winter is about the only thing doing here that gives any promise of lifting the old town out of the dumps.

Pioche District.

BONDED.—Pioche *Record*, Jan. 2: Thomas McMahon has bonded to S. T. Godbe, for six months, the Half Moon, Columbia, Rainbow and War Eagle mining claim, situated in this district, about three miles west from town. The consideration mentioned in the bond is $15,000, of which amount $1000 was paid in cash. The claims adjoin the Chisholm mine and a good body of ore is exposed to view, the work of developing which will be continued by McMahon during the existence of the bond, unless stopped by a consummation of the transaction and full payment of the amount, which may occur.

YUBA.—The work of development at the Yuba steadily progresses, every week showing up the mine in a better light. Drifting progresses on the 11th and 12th levels to determine the extent of the ore body on the strike of the vein at those points. The extent of the ore is not exactly known on any level from the 8th to the 12th, though it is developed for over 200 feet on some of them. The ore at the bottom of the 12th level drift is exceptionally fine, and sinking on it will be commenced in a day or two. From lack of teams and also on account of bad weather, the shipments of ore the past week are light.

Safford District.

STILL IMPROVING.—Eureka *Sentinel*, Jan. 5: The *Sentinel* has word that the late find in the old Onondago mine is still improving. Supt. George O'Briter has great faith in the property. The winze which is being carried down below the tunnel level is showing exceedingly well in high-grade ore, a good deal of which goes above $200 to the ton. There has been a marked change in the appearance and character of the ore as depth is attained. It is now thought that the water level is about reached where the ledge assumes a more compact form, as well as being of higher grade. No shipments of ore are being made for the winter.

Tuscarora District.

BELLE ISLE.—*Times-Review*, Jan. 5: East crosscut from north drift, 250-foot level, extended ten feet.

COMBINATION SHAFT.—The new hoisting works have been completed. Sinking will be resumed in the bottom of the shaft.

NORTH BELLE ISLE.—South intermediate from No. 1 winze, 300-foot level, extended four feet; face shows a good width of ore.

GRAND PRIZE.—400-foot level: Crosscut has been extended 20 feet. Formation has been more favorable for making progress the past few days.

FOUND TREASURE.—Branch drift, 150-foot level, has been extended five feet; total, ten feet. The ground is very heavy and requires large timbers.

NAVAJO.—The upraise opposite the shaft on the west vein, 150 level, extended seven feet, still showing a fair width of ore. The stopes above the 350-foot level are looking well. Everything about mine and mill running smoothly.

NEVADA QUEEN.—North drift, 450-foot level, has been advanced 20 feet, showing some spots of mineral in the vein, and looks more favorable than heretofore. The stopes are yielding some good concentrating ore; 100 tons hoisted during the week. Chloride stope above the 100-foot level is narrow, but good ore. The concentrator has been running steadily and doing good work. The cold weather interferes with the running, but not enough but what it has been kept going steadily. Concentrations are clean and show well.

COMMONWEALTH.—100-foot level: North intermediate drift is being timbered. West intermediate drift: A winze has been sunk ten feet following a seam of good ore. 150-foot level: Upraise from No. 3 west crosscut has extended up eight feet. Assays from the top of raise give returns of $55 per ton.

Tybo District.

DIMICK.—Belmont *Courier*, Jan. 2: Work goes on as usual in the Dimick mine. The ore encountered in this mine is of a good grade.

ARIZONA.

VARIOUS CAMPS.—Arizona *Journal-Miner*, Jan. 2: Talk is that the Etta mill will start up soon again. Louis Himmelreich went out to-day to Copper Basin to erect the new smelter for that company. A smelter will probably be erected in Big Bug early in the spring, for the reduction of ores from that district. The Crowned King Co. has closed down for a short time, to add pans and settlers to its reduction plant. The United Verde has temporarily closed down on account of bad roads. The rumored sale of the United Verde copper mines to W. A. Clark has been confirmed. Frank Dolph, manager of the Oro Fino placer mines on the Hassayampa, says there is plenty of water there for washing out gravel at present. Sam F. Powell writes from the lower Hassayampa that new strikes are being made every day in the district discovered by him some time since, and a big camp is expected to be located there within a year. The main shaft on the Congress mine was sunk during the past year to a depth of nearly 600 feet. Six other shafts have also been sunk on other claims owned by the company, aggregating in all 630 feet of work, the deepest shaft being 225 feet. They have also run levels aggregating 1300 feet, but have done but little stoping. From the above workings they have shipped over 600 tons of ore, aggregating in value over $100,000, while it is estimated that the dumps contain 5000 tons of second-class ore, which will average $50 per ton. I. T. Stoddard of the Oro Bella Mining Co. says the company had its sawmill in operation cutting lumber for its new mill. He says the mines are looking splendid. Quite a large body of high-grade ore was encountered last week in one of their openings. F. M. Murphy returned last evening from a trip to Lynx creek and the head of the Hassayampa. He says there is a large amount of water in the former stream at present, while at the divide at its head he found 18 inches of well-packed snow. This is good news for the mining interests of that section, as it will furnish an abundance of water for placer mining all along the creek, and will also enable the Lynx creek hydraulic works, the greatest producer of placer gold in this section, to have water for a long run this season, which means the production of several thousand dollars.

COLORADO.

SALE.—Georgetown *Courier*, Jan. 3: A sale of Leavenworth Mountain group of lodes was completed on the last day of the old year. The group consists of the Good Hope, Lebanon, Big Blue and Midas lodes, one-half of the Silver Dale tunnel, No. 4 lode, and one-half of the Silver Dale tunnel,

owned by George L. Sites. The purchasers are George Crawford of Pittsburg, Penn., and H. H. Warner of Rochester, N. Y. The consideration was $49,000. The Astor Alliance group of mines was sold at sheriff's sale last Saturday and bid in by G. W. Hall for $19,900. This was the nominal sum necessary to satisfy some debts held against the property. The company will doubtless redeem. In the first place this group was fairly flooded with watered stock. The properties of the Clear Creek Mining and Improvement Co. were sold under a judgment in favor of J. Warren Brown for some $10,000 on Saturday. It is to be hoped that the Clear Creek, the Republican and the Lebanon properties will be consolidated and thoroughly explored by one central system of development. These mines embrace the entire south slope of Republican mountain from the Pay Rock properties to the south line of Georgetown. All have yielded rich mineral in large quantities, and with the large mill now contemplated and a union of working forces, this property will be as great in dividends as it is in size.

IDAHO.

THE HUB MINE.—Wood River *Times*, Jan. 2: The Hub mine, near Era, continues to show better with every foot of development work done upon it. Most of the work the past season has been done with a view to open the property and work it economically. A good hoist has been put in place and other improvements made, and preparations completed with a view to sinking an additional hundred feet this winter, and driving 200 or 300 feet of drifts. A short while back the owners began shipping ore in order to lay in their winter supplies. The teams take ore to Nicholia and bring supplies back. They have only hauled about $5000 worth so far, but this will suffice for the present. In extracting this shipping ore, some 350 to 400 tons of 60 to 80-ounce ore was taken out and thrown over the dump. The work done indicates that the workings are in the top of an ore body that must be both rich and extensive. If this be demonstrated this winter, a mill will be erected in the spring.

THE CHARLES DICKENS. — Ketchum *Keystone*, Jan. 5: We learn from parties over from Custer county that the London syndicate, which, as the Charles Dickens Company, purchased the controlling interest in the Charles Dickens mine some time ago, have now obtained complete ownership of that property. When the company was organized and the purchase first made, some of the original owners did not take stock, and debenture bonds were issued to them to secure their interests. Not long ago a suit on the mine in the interest of these bonds was commenced. To avoid litigation and to obtain full possession of the property, the company purchased those debentures themselves. This is a matter of great importance to Bonanza, as well as to the company, for this valuable property has lain idle over a year on account of trouble with parties holding these debentures, and now it is understood that Mr. Treweek, the manager, intends to begin active operations in the spring for fully developing the mine, which fact will give new impetus to mining in that locality. The company is now known as the Dickens-Custer Co., the Dickens and Custer properties having been consolidated nearly a year ago. The company has been running its 30-stamp mill since February, and turning out about $30,000 per month in bullion. They have been running on Lucky Boy ore, which for the month of November averaged $51.11 per ton. The ore in this mine improves with depth, and in the new winze from the lower tunnel, they have gone down 40 feet, through solid ore all the way. A piece was brought into Bonanza a short time since, weighing 80 pounds, which assayed 77 ounces in silver and $100 in gold per ton.

EVOLUTION DISTRICT.—Wardner *News*, Jan. 3: The Polaris mine, owned by W. B. Heyburn and L. Matheson, is a property of which but little mention has been made of late, although more work has been done on it than any other mine, outside of the extensively developed properties of the South Fork. It has a tunnel to a distance of 600 feet, two crosscuts running north and south, each one extending 100 feet, a winze sunk to a depth of 100 feet with 125 feet of drifting on same, besides numerous stopes. Work is steadily progressing and from the quality and quantity of ore in sight this mine should rank among our best ore-producers. It is conveniently located and has the advantage of a finely graded road three miles long connecting with the railroad and built at a cost of $3000.

HUNTER CONCENTRATOR.—Work on the erection of the Hunter 100-ton concentrator is being pushed with energy; the structure is now roofed and the machinery is being put in place as rapidly as possible. Most of the plant is on the ground and the remaining portions are en route to Mullan. The concentrator will be run by water-power, the air-compressor by steam, and the entire works will be lighted by electricity. Mr. Storr, superintendent of constructions, will be ready to turn the mill and all work under his control over to the company by February 15th.

MONTANA.

THE JAY HAWK.—Montana *Mining Review*, Jan. 2: The Jay Hawk Mining Company, in the Jay Gould district, have their machinery on the ground for a ten-stamp mill, which will be put up and set at work as soon as the weather will permit. The air compressor, running Burleigh drills, is now at work in the tunnel, which is 1400 feet long.

IN GOOD DEMAND.—Lead ores are in good demand now, and the bidding for them by the rival establishments spirited. Small shipments are going forward to the Montana company's smelter or the Helena smelter every day.

THE LITTLE BONANZA.—Work is progressing on the Little Bonanza lode, in the Helena district, but some difficulty is being experienced with surface water in sinking, which in the absence of a pump is difficult to overcome, although the contractors think they may be able to finish the 20-foot contract with the limited facilities at hand. Only three feet of additional depth has thus far been secured, but the vein shows a big improvement, some ore being already in sight, and increasing in quantity with every foot of depth.

PLACERS.—Boulder *Age*, Jan. 3: It is reported that the Mitchell gulch placer mines have been placed under bond and that a wealthy company will take hold of the mines next season and make extensive developments. The Minah mine is under examination by various experts preliminary to a sale. The price is said to be three-quarters of a million dollars, and it is said that if the next report of the expert is favorable, the sale will be perfected. Rumors of the sale of the Elkhorn Mining Co.'s property have been current for some time, but nothing definite has yet been given out, though it is evident that negotiations for the sale of the mill and mines are in progress.

NEW MEXICO.

BENNETT. -Rio Grande *Republican*, Jan. 7: The Bennett mine starts up with a force large enough to take 35 tons of ore from the mine daily, and one who has seen the mine lately will not doubt but it is capable of producing more ore than that.

LOST MINES.—In the Organs there are, scattered at various points along the range, a number of spots where the Mexicans in early days have erected their primitive smelters, and the ruins still exist. It is said that ore of very high grade is found near them, different from anything ever discovered in the camp, and it is thought that it comes from some point in the mountains and will yet be found.

OREGON.

PLACER STRIKE.—Bedrock *Democrat*, Jan. 1: So often is it reported that "rich strikes" in quartz or placer have been made here and there that the public have learned to give these rumors but little credence from the fact that too frequently it occurs that these reports are originated by over-zealous and imaginary persons and have no foundation in fact. It often happens, however, that there is more "truth than poetry" in some of the reports sent out and we are led to believe that the "rich strike" which heads this column is worthy of belief from the fact that responsible persons assure the reporter that it is true from personal observation. The strike in question was made a short time since on Powder river, south of Sparta, and near the old quartz-mill, but the knowledge of the existence of rich gravel deposits in this locality was kept from the public until those on the "inside" had perfected their locations. This done and now the news is given to the world. The principal locators on the ground are Messrs. O. S. Buckland, E. E. Clough, Henry Wilkinson, Wm. Ainsworth, Jay Guy Lewis, and others who have taken up the entire ground for miles in length along Powder river from the old mill south. Our informant tells us that four Chinamen in the employ of O. S. Buckland in one week's time took out upward of $1600 and that nuggets weighing as high as $30 had been found. The excitement at Sparta over the rich finds is intense and it is said these mines are the richest ever discovered in Eastern Oregon. The location of these mines for working is excellent, as plenty of water can be had from Powder river. That these rich gravel deposits should have lain uncovered and unmolested by the pick and shovel for all these years, while the gulches a few miles north are worked out, is a mystery, but it is one of those unaccountable happenings for which no explanation can be offered.

UTAH.

THE NEW LAST CHANCE.—Salt Lake *Tribune*, Jan. 3: The English company owning the New Last Chance mining property, at Bingham, have cabled Mr. Theodore Bruback to take charge of the property and push work on it. Yesterday he went to Bingham and set teams to hauling coal to the new concentrating-mill; took a look through the mine and returned to the city in the evening. He will get a force of men at once and have the mill running in a few days. There is a large quantity of concentrating ore ready to run through the mill, and it is proposed to keep the machinery and mine at work steadily after once starting. Mr. Bruback will give the property his attention for the present, and if he can find time away from his railway business, will continue to manage it. He expects to extend the San Pete railway down the valley and get in all the new mileage he can this year.

FRISCO AND COPPER GULCH. — A Happy New Year struck the town of Frisco and Copper Gulch for the first time in five years, happy because a new enterprise that would give employment to many this winter had been inaugurated. The French Copper Co., now known as the Comet Mining and Smelting Co., have nearly completed their smelting plant, which is a model of neatness and adaptability. Mr. Carl Henrich has charge of the smelting part, Mr. Jones the construction. While the management of the mines is in the hands of the Morrensen Bros., Professor Sebillot has charge over all. The Massachusetts mine, now owned and being worked by this company, has a fine showing of copper ore. A new tunnel is being driven into this mine which will strike the ore body at great depth and expose large bodies of copper ores of a good smelting quality. Near by and adjoining this mine is the Quartize No. 2, now owned by Gen. Solomon of Salt Lake, which shows a large body of copper ore. There are also a number of copper claims further to the northeast, owned by James Hedges. In Lober canyon are the Broadway mine, Niagara, Cambria and a number of other claims that have a good showing of copper; in fact, there is lots of copper ore existing all through San Francisco district, which only needs capital and muscle to develop it.

PARK NOTES. — *Record*, Jan. 5: The Russell leaching process is doing most satisfactory work at the Marsac mill. Rather slow progress is being made now in driving the Ontario's big eastern drain tunnel, because of the soft ground encountered. The Woodside tunnel is being pushed with vigor, and the contract will be completed in a couple of weeks. It will tap the ore body at depth and open up a vast amount of stoping ground. It is now asserted that the reorganization of the Sampson company will be perfected in about a month under the name of the Alliance Mining Co. Heavy shipments of first-class ore would be made from the Crescent mine now if the roads were only in condition for hauling by sleds.

ORE AND BULLION SHIPMENTS. — During the week the Mackintosh sampler received 58,160 pounds of Ontario ore, 214,400 of Daly and 909,790 of Woodside leasers' ore; total 1,182,350 pounds. Last Monday the Ontario shipped 43 cars of bullion containing 23,839.79 fine ounces of silver. Twelve bars of Daly bullion, 12,045 fine ounces of silver, were shipped from the Marsac mill last Monday.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, Jan. 10, 1889.

The past week showed a slight improvement in general trade, due chiefly to more settled weather. It is confidently asserted that the spring trade will be the largest on record, owing to light stocks with the trade and extended rains in all parts of the State inspiring a more confident feeling among all classes. The money market, not only here but in all leading centers on the coast, is exhibiting a remarkable ease for so early in the month of January. In this city large sums are being disbursed in dividends and on interest accounts. This is tending to create more ease, which is very materially aided by stockbrokers, who usually borrow large sums of money, not only reducing their accounts, but the majority having a cash balance to their credit. It is claimed that this condition will not likely be changed for a few days yet, or until stocks begin to show more activity in an upward direction. This is expected in the near future, or soon after the Sutro tunnel is sold, which will probably be on next Monday, and the new reorganized company take possession. The new company, it is understood, consists largely of Eastern capitalists. From the various mining districts, the mines of which are listed on the two stock exchanges, information is of a most flattering character, with every probability of important developments being made within the next few weeks. From the private mines in this State and adjoining States and Territories, the advices continue of a very favorable character, with an active season looked for.

SILVER—The market held steady at 92⅞@93c up to Monday, when an advance was established in sympathy with an upward movement abroad. The obtainable supply of silver bullion in this market is light, and as there is a good demand, buyers are compelled to pay from ½ to ⅝c on ounce above New York quotations. The silver-producing mines are not, as yet, turning out as much bullion as was expected, but the outlook is said to be favorable for a gradual increase from now on. Sales of silver were made in this market at 93¼c on Monday and 93⅜c on Tuesday. Yesterday, Wednesday, buyers bid 93⅛c in sympathy with a decline at the East and also abroad. Silver shaded off to-day in London to 42½d and in New York to 92⅞c. In our market 92⅞c is bid, although an advance, it is claimed, would be paid on this price.

QUICKSILVER—The market is very active for both home and export. China is drawing more freely. This coast's mines are said to be taking more than at this time in 1888.

LEAD—The market is lower, with a weak tone at the close. For March and April delivery, pig lead has been sold at 4⅛c.

TIN—Pig tin is weak and lower. The demand for spot parcels is slow. Tin plate on spot is dull, but a revival of the inquiry is looked for in next month. For March and April delivery, prices are reported to be steady.

BORAX—The market is without essential change.

IRON—There is nothing new to report. Ironworkers and foundrymen look for quite an active season, but as yet they are not disposed to anticipate their wants. Considerable work has been and is being figured on by the foundrymen, but as yet very little active business has followed. The market for iron is reported to be quiet but firm.

COKE—The market is very strong for spot parcels, under limited supplies. Consumers, at the high prices, buy sparingly.

COAL—The market for spot parcels is claimed to be firm for both steam and household. Importations continue quite free, with more Rocky mountain coals coming to hand. The coast collieries output continues large. Australian coals for shipment in April and May are offered at $7.25 a ton.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Jan. 10, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42½	92⅜	$17 25	$3 95	$21 80
Friday	42½	92⅜	17 30	3 90	21 85
Saturday	42½	92⅛	17 30	3 90	21 85
Monday	42 11-16	93⅛	17 35	3 87½	21 90
Tuesday	42 11-16	93⅛	17 35	3 87½	21 85
Wednesday	42 9-16	93	17 40	3 85	21 80

Borax is firm, with a stronger feeling. Lake copper was quiet and sold nominally at $17.15@17.25. For the first three months of the year 1888 the output was 54,275 tons; in 1887, 47,633 tons. Eight hundred and thirty tons of pig lead was sold by auction at $3.85½@3.86, and in regular market at about $3 90. Petroleum is lower than for a long period. Barrels, $7@6.90; plain cases, $9.

Mining Share Market.

Mining stocks were more active during the latter part of the week than has been the case for some time, a large amount of stock changing hands at an advance. Tuesday's Virginia *Chronicle* says: Unless the Carson river flow should be materially impeded by freezing, the Con. Cal. and Virginia Co. will take out sufficient bullion the present month to cover operating expenses and pay a dividend in February.

The following mining companies had cash on hand Jan. 7th: Alpha, $22,771; Alta, $40,906; Andes, $17,142; Belcher, $3998; Best and Belcher, $8661; Benton Con., $96,564; Bulwer, $5016; Bodie Con., $47,973; Bullion, $37,099; Caledonia, $14,226; Con. California, $191,076; Con. Imperial, $21,491; Confidence, $67,136; Crocker, $2579; Del Monte, $4756; Exchequer, $13,313; Found Treasure, $1161; Gould and Curry, $3105; Hale and Norcross, $14,612; Independence, $2825; Julia, $691; Justice, $15,000; Lady Washington, $24,508; Locomotive, $2560; Mexican, $8855; Mono, $21,056; Navajo, $38,869; Ophir, $26,663; Overman, $6480; Scorpion, $1094; Standard, $1614; Silver Hill, $12,542; Silver King, $70,000; Sierra Nevada, $10,783; Summit, $1830; Syndicate, $9056; Utah Con., $12,229; Weldon, $2035.

The following mines were in debt January 7th: Belle Isle, $1268; Challenge Con., $700; Chollar, $2661; Crown Point, $1604; Commonwealth, $57,314; Con. New York, $1262. Grand Prize, $32,597; Holmes, $2799. Kentuck, $946; Nevada Queen, $6312; North Belle Isle, $34 094; Peerless, $5637; Peer, $6110, Potosi, $10 270. Occidental, $6623; Savage, $49,376; Seg. Belcher, $31,056; Union Con., $4347.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING JAN. 1, 1889.

395,616.—CARBURETOR—H. J. Dykes, Berkeley, Cal.

395,618. — CORK EXTRACTOR—Geo. Edwards, Berkeley, Cal.

395,433.—BEVEL GAUGE—M. O. Godding, Monrovia, Cal.

395,621.—DRIED-FRUIT CLEANER—John Harrel, Plymouth, Cal.

395,443.—CONDUIT ELECTRIC RAILWAY—B. Jennings, San Jose, Cal.

395,448.—PILE—R. B. Markle, Westport Cal.

395,449.—GAS APPARATUS—J. A. McCollum, Riverside, Cal.

395,401.—GREASE EXTRACTOR—W. D. Nelson, S. F.

395,344.—FURNACE—J. P. Oliver, Oakland, Cal.

395,340.—COUGH MIXTURE A. M. Poe, Lakeport, Cal.

395,587.—VINEYARD CULTIVATOR—C. Rebman, Napa, Cal.

395,349.—MOWER—Redfield & Hansbro, Glendale, Ogn.

395,460.—OIL-FEED FOR LAMPS—C. Sieghold, Salinas, Cal.

395,680.—ROTARY BOLT—G. Summerton, S. F.

395,411.—CATAMENIAL SACK—Emma A. Wiley, Los Angeles, Cal.

395,642.—WIRE SPLICER AND CUTTER—H. V. Wulbecke, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PILE.—**Robert B. Markle, Westport, Mendocino Co. No. 395,448. Dated Jan. 1, 1889. This novel construction for piles consists in building up a pile of boards or strips with intermediate layers of a preservative compound, the strips being so placed with relation to each other that the edges and sides of all the strips, except the outer ones, are inclosed and protected by the preservative compound. The outer surface may also be coated with any suitable compound; or, if left unprotected, the insects can only burrow into the thickness of this exterior coating, not being able to penetrate the intermediate compound placed between this and the next interior layer of strips.**

WIRE SPLICER AND CUTTER.—**Henry V. Wulbecke, S. F. No. 395,642. Dated Jan. 1, 1889. The object of this new and useful implement is to twist the overlapping ends of wire to form the splice and to cut off wire when necessary. It consists in a stock having a novel head forming a bearing by which the implement is journaled or pivoted upon the body of the wire, and having on the side of said head a curved guide for receiving the free end of the opposing wire and twisting it around the first wire on which the head is journaled. It consists further in a handle having a cutting blade pivoted to it for the purpose of clipping off the ends or other portions of the wire.**

ROTARY BOLT.—**Geo. Summerton, S. F. No. 395,680. Dated Jan. 1, 1889. This is an improvement in bolting machines for flour and other materials, and is especially designed to provide a more effective shaking and bolting motion of the apparatus, and an adjustment of the parts. This is effected by peculiarly arranged hangers from which the bolt shaft is suspended, with cams and springs to produce the proper oscillation without deranging the rotary motion, and mechanism whereby the movements are steadied, and the amount of shake is limited and adjusted so that the rate of travel of the material through the bolt is controlled.**

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Cons. California and Virginia, Jan. 5, $91,735; Hale and Norcross, 5, $87,488; Confidence, 5, $17,000; Overman, 7, $7540; Eureka Con., 7, $27,800; Peerless, 7, $8650; total for December $14,535; Mt. Diablo, 7, $5901; Blue Bird, 5, $33,280; Alice, 5, $26,312; Lexington, 5, $35,104; Butte & Boston, 5, $33,200; Moulton, 5, $106,240; Navajo, 7, $12,000; Hanauer, 3, $2000; Woodside, 3, $6600.

THE New York *Times* says editorially: **It is reported in Boston on credible authority that the copper syndicate has very recently closed a contract with J. B. Haggin, owner of the Anaconda mine, for two years, with the privilege of extending it for 12 years.**

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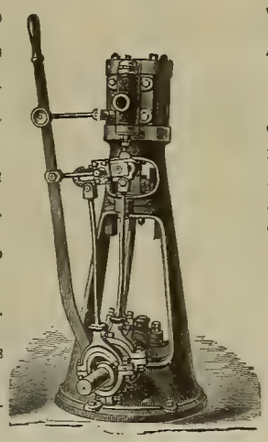

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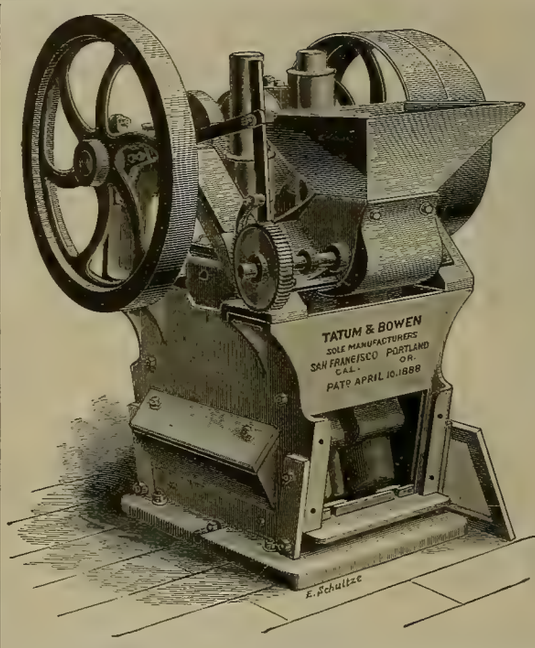

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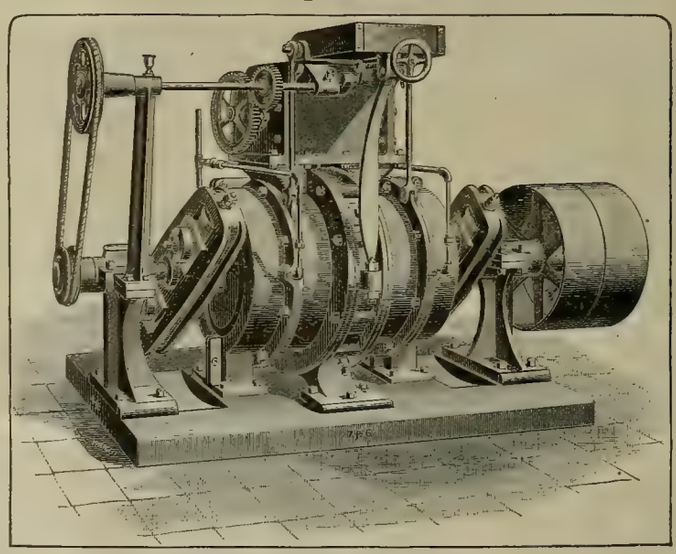

IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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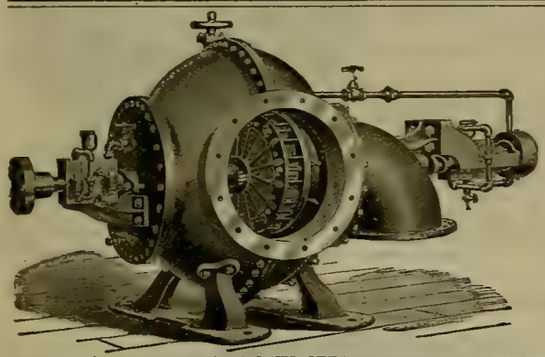

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

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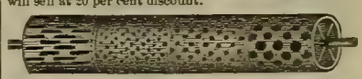

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MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS
Big Canyon G M Co	California	1	20	Dec 20	Jan 22	Feb 7	T W Nolin	230 Montgomery St
Commonwealth Con M Co	Nevada	7	50	Nov 24	Jan 4	Jan 31	H Deas	309 Montgomery St
Concordia M C	Nevada	2	50	Nov 12	Dec 24	Jan 12	G C Higgins	121 Montgomery St
California Slate Co	California	3	30	Dec 13	Jan 19	Feb 18	J O Hansome	10 California St
Gt Western Quicksilver M Co	Cal	3	10	Nov 28	Jan 7	Jan 28	A Halsey	328 Montgomery St
Gover M Co	California	1	15	Nov 28	Jan 5	Jan 29	L G Harvey	13 Fremont St
Gray Eagle M Co	Nevada	10	05	Nov 13	Jan 2	Jan 22	O H Bogart	327 Pine St
Horseshoe Bar Con M Co	California	2	10	Dec 7	Jan 14	Feb 4	D M Kent	330 Pine St
Kossuth M Co	Nevada	10	10	Nov 21	Dec 24	Jan 19	E P Flint	328 Montgomery St
Lord of Lorn M Co	Nevada	4	10	Nov 13	Dec 28	Jan 22	L G Harvey	313 California St
Live Oak Drift Gravel Co	California	10	05	Nov 19	Dec 21	Jan 16	J Morizio	328 Montgomery St
Montrose M Co	Colorado	1	1¼	Oct 3	Dec 24	Jan 28	F E Luty	330 Pine St
North Gould & Curry M Co	Nevada	10	20	Dec 18	Jan 18	Feb 4	C H Mason	331 Montgomery St
Nevada Queen M Co	Nevada	4	50	Dec 21	Jan 28	Feb 25	H Deas	309 Montgomery St
North Belle Isle M Co	Nevada	16	50	Jan 3	Feb 6	Feb 27	J W Pew	310 Pine St
Omilak M Co	Alaska	6	20	Dec 4	Jan 5	Jan 24	D M Kent	330 Pine St
Occidental Con M Co	Nevada	5	25	Dec 27	Jan 31	Feb 25	A K Durbrow	369 Montgomery St
Puget Sound Iron Co	Wash Ter	13	1.00	Dec 29	Feb 2	Feb 25	A Halsey	328 Montgomery St
Russell Reduction & M Co	California	4	05	Dec 15	Jan 21	Feb 12	J Morizio	328 Montgomery St
Seg Belcher & Mides Con M Co	Nev	2	25	Dec 3	Jan 7	Jan 28	E B Holmes	309 Montgomery St
Savage M Co	Nevada	72	50	Jan 4	Feb 11	Mar 4	E B Holmes	309 Montgomery St
Sunerior M Co	Nevada	24	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
S F Natural Gas & Oil Co	California	1	25	Jan 3	Feb 4	Feb 28	J Scoville	309 Montgomery St
Union Con M Co	Nevada	37	25	Jan 4	Feb 8	Mar 1	J M Buffington	303 California St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Black Diamond Coal Co	California	J H Dobinson	305 Sansome St	Annual	Jan 15
Crocker M Co	Arizona	A Waterman	309 Montgomery St	Annual	Jan 21
Crescent M & M Co		J H Isham	310 Pine St	Annual	Jan 21
Del Monte M Co	Nevada	J W Pew	310 Pine St	Annual	Jan 18
Kossuth M Co	Nevada	E P Flint	328 Montgomery St	Annual	Jan 21
North Commonwealth M Co	Nevada	J W Pew	310 Pine St	Annual	Jan 22
Spring Valley G M Co	California	H Pichoir	320 Sansome St	Special	Feb 28
Sierra Nevada M Co	Nevada	E L Parker	309 Montgomery St	Annual	Jan 16

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Jan 10
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	Nov 26
Candelaria Con M Co	Mexico	C T Givens	221 Market St	50	Nov 13
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Idaho M Co	California		Grass Valley	50	Oct 11
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Dec 10

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 20.		WEEK ENDING Dec. 27.		WEEK ENDING Jan. 3.		WEEK ENDING Jan. 10.	
Alpha	2.70	3.10	2.65	2.90	2.55	3.15	2.40	2.80
Alta	2.75	2.90	2.65	2.90	2.65	2.90	2.60	2.80
Andes	1.25	1.40	1.00	1.25	1.00	1.30	1.05	1.15
Argenta	....	.10	....	.10	....	.10	....	.10
Belcher	6⅞	7.25	6.00	6.75	5.75	7⅞	5.00	6.00
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	8.30	9.00	6.00	8.25	7½	7.50	5.50	7.50
Bullion	1.40	1.50	1.35	1.45	1.20	1.45	1.20	1.40
Baltimore	....	.45	.35	.45	.35	.40	.35	.40
Belle Isle	.40	.45	....	.35	.40	.45	35	.45
Bodie Con	1.45	1.50	1.25	1.35	1.35	2.80	1.60	2 15
Benton	....	....	....	2.00	2.65	3.00	2.75	3.00
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.50	.55	.45	.55	.50	.75	.60	.65
Con. Va. & Cal	10½	10⅞	9⅜	10⅜	9⅝	10⅜	8⅝	10
Challenge	5.50	6.50	5.00	5⅝	5.00	6⅜	4.60	5⅜
Champion	....	....	....	....	....	....	....	....
Chollar	3.30	3.65	3.00	3.50	3.10	3.50	2.85	3.50
Confidence	....	16½	....	.15	15	16⅛	13⅛	15
Con. Imperial	.85	1.00	.75	.90	.70	.90	.70	.90
Caledonia	.50	.55	.40	.50	....	.45	....	.45
Con. Pacific	....	....	....	....	....	....	....	.15
Crown Point	5.75	7.50	6⅝	7.50	6.50	7.75	5⅝	7.00
Crocker	.85	.90	.70	.55	.80	.90	.80	1.05
Central	.35	.40	....	....	....	....	....	....
Dudley	....	....	....	....	....	....	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	....	....	....	....	....	....	....
Exchequer	1.20	1.35	1.15	1.25	1.15	1.25	1.10	1.25
Grand Prize	.80	.90	65	.85	.65	.75	.70	.90
Gould & Curry	4.20	4 50	3.55	4.15	2.65	4 30	3.05	3.50
Hale & Norcross	5⅜	6.40	5¼	5⅝	5.25	5.75	4.90	5.50
Holmes	....	.85	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	.40	.45	.25	.35	....	.35	.25	.35
Justice	1 50	1.8	1.75	2.00	1.70	2.45	2.10	2.45
Kentuck	2.75	2.90	2.20	2.80	2.75	2.85	2.20	2.25
Lady Wash	.50	.55	.45	.50	.50	.55	.50	.55
Martin White	....	....	....	....	....	....	....	....
Mono	....	1.10	1.00	1.05	1.05	1.70	1.25	1.55
Mexican	4.70	4.95	4.00	4.50	3.70	4.65	3.40	4.00
Mt. Diablo	....	....	....	....	....	....	....	2.75
Northern Belle	....	....	....	....	....	....	....	....
Navajo	2.10	2.40	1.50	1.65	1.75	1.80	1.60	1.70
North Belle Isle	2.80	3.25	2.65	2.85	2.60	2.90	2.25	2.50
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.95	3.40	2.55	2.80	2.55	2.95	2.50	2.90
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.80	2.10	1.60	2.00	1.60	2 00	1.50	1.75
Ophir	7⅜	8.00	6⅝	7.00	6.25	7.50	5.25	6.50
Overman	1 90	1.90	1 50	1.70	1.55	1.85	1.55	1.70
Potosi	2.75	3.15	2.55	2.80	2.50	2.65	2.00	2.60
Peerless	1 40	1.45	1.25	1.30	1.20	1.45	1.20	1.40
Peer	.45	.50	.40	.46	.40	.45	.40	.60
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	3.80	4.15	3.45	3.80	3.25	3.95	3.00	3.40
S. B. & M	3.00	3.25	2.80	3.00	2.75	3.20	3.00	3.50
Sierra Nevada	3.75	4.00	3.15	3.55	3.10	3.45	3.00	3.30
Silver Hill	.80	.95	.80	.85	.75	.95	.85	1.00
Silver King	....	1.60	....	....	....	....	....	1.50
Scorpion	....	.55	....	.50	.50	.55	.45	.50
Syndicate	....	....	....	.10	.10	.15	....	.15
Union Con	3.55	3.80	3.05	3.40	2.90	3.60	2.75	3.10
Utah	1.50	1.60	1.25	1.40	1.20	1.45	1.25	1.35
Yellow Jacket	4.85	5.50	4.90	5⅜	4.75	5⅜	4.60	5⅛

Sales at San Francisco Stock Exchange.

THURSDAY, Jan. 10.

100	Andes	1.05	
100	Alta	2.65	
150	Alpha	2.95	
160	Belcher	4.90	
585	B. & Belcher	5¼	
100	Benton	3.25	
150	Bodie	1 75	
400	Challenge	44	
150	Chollar	2.80	
60	Confidence	13.50	
610	Con Va & Cal	8.75	
1200	Con. Imperial	75c	
100	Crocker	80c	
8 0	Crown Point	6.00	
50	Exchequer	1.05	
100	Grand Prize	80c	
7 0	Gould & Curry	2 85	
750	Hale & Nor	4.90	
1440	Justice	2 40	
100	Kentuck	2.50	
400	Lady Wash	60c	
250	Mexican	3.30	
200	Mt. Diablo	2.60	
500	New York	50c	
150	Nev. Queen	2.90	
800	N. Belle Is	2.50	
400	Navajo	1.80	
250	Ophir	5¼	
50	Overman	1.55	
250	Occidental Con	1.50	
100	Potosi	2.25	
1200	Peer	35c	
300	Peerless	1.15	
510	Savage	2 70	
460	Sierra Nevada	3.05	
150	S. B. & M	3.20	
330	Silver Hill	9 c	
100	Utah	1.2	
50	Union	2.75	
600	W Comstock	40c	
485	Yellow Jacket	4½	

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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W. W. THEOBALDS—San Diego Co.
JOHN L. DOYLE—Napa Co
J. C. HOAG—San Francisco.
J. G. H. LAMPADIUS—San Francisco.

THE Southern Pacific Company has purchased Stone's coal mine in Slack's canyon, Monterey county, for $75,000.

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The works are situated on A. & P. R. R., Calico Mining District, Daggett, Cal., and contain a first-class Engine and Boiler with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPY & CHILDS, 123 California street, San Francisco.

THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Lesler, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No. 1, 32 ft.; No. 2, 94 ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Secy.

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The German Savings and Loan Society,
526 California Street.

For the half-year ending December 31, 1888, a dividend has been declared at the rate of five and one-tenth (5 1-10) per cent per annum on Term Deposits, and four and one-fourth (4¼) per cent per annum on Ordinary Deposits. Payable on and after Wednesday, January 2 ,1889.

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Assessment Notices.

Lord of Lorn Gold and Silver Mining Company. Location of principal place of business, City and County of San Francisco, State of California. Location of works, Gold Hill Mining District, State of Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 19th day of December, 1888, an Assessment (No. 4) of Ten (10) Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 313 California street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 21st day of January, 1889, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Monday, the 11th day of February, 1889, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

L. G. HARVEY, Secretary.
OFFICE—313 California St., San Francisco, Cal.

STOCKHOLDERS' MEETING.

OFFICE OF
The Superior Mill and Mining Company.

A SPECIAL MEETING of the stockholders of the Superior Mill and Mining Company will be held at the office of the company, Room 11, 303 California Street, San Francisco, California, on Wednesday, February 20, 1889, at 1 o'clock P. M., for the purpose of taking into consideration the increasing of the capital stock of said company from ten million (10,000,000) dollars, divided into one hundred thousand (100,000) shares of the par value of one hundred (100) dollars per share, to fifteen million (15,000,000) dollars, divided into one hundred and fifty thousand (150,000) shares of the par value of one hundred (100) dollars each. Transfer books will close on Monday, February 18, 1889, at 3 o'clock P. M. By order of the Board of Directors.

J. M BUFFINGTON, Secretary.
OFFICE—Room 11, No. 303 California Street, San Francisco, California.

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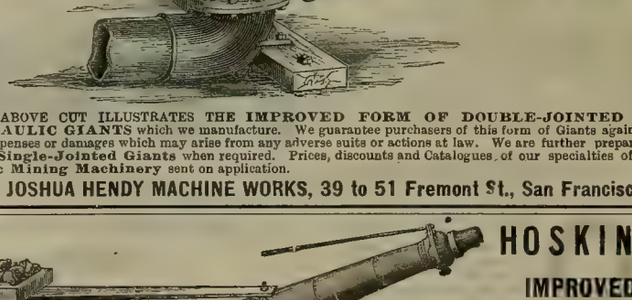

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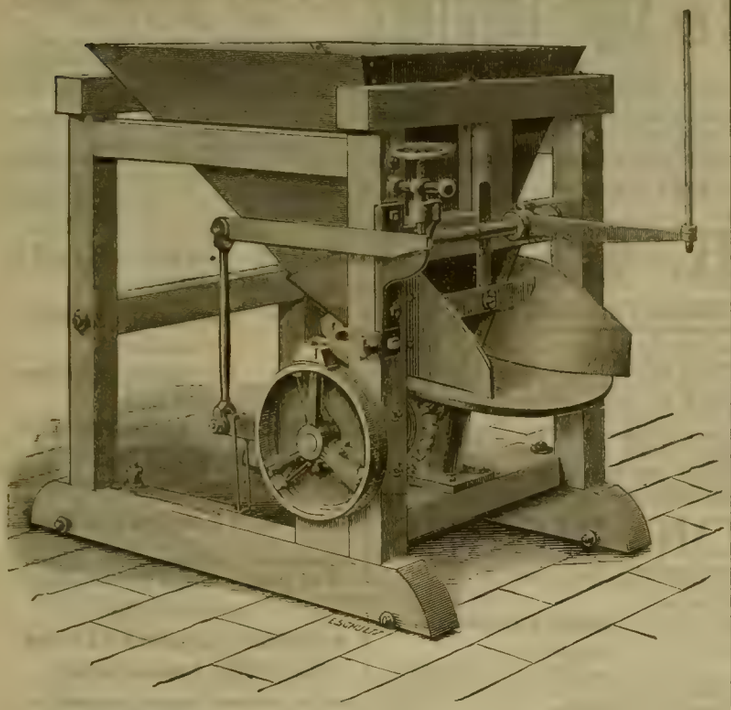

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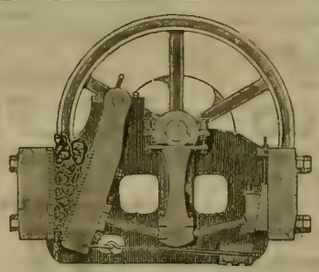

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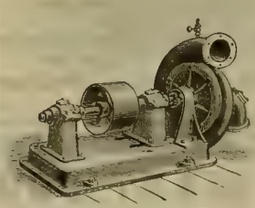

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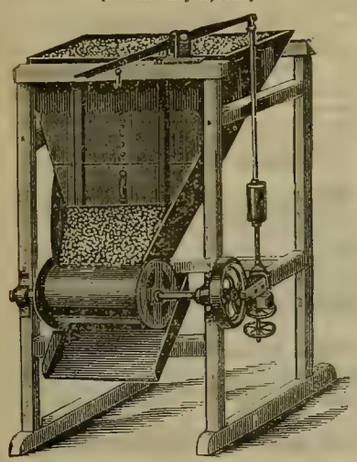

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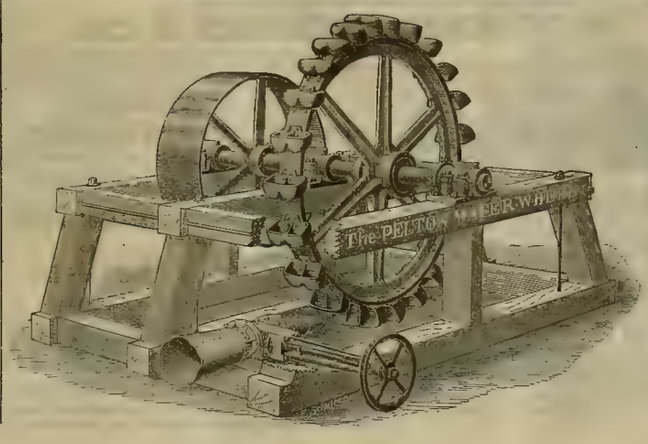

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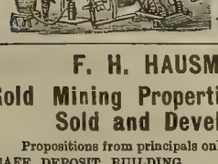

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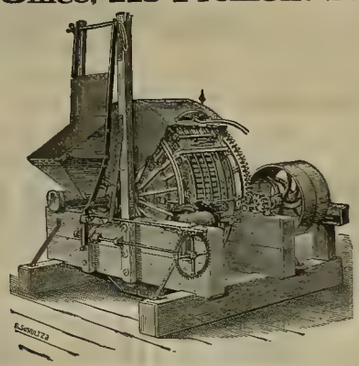

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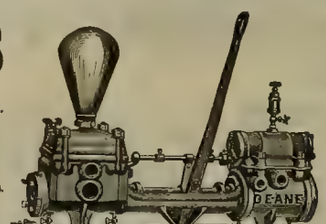

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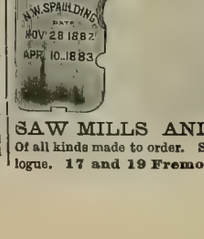

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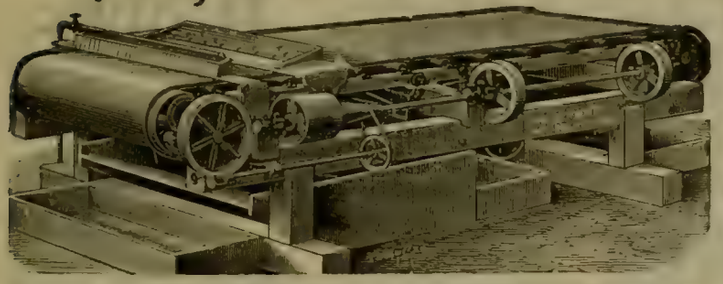

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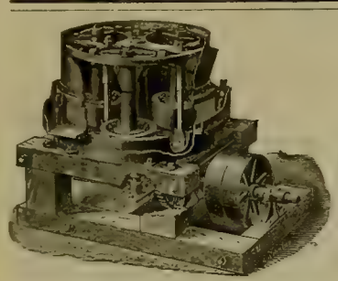

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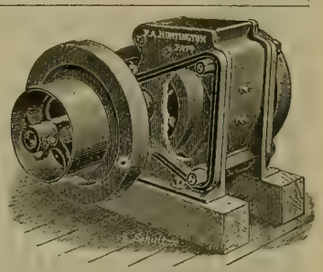

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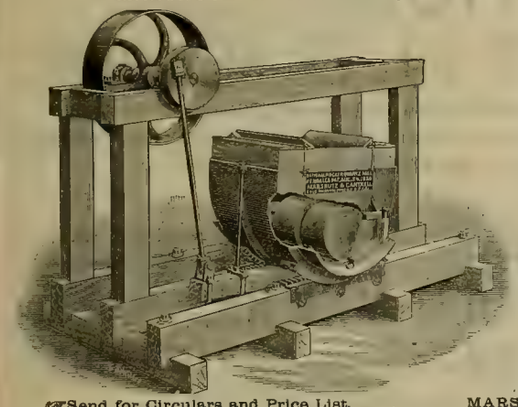

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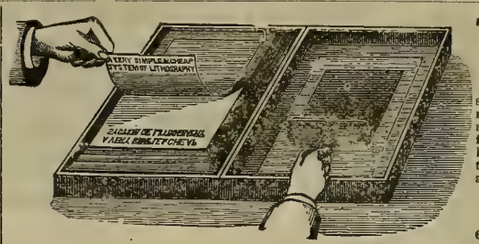

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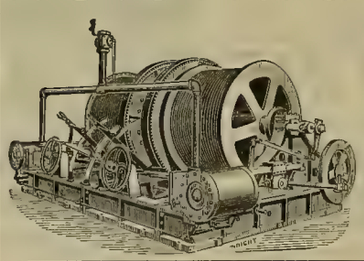

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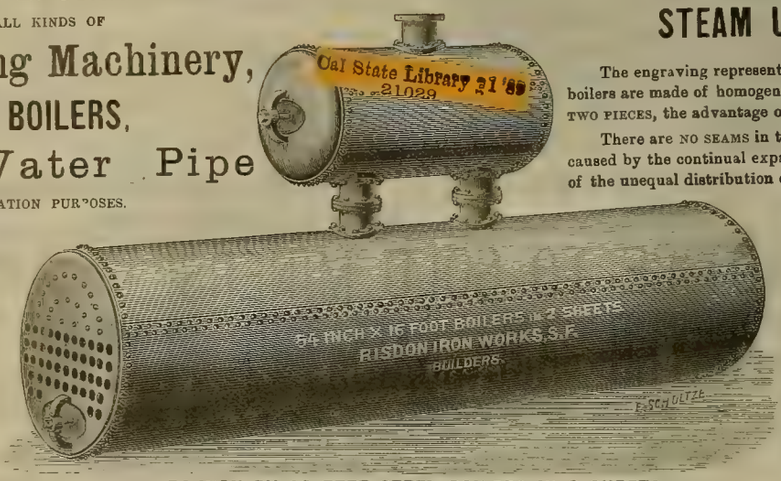

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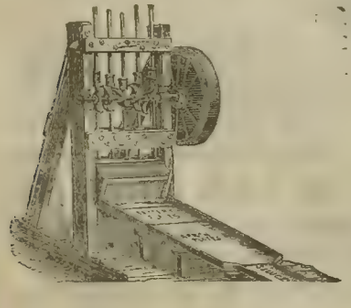

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, JANUARY 19, 1889.

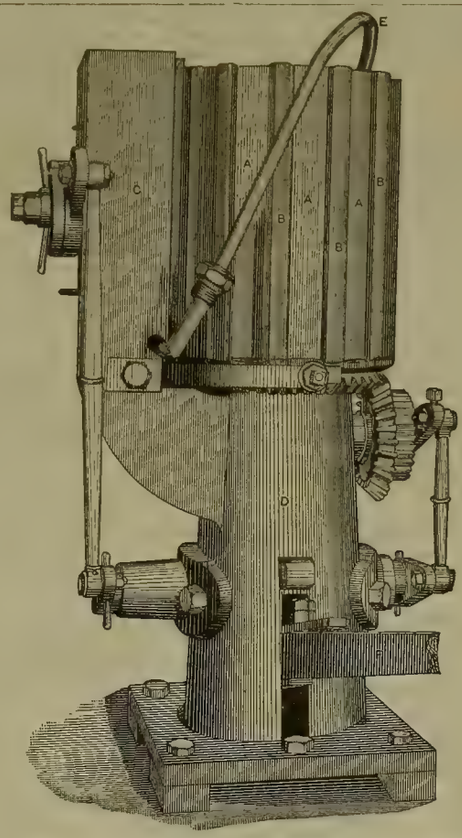
VOLUME LVII. Number 3.

The Sutro Tunnel.

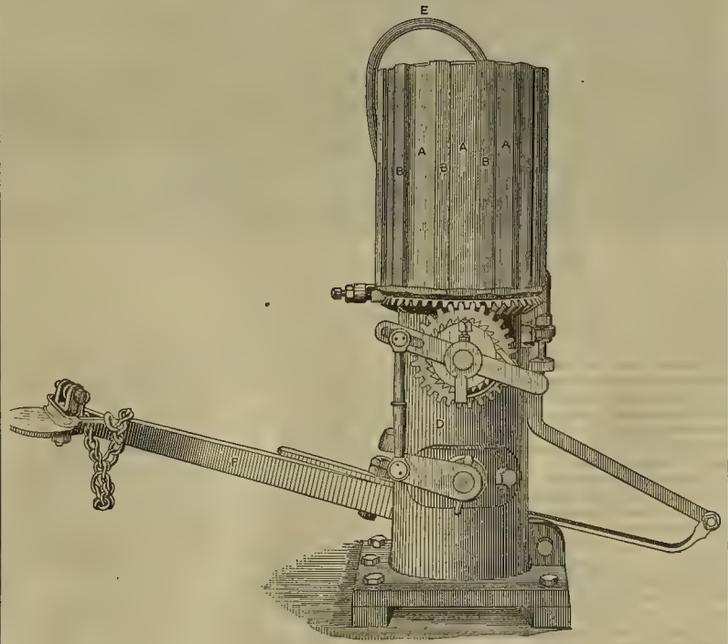
The sale of the Sutro tunnel, Virginia City, Nevada, under a decree of foreclosure granted by the United States Circuit Court at Carson City, Nevada, took place on Monday, January 14th. The property was bid in by Judge Henry C. Dibble for the Union Trust Company of New York, for the sum of $1,325,000. It is understood that the purchase was made in the interest of the old shareholders of the Sutro Tunnel Company, to whom it will be reconveyed. This sale, it is supposed, marks a new era of general prosperity for the mines at Virginia City, particularly so if the company pursues a more lenient course toward the mining companies whose properties are benefited by the tunnel. The royalty charged by the tunnel company of $1 a ton on all ore extracted, crushed or sold, yielding in bullion $40 a ton or under, and twice that amount on all ores yielding over $40 a ton in bullion, has, no doubt, been a serious drawback to a much larger quantity of ore being extracted and crushed. With the royalty reduced fully one-half and the cost of milling also reduced, about every mine on the Comstock can be advantageously worked, by which the tunnel company's revenue will be largely increased. Last year the income derived from royalty on ore extracted and crushed was nearly $300,000 and the total expenses incurred only about $80,000, leaving a very handsome net income—over 15 per cent a year interest on the cost, $1,325,000. It is claimed by mining experts and other authorities that there are on the lodes drained by the tunnel many billion tons of low-grade ore which can be made to pay a profit provided the royalty and cost of milling are reduced.

Aside from the royalty charge on all ores extracted that are crushed or sold, the Sutro Tunnel Co. has independent rights which will unquestionably make the property very valuable, not the least of which is that by Act of Congress, the company has the right to purchase all mineral veins within 2000 feet on each side of the tunnel, "cut, discovered, or developed" by it. This is the more important when it is understood that the right of way extends westerly for about seven miles from the mouth of the tunnel to and beyond the Comstock lode. In pursuance of the original object of the company, it is the intention to commence at an early day the extension of the tunnel to the west, toward the new mineral zone, now known to exist west of the Comstock lode. In doing this it will pass in a horizontal direction, at a depth of 3600 feet, the summit of Mt. Davidson. At this great depth many theories advanced concerning the veins or lodes at Virginia City will either be confirmed or disproved. This assertion has special reference to the depth, extent and richness in mineral ore of the veins found on the west side of Mt. Davidson. Shafts sunk on these veins showed them to dip eastward, and as depth was acquired, they were found to be widening and growing richer in gold.

ALVAN G. CLARK, the most famous maker of telescopic lenses in the country, was in the city this week on his way to Los Angeles to confer with the authorities of the University of Southern California with regard to making a 40-inch lens for a telescope, to be placed on Wilson's peak. He has just fitted up an instrument with a 20 inch lens at Denver, Col. He anticipates no trouble in making a 40 inch lens. Mr. Clark will visit the Lick Observatory while in California. He says that when last here he kept a record of the final tests made with the Lick lens, and out of five nights spent at Mt. Hamilton, four were infinitely better for astronomical observations than any one out of 70 nights spent in similar tests in Cambridge.



ROTARY MACHINE FOR MAKING SILVER INGOTS.



SIDE VIEW OF ROTARY INGOT MACHINE.

Silver Ingot Melting.

The method of making silver ingots at the mint at New Orleans is different from that employed at other mints in the world, the main distinguishing feature being the rotary ingot mold, which, though not a recent improvement, is comparatively unknown. There are four silver-ingot melting furnaces, standing in sets of two, and one crane and one ingot machine serves two furnaces. The appliances were described to the American Institute of Mining Engineers by F. F. Claussen, the assayer in the mint.

On a cast-iron platform 4½ feet by 8 feet in front of the furnace and 2½ feet above the floor, stands the rotary ingot machine shown in the accompanying engravings. The machine consists of a hollow vertical revolving cylinder of cast iron with slots, *AA*, cast on the outer circumference 12⅝ inches long, 1⅝ inches wide, and a half-inch deep, separated by lugs, *BB*, ⅝-inch wide extending the full hight of the cylinder. The slots are open at the top and outer side, and when closed by the block *C* form the molds for the standard silver-dollar ingots. The cylinder for this size of ingot has 12 molds on its circumference. It is supported by a cast-iron standard, *D*, and revolved by a gear-wheel bolted to its base.

The cast-iron block *C*, which closes the molds, has a motion to and from the cylinder of one-quarter inch. Both cylinder and block are kept cool by a half-inch stream of cold water *E* constantly flowing through them. This cooling is rendered necessary by the strong tendency of silver-copper alloys to segregate, and can only be partially overcome by cooling the ingot as quickly as possible after casting. The machine is operated by a foot-treadle.

The workman presses down the treadle, which first retracts the block from its position in contact with the lugs on the cylinder, where it has been left during and after the pouring of the preceding ingot; then rotates the cylinder one-twelfth of a revolution, bringing one of the molds on its circumference exactly opposite the block; then locks the cylinder in place, and finally releases the block from its retracted position, and allows it to be forced (by means of powerful steel springs) firmly against the lugs on the cylinder. So close a joint is obtained that no silver escapes through it, and only a slight feather-edge forms on the ingot after a cylinder has been in use for months. The silver is now poured into the open top of the mold, where, owing to the cooling by water, it immediately sets. The cylinder is again revolved as before, and the ingot at a dull red heat is exposed to view. This ingot remains in the mold until the third or fourth succeeding ingot is poured, when it is removed and placed in a cast-iron box.

The advantages derived from the use of the rotary ingot machine are obvious. Only four large furnaces are required, instead of a large number of small ones; the number of workmen required is also greatly reduced; and the weight of each melt is increased to an average of 8600 standard ounces, while by the hand-mold method the limit appears to have been reached at 3000 ounces, and the average weight by that method was about 2600 ounces.

THE Wellington coal mine strike has ended, the men having decided that all who could secure work should take it.

CORRESPONDENCE.

We admit unindorsed, opinions of correspondents.—EDS.

Debris and Tule — A Word for the Miner.

EDITORS PRESS:—I see that the Hydraulic Mining Commission is to meet this month, and I feel it my duty to say something in favor of the miner. In the years 1851–3 I traveled over all the debris section, and I was familiar with the different ranches on Bear river and the Yuba. Both rivers had very rich bottom land; farmers did well in summer, but the ground was so low that it was an accident if they got their stock out in the fall before the floods came down and carried houses, barns and stock into the bay. I know of one ranch that was served this way three years in succession. Then there was J. Bareham's place at the mouth of Bear river—he never could stay there through the winter, and stages had to abandon the Sacramento and Marysville route at the first heavy rains. Then there was a strip of tule from the American river to Fremont, from five to fifteen miles wide, and stretching from Suisun bay to the Buttes, all covered with water, besides many thousand acres on the Feather river, that were worthless, except in the driest part of the season. Marysville grew to be quite a city and you could see from 20 to 30 six and ten mule teams, and half as many pack trains loading every day.

This was all before hydraulic mining commenced.

Ten years after this, hydraulic mining was in full blast and run up to 1880. In the meantime the ranchers, fruit-growers and vegetable men were all getting rich. Marysville and Oroville were the most lively towns in the State; everybody was raising grain, hay and fruit to send to the mountains, and in every way prosperity reigned. But since the mines have shut down everything is dead; fruit is fed to the hogs, there is no demand for hay and grain in the mines, and Marysville has but one big team now where she used to have 20.

I will admit that the debris has done some damage to some farmers, but those men have lost all that they can, for their land, as well as thousands of acres of debris land, has been sold for taxes to lawyers, and they are the ones that have kicked more than any one else. The land as it is now makes splendid farms. The debris has filled all the low and uneven places along the Yuba, Feather and Bear rivers and all the tule between the American river and Fremont, besides filling a long way out toward Knights Landing, in some places eight feet deep; and I have always contended that there have been ten acres made where one has been spoiled.

There are plenty of farmers to-day whose land has been sub irrigated by the raising of the river-beds, so that they grow much better crops than they ever did before, but they have no market for what they do raise.

Now in "the fifties" I have seen the Sacramento valley full of water from mountain to mountain, when steamboats went all over the valley gathering up stock that had sought refuge on haystacks and people in trees and on house-tops. Then and there many a man wished there was a pile of debris around his house high enough to save his stock from floating down stream, when Sacramento had one little dry spot and Marysville had none less than six miles off.

Now, I believe that there are millions of acres of tule that could be made the finest agricultural land in the State, if proper care could be taken in depositing the debris in the low-lands by opening canals through the valleys, as is proposed by a late company organization to drain the Sacramento valley, so that private individuals can be benefited. This company will ask Congress to appropriate from $5 000,000 to $8,000,000 to defray the expense. Now, why have not the miners a better right to ask similar appropriations for a deposit for their tailings?

We are boasting of California's great mineral wealth, and sending grand specimens to foreign exhibitions, and making a great blow about it, and at the same time serving injunctions and keeping a vigilant watch over the miner, to see that he shan't work the mines. But, mind you, the miner has been at work for 15 or 20 years trying to open his mine. Knowing that it is rich, and that he has a fortune before him, he has worked early and late, through mud, rain and snow, to form companies to bring in water—some 10 miles, some 30 miles—to wash his ground, while his family has scarcely had the necessaries of life, and his children have gone barefooted in snow, eking out a miserable existence, awaiting the time they should have a fortune; and for fear of losing their claims, they had to buy their mining land from Government. Then, after all this, when they are ready to realize their anticipations, the Government—the very one that should have been their friend—says: "You shan't work your mines." I ask you how intelligent, law-abiding men and women feel at such treatment at the hands of their own Government.

Now these are facts; the miners are even willing to impound their debris; but no! you shan't even do that, when farmers have bought their tailings and are even fighting for them, doing as at Quincy. But no relief can be had. Now here is a wrong that should be righted; and it can be done by our Government carrying the debris down into the tules and making canals with plenty of openings, so that the current will eddy through and the mud will settle in the tules, and in due time the low grounds outside of the canals will be filled up to high-water mark. And this very same land, to-day worthless, will be one of the garden spots of California, and the miner who has survived will be made happy, and I hope independent. There is a wrong existing, and it should be righted by our Government.

For myself, I am not interested in hydraulicking, but am a quartz-miner and fruit-grower.

Petaluma, Jan. 10, 1889. A SUBSCRIBER.

On a Method of Assaying Copper.

[Written for the MINING AND SCIENTIFIC PRESS by C. H. AARON.]

Some few years ago I briefly described in the columns of the PRESS a determination of copper in the form of xanthate, which was not quite correct. I then supposed the copper xanthate to be a cupric basic salt containing theoretically 32 95 per cent of copper, or empirically, by my experiments, 33 per cent. I have since ascertained that it is a cuprous compound, containing 34 85 per cent of copper, according to the formula given in Roscoe & Schorlemmer's chemistry.

When potassium xanthate is added to a cupric solution, the copper is reduced from the cupric to the cuprous state, and xanthic acid is oxidized, forming an oily liquid, which, being insoluble in water or aqueous solutions generally, remains entangled with the yellow, cuprous xanthate from which it is but imperfectly removed by washing with alcohol, in which it is soluble.

It was owing to this substance, which I supposed to be free xanthic acid, that I could not get my precipitate to contain more than 33 per cent of copper, even by washing it with alcohol, and as 33 per cent agreed practically with the formula for a basic cupric xanthate, I was led to adopt that erroneous view.

While the volumetric assay, as described in my handbook of assaying, Part III, can be made with accuracy in the ammoniacal cupric solution, the gravimetric determination requires that the copper be reduced to the cuprous state previous to the precipitation, in which case the oily matter is not produced.

My first attempts at obtaining a purely cuprous (*ammoniacal*) solution did not succeed; there was always some copper in the cupric state, and, consequently, always some of that troublesome oily matter. The best result I could get in this way was 34 44 per cent of copper in the precipitate, and that by a troublesome alcoholic washing. I have now succeeded perfectly by means of a different solution.

The copper is first brought into the state of an ammoniacal solution free from silver, lead, antimony, tin, bismuth, barium, strontium, iron and manganese, by easy means which are too well known to need description. The liquid is then rendered faintly acid by means of sulphuric or hydrochloric acid. Sodium sulphite and sodium thiosulphate (hyposulphite) in crystals are then added and dissolved until the liquid, in the absence of chromium, is perfectly colorless and quite clear. The object of using the sulphite is to dissolve any sulphur which may be liberated from the thiosulphate. If cadmium is present there may be a white precipitate, but this dissolves on addition of more thiosulphate. If chromium is present the solution will not become colorless, but if thiosulphate is used liberally and the liquid smells of sulphurous acid, the copper will be all reduced to the cuprous state, and on the addition of solution of potassium xanthate, which should not be too weak, in slight excess, will be completely precipitated.

The precipitate must be collected on a counterpoised filter, well washed with pure water, which is better if warm, dried on the water-bath and weighed on the filter. I prefer to wash, at last, with alcohol, as the precipitate then dries much faster.

Zinc, cadmium, manganese, if not entirely removed previously, chromium, arsenic, alumina, lime and magnesia do not interfere. Nickel and cobalt are precipitated with the copper; the former can be washed out by ammonia, the latter not. Hence, if cobalt is present in the assay the copper must be precipitated by iron, or otherwise, from the first acid solution, and then redissolved and determined.

My results in experimenting on pure copper are almost absolutely exact, and I am convinced that the method is as accurate as electrolysis, while more rapid and less troublesome in presence of arsenic, etc.

A solution of potassium xanthate can be kept in dark-colored or opaque bottles for a few weeks without decomposition. The crystals are stable and may be dissolved as required for use.

THE new chloride camp near Lake Pen d'Oreille is said to be one of the most promising in the Cœur d'Alene district. One of the veins has been bonded for $250,000. There are 100 prospects already located, and considerable excitement prevails.

THE Pacific Rolling Mill Co. has sued the Mission Transfer Company for $159,872.78 damages for the alleged breach of contract entered into in May, 1887, to furnish a quantity of crude petroleum.

The State Mining Bureau.

In his message to the Legislature, Governor Waterman has this to say concerning the State Mining Bureau:

Among the institutions of the State which aim to give information of a practical kind is the Mining Bureau. The objects contemplated by the Legislature in establishing the Bureau differ somewhat from those of any other institution in the United States. While recognizing the value of scientific research, the legislators concerned themselves more about the details of practical mining, and in defining the duties of the State Mineralogist indicated unmistakably the direction to which they desired his time and attention to be principally given.

The failure of the old Geological Survey to supply one volume of the economic geology of the State was a great disappointment and undoubtedly, in a measure, led to the refusal of the Legislature to make further appropriations to continue that survey, and in consequence the work was discontinued at a time when its continuance might have led to an authentic report on the subjects most sought for by the people.

The State Mineralogist is in no way incumbered by the Act creating the bureau. He may consistently go ahead with the work where the old survey left off, if sufficient funds are placed at his disposal, and I think such provision should be made.

Gold-mining should receive the fostering care of the State and the encouragement which it deserves. Until recently little or no attention has been paid to the fact that many valuable deposits of minerals other than the precious metals occur abundantly throughout the State undeveloped and not applied to any use, the existence of which has been made known through the efforts of the Mining Bureau.

We continue to be supplied with many crude minerals from foreign markets, notwithstanding they are largely distributed throughout the State, and materials manufactured from minerals continue to be imported which could be made at our very doors.

The collection of ores and minerals in the museum of the State Mining Bureau at San Francisco is a feature which proves the importance of the institution. It is arranged in a manner most convenient for the inspection, examination and comparison of the ores and minerals.

The economic ores and minerals exhibited can stand comparison with any other collection in the United States, and as a whole it is invaluable to the scientist, the miner and the student.

Since the last session of the Legislature, the State Mineralogist has submitted his seventh and eighth annual reports. The first is chiefly confined to the deposits of coal, petroleum and asphalt in the State. The eighth report is a comprehensive presentation of the mining being carried on in the State, and of the localities of many valuable economic minerals, and is replete with much-needed statistics and suggestions.

While on this subject, your attention is called to an Act amending the Act of April 16, 1880 (see Stats. 1885, p. 217), by providing for the appointment of a board of trustees to direct and control the affairs of the Bureau. Section 8 provides as follows: "The Board of Trustees may, with the assistance of the State Mineralogist, prepare a special collection of ores and minerals of California, to be sent to any world's fair, or exposition, at which they deem it desirable to display the mineral wealth of the State."

The importance of exhibiting our mineral wealth at the exposition to be held at Paris is generally recognized. The policy of making a special appropriation to the trustees for that purpose has been considered, and I give it my recommendation.

The Silver King.

The election of officers of the Silver King mine, Pinal county, Arizona, resulted in a victory for the Nevada bank people as against the Eastern stockholders. The directors are, W. S. Lyle, C. H. Fish, J. B. Low, H. H. Noble, and B. A. Barney.

At a subsequent meeting of the Board of Trustees H. H. Noble was elected president, Chas. H. Fish vice-president, Jos. Nash secretary, and Wm. S. Lyle general manager. Randolph Adams was elected superintendent. The secretary's financial statement was as follows:

Receipts—January 1st. Balance on hand, $27,924 30; sales of bullion during the year, $101,319 20; sales of concentrates, $441.713 58; assessment No. 1, $50,000. Total, $620,957.08.

Disbursements—Assaying, $456; expenses, $8127.66; law, $1505; insurance, $797.15; interest, $1946 45; freight, $19,605.74; merchandise and supplies, $41,028.99; superintendent's drafts on account of mine and mill, $531,206.19; balance cash on hand, $16,283.40.

On hand, 110,000 ounces of silver.

Liabilities—Superintendent's drafts unpaid, $18,147.76; merchandise account unpaid, $478.60; labor on mine (estimated) $11,000. Total, $29,626.36.

JOHN HOSKING, superintendent of the Plumas Eureka mine, died recently of pneumonia.

THE pay-roll of the Comstock mines for December amounted to $224,387.

The Legislature of 1889

Convened at Sacramento on Monday, 7th instant. The Senate was called to order by the president pro tem., S. M. White, of Los Angeles, who delivered an address eulogizing the late Gov. Bartlett and Senator Chandler. Mr. White was subsequently elected permanent President of the Senate, and Robert Howe of Sonoma Speaker of the Assembly, both being Democrats. Following are the Senatorial and Assembly districts and the counties constituting them, with the P. O. addresses of the members:

THE SENATE.

DIST.—NAME.	COUNTIES.	POST OFFICE.
1–Frank McGowan, *R*	Humboldt, Del Norte	Eureka
2–J. M Briceland, *D*	Trinity, Siskiu, Shasta, Shasta	
3–M. H. Meade, *D*	Modoc, Plumas, Lassen, Sierra	Logansville
4–A. F. Jones, *D*	Butte	Oroville
5–E. M. Preston, *R*	Nevada	Nevada City
6–A. Yell, *D*	Mendocino, Lake	Ukiah
7–Thomas Fraser, *R*	Placer, El Dorado	Placerville
8–John Boggs, *D*	Tehama, Colusa	Colusa
9–F. S. Sprague, *R*	Yolo, Napa	Woodland
10–E. C. Hinshaw, *D*	Sonoma	Bloomfield
11–G. J. Campbell, *R*	Solano	Vallejo
12–F. H Greely, *R*	Yuba, Sutter	Marysville
13–F. R. Dray, *R*	Sacramento	Sacramento
14–A. Caminetti, *D*	Amador, Calaveras	Jackson
15–F. C. DeLong, *R*	Marin, Contra Costa	Novato
16–F. J. Moffitt, *D*	Alameda	Oakland
17–W. F. Dargie, *R*	Alameda	Oakland
18–M. W. Dixon, *D*	Alameda	Harrisburg
19–J. W. Welch, *D*	San Francisco	670 Harrison
20–T. J. Pinder, *D*	San Francisco	321 Broadway
21–W. O. Banks, *R*	S. Francisco, 1419½ Washington	
22–J. N. E Wilson, *R*	San Francisco	1812 Pacific
23–W. H. William, *D*	San Francisco	115 Fifth
24–P. J. Murphy, *D*	San Francisco	29 Russ
25–J. E. Britt *D*	San Francisco	403 Eighth
26–T. H. McDonald, *D*	San Francisco, State Pg office	
27–John E. Hamill *D*	San Francisco, Stevenson B'ldg	
28–J. R. Spellacy, *D*	San Francisco	2529 Bryant
29–B. F Langford *D*	San Joaquin	Lodi
30–A. J. Meany, *D*	Merced, Stanislaus, Tuolumne	Merced
31–A. W. Crandall *R*	Santa Clara	San Jose
32–E. B Conklin, *R*	Santa Clara	Santa Clara
33–Joseph D. Byrnes, *R*	San Mateo, Santa Cruz, S Mateo	
34–Geo. C. Goucher, *D*	Mariposa, Fresno, Alpine Mono	Fresno
35–Thomas Flint, Jr., *R*	San Benito, Monterey, Hollister	
36–John Roth, *D*	Tulare Inyo Kern	Woodville
37–E. H. Heacock, *R*	S. L Obispo, S Barbara, Ventura	Santa Barbara
38–S. M. White, *D*	Los Angeles	Los Angeles
39–J. E. M. Coma, *R*	Los Angeles	Pomona
40–W. W. Bowers, *R*	S. Diego S. Bernardino, S Diego	

THE ASSEMBLY.

1–John McVay, *D*	Del Norte, Siskiu, Crescent City	
2–J. G. Murray, *R*	Humboldt	Eureka
3–G. Williams *R*	Humboldt	Ferndale
4–T. W H. Shannahan, *D*	Shasta, Trinity	Anderson
5–James J. K ayes, *D*	Modoc, Lassen	Bieber
6–H. K Turner, *R*	Plumas, Sierra	Sattley
7–A. P. Matthews *D*	Tehama	Tehama
8–C H Porter, *R*	Butte	Biggs
9–L. L. Burwell, *D*	Butte	Oroville
10–J C. Campbell, *R*	Colusa	Colusa
11–J. H. Seawell, *D*	Mendocino	Ukiah
12–C. M. Crawford *D*	Lake	Upper Lake
13–D. A. Ostrom, *D*	Sutter, Yuba	Wheatland
14–Joseph Sims, *R*	Nevada	Nevada City
15–J. I. Sykes, *R*	Nevada	Grass Valley
16–John Davis, *R*	Placer	Auburn
17–Henry Mahler, *D*	El Dorado	Coloma
18–W. M. Petrie, *R*	Sacramento	Sacramento
19–E. C. Hart, *R*	Sacramento	Sacramento
20–L. H. Fassett, *R*	Sacramento	Florin
21–L. B. Adams, *D*	Yolo	Woodland
22–F. L. Coombs, *R*	Napa	Napa
23–F. B. Mulgrew, *D*	Sonoma	Healdsburg
24–J. W. Ragsdale, *R*	Sonoma	Santa Rosa
25–Robert Howe, *D*	Sonoma	Sonoma
26–J. A Mullaney, *D*	Solano	Benicia
27–J. F. Brown, *R*	Solano	Bingham ton
28–J. W. Athe ton, *R*	Marin	Novato
29–Thomas Mulvey, *D*	San Francisco	320 Beale
30–J D. Long, *D*	San Francisco	16 Hubbard
31–T. J. Brannan *D*	San Fran.	International Hotel
32–John Staude, *D*	San Francisco	815 Pacific
33–W. E. Dinan, *D*	San Francisco	5 Jane Place
34–E. J Reynolds, *D*	San Francisco	1315 Jackson
35–H H. Dobbin, *D*	San Francisco	125 Silver
36–C. H. Kiernan, *D*	San Francisco	836 Mission
37–Thos. Scarry, *D*	San Francisco	432 Clementina
38–D. S. Regan, *D*	San Francisco	215 Seventh
39–John McCarthy, *D*	San Francisco, 329 Golden Gate	
40–E. Murray, *D*	San Francisco	10 Col Square
41–H C. Dibble, *R*	San Francisco	Nevada Block
42–E. S. Salomon, *R*	San Francisco, Stevenson B'dg	
43–L. L. Ewing *R*	San Fran.	Fourth & Townsend
44–H. M. Black, *D*	San Francisco	598 Mission
45–H. M Brickwedel, *R*	San Fran.	Fourth & Townsend
46–J mes Reavy, *D*	San Francisco	13½ Freelon
47–G. W. Burnett, *D*	San Francisco	616 Shotwell
48–P. C. Maher, *R*	S. Francisco, 637 Twenty-third	
49–L. J. Franks, *D*	San Mateo	Redwood City
50–James A. Hall, *D*	Santa Cruz	Watsonville
51–Joseph McKeown, *R*	Alameda	Alameda
52–Wm Simpson, *R*	Alameda	Alameda
53 M D Hyde, *R*	Alameda	Oakland
54–E. S. Culver, *R*	Alameda	Oakland
55–M. C. Chapman, *R*	Alameda	Oakland
56–C. O. Alexander, *R*	Alameda	Oakland
57–Henry Hook, *R*	Contra Costa	Pacheco
58–R. S Johnson, *R*	San Joaquin	Stockton
59–John McMullin, *D*	San Joaquin	Lathrop
60–C. T. Ligrave, *D*	Amador	Ione
61–John Gardner, *R*	Calaveras	Angels Camp
62–L. R. Tullock *D*	Tuolumne	Sonora
63–Philo Hersey, *R*	Santa Clara	San Jose
64–James R. Lowe, *R*	Santa Clara	San Jose
65–L. A. Whitehurst, *D*	Santa Clara	Gilroy
66–V. E. Bangs, *D*	Stanislaus	Modesto
67–W. M. Rundell, *D*	Merced, Mariposa	Hornitos
68–E. C. Tully, *D*	San Benito	Bitterwater
69–Thos. Renison, *D*	Monterey	Gonzales
70–E. H. Tucker, *D*	Fresno	Selma
71–G. Stockton Berry, *D*	Tulare	Visalia
72–Cyrus Coleman, *R*	Inyo Alpine, Mono, Markleeville	
73–D W. James, *D*	San Luis Obispo	Paso Robles
74–A. A. Storke, *D*	Santa Barbara	Santa Barbara
75–Geo. W We r, *D*	Kern, Ventura	Bakersfield
76–J. R. Briely, *R*	Los Angeles	San Pedro
77–J. M. Damron, *R*	Los Angeles	Los Angeles
78–E E. Edwards, *R*	Los Angeles	Santa Ana
79–E. W. Holmes, *R*	San Bernardino	Riverside
80–N. A. Young, *R*	San Diego	San Diego

SENATE.

Democrats	22
Republicans	18
Democratic majority	4

ASSEMBLY.

Democrats	42
Republicans	38
Democratic majority	4
Democrats	64
Republicans	56
Democratic majority on joint ballot	8

What Confidence Will Do.

The Nevada City *Herald* finds it necessary now and then to rap the knuckles of the croakers in that town, "who stay by hot stoves and walk the principal streets." It says: There are shirkers and workers in every community. There are birds of evil omen among the feathered race, and there are prophets of evil among men. The different impressions a stranger gets by conversing with citizens of a place is a pretty good criterion to judge of the citizen. The doubtful, faithless individual will convey the idea to others and probably give them the same impression he possesses. On the other hand, the hopeful man—the man who believes in moving things by personal effort—will convey his opinions and belief to all he comes in contact with. It is this kind of men that give life to a town. It is this kind of men that cause booms to take place in communities. Every prosperous place has a majority of such men. They are hopeful, confident and energetic. Their influence and example inspire others with the same feeling. The principle holds true in mining, as well as in other business. One hopeful man has raised Grass Valley from a comparatively dead mining camp to one of great prosperity. It will be conceded that when Mr. Bourne decided to take hold of the North Star and Empire mines, Grass Valley was not very prosperous. The mines themselves had been abandoned as worthless, but Mr. Bourne's faith induced him to invest his money, believing that with great depth he would be rewarded for his outlay. The facts proved that he was correct in his conclusions. His energy and hopefulness has borne fruit and the whole country around Grass Valley is now considered a good field for investment. Bourne's success has made every idle mine in Grass Valley district valuable. Men will now take hold of abandoned properties there who would not have looked at them before. The confidence of one man will inspire confidence in a dozen. Confidence makes a town, while want of it ruins one.

THE Oro Fino mine, El Dorado county, will soon start up its new 20-stamp mill. The mill cost $37,000, and is a very fine one.

Claims and Prospects.

There is a vast sight of difference between a mining "claim," a "prospect," and a "mine," and it would be money in the pockets of many a claim-owner in Homer district if they would learn this difference, get right down off their "high horse" and sell their numerous little piles of stone and pick scratches at from $20 to $1000 the claim, according to the prospect. The price of a farm bears some relation to the amount of improvement made upon it, and its other advantages in the way of location and other natural surroundings; but the most costly and splendid improvements will not make a farm of a lava bed, nor will a "claim" nor any amount of "blowing" make a mine, nor even a prospect, of side and end monuments and a paper notice of location.

A "prospect" is another thing, and is valuable according to the lithological and other conditions surrounding it—chiefly the trend, dip, strength and width of the ore body and the character and quality or grade of ore. But it requires labor and sometimes a great deal of it to show up a prospect—and even labor will not show it up unless it has first been prepared by nature's laboratory in the silent centuries of the past.

The Eastern people have adopted a very good test of the comparative or probable value of a prospect that is offered for sale. They will not look at nor listen to a person offering a mere claim or location; and they argue, and rightly, too, that if a man has a prospect that is worthy of their attention he has acquired it, not by discovery or accident, but by development, and their test of his faith in his own property is, did it justify him in making, at least, an attempt to develop it? If not, they will have nothing to do with it. And the Eastern people are right.—*Homer Mining Index.*

THE Plumas County Mining Committee asks the miners of that county to furnish it as soon as possible with detailed statements showing the amount of ground worked by them, the amount of water used and the length of their water season, together with any other information which might prove of value in the pending investigation of the debris question.

Rich Finds.

Wonderful stories are being told of a gold strike in Arizona. Thousands of dollars of free gold was found on the surface and tons of ore are reported which will run very high. As a result of these fascinating tales many are flocking to the scene of the strike, a few to be successful, but the great majority to fail in the attempt to gain sudden wealth. This, at least, has been the case in mining strikes without end. We can call to mind the excitement which existed when the Homestake was discovered at White Oaks, in the winter of '79 and '80, and the newspaper reports which brought an army of men into the country. Old Jack Winters was bringing out boulders filled through and through with yellow, wire gold, from a 10-foot hole on the hillside, and as specimens went East, adventurous men flocked in until the mountains were teeming with them. Then Jack "cleaned out" his pocket and the army took the back trail. A few, however, stayed; many more came in the course of years, and White Oaks is now a noted mining camp of the world. Then there was our own rich gold strike in the Organ mountains. The glowing descriptions of Pat Breen's "find," made six years ago, which at the time occupied columns of the *Republican*, read like fairy tales. A single shot left the bottom of a shallow hole yellow with the precious metal; large pieces of pure gold, not interlaced in the rock as at White Oaks, but in nuggets, were brought by swift messengers to Las Cruces to announce the find. Pat sold half of his mine for $12 000. After a time when gold couldn't be picked from the dump by every visitor, the excitement died out. Breen's mine is yet to be thoroughly developed, and, like at White Oaks, ore of probably lower grade but better bodies will be found with depth.—*Rio Grande Republican.*

THE Santa Fe *New Mexican* says: Santa Fe county leads in exporting the treasures of the earth. At present Santa Fe county is shipping out hard and soft coal, coke, charcoal, iron, turquoise, silver, lead, copper, zinc, stone, lumber and gold. Shipments of the latter have been going on continuously for more than 100 years.

AN EXTINCT VOLCANO.—At a point in Mexico, about 100 miles north of El Paso, there is a lake of molten, black volcanic glass, which seems to have been agitated at the moment of cooling into ragged waves of fantastic shapes. These lava waves or ridges are from 10 to 12 feet high, with combing crests. This lava flow is about 40 miles long from northeast to southwest, and from 1 to 10 miles wide. For miles on all sides the country is the most desolate that can be imagined. It has been literally burnt up. It consists of fine white ashes to any depth which, so far, has been dug down.

BUTTE COUNTY ORES.—At the recent Citrus Fair at Oroville a small mineral exhibit was also made. The gold quartz from the Golden Buzzard mine, near Inskip, Butte Co., exhibited by S. M. Morgan, was exceptionally rich. A representative of the MINING AND SCIENTIFIC PRESS learned from Mr. Morgan that he is running a tunnel which will strike the ledge 75 feet from the surface. There are two tunnels that reach the vein, and the richest specimens were obtained in the lower one. The vein is decomposed quartz and the gold is so coarse and free that it can be separated from the rock by hand with any sharp instrument. McMillan Bros. & Hurlton had on exhibition 20 specimens of gold and gold quartz from the Hurlton mine, 14 miles east of Oroville, that were much admired, and pronounced by experts as fine as any ever seen in Oroville.

Photo by Conklin. *Photo-facsimile by Dewey Eng. Co.*

THE "GRIZZLY GIANT" OF MARIPOSA GROVE.

MISS FLORENCE A. DENSMORE, late principal of the New York Woman's Institute of Technical Design, is now in this city, with the view of establishing a similar institution here. Her own work will be to form a normal class for the purpose of training young women to act as teachers in such an institute. They will be taught the best methods of instructing pupils in industrial drawing, modeling, designing, and the mechanical arts.

IN the Agra district, between Shingle Springs and Placerville, El Dorado Co., mining matters are very active.

CHIEF ARTHUR of the Brotherhood of Locomotive Engineers is on a visit to this city.

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W. B. EWER.....SENIOR EDITOR

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A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO
Saturday Morning, Jan. 19, 1889.

TABLE OF CONTENTS.

EDITORIALS.—The Sutro Tunnel; Silver Ingot Melting, 37. Passing Events; Gold in California and Australia; The State Mineralogist's Report, 40. The Legislature; Taylor's Iron Mountain; An Improved Carburetor; The Discoverer of Gold, 41.

ILLUSTRATIONS.—Rotary Machine for Making Silver Ingots, 37. The Figure on the Marshall Statue; Dyke's Automatic Gas Machine, 41. The "Grizzly Giant" of Mariposa Grove, 39.

CORRESPONDENCE.—Debris and Tule—A Word for the Miner; On a Method of Assaying Copper, 38.

MISCELLANEOUS.—The State Mining Bureau; The Silver King; The Legislature of 1889, 38. What Confidence Will Do; Claims and Prospects; Rich Finds; An Extinct Volcano; Butte County Ores, 39.

SCIENTIFIC PROGRESS.—Remarkable Volcanic Eruptions; The World's Largest Flower; The Age of Trees; A New Mineral Compound, 42.

MECHANICAL PROGRESS.—Selecting Iron for Boilers; Radiation from Steam Pipes; The Manufacture of Screws; Cement for Belts; Removable Fire-Tube; Fighting Ships with Burning Petroleum; Bull's Metal; To Prevent Cast Iron from Rusting; Casting Iron Columns; The Electro-Magnet in a Machine Shop; Cast Steel for Heavy Ship Machinery; Tempering Drills, 42.

USEFUL INFORMATION.—Keeping Flowers; Butter Without Churning; Killing Whales with Cannon; Unexplored Mexico; Lawyers in China, 43.

GOOD HEALTH.—Injurious Effects of Noise; A Bug in the Ear; Prevention of all Infectious Diseases; Dangers of Close Shaving; Rules for Fat People and for Lean; Onions and Beef; No "Sure Cures," but Humbugs; Effects of Lights on the Eyes; Telegraphers' Disease, 43.

ENGINEERING NOTES.—A Pneumatic Marine Motor; The Behring Straits Railway; A Postal Tube for the Channel; Railway Building in Japan; Bridging the Missouri; Improved Screw Propulsion, 43.

MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 44-5.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 48.

Business Announcements.

[NEW THIS ISSUE.]

Gold Mine—N. H. Meagher, Halifax, N. S.
Mining Engineering School—A. Van Der Naillen.
Drugs—J. G. Steele & Co.

☞ *See Advertising Columns.*

Passing Events.

The Harqua-Halla mining excitement in Arizona has received a little "set-back," by reports of people who had visited the district and do not believe it is as rich as represented. The views of an observer are given in another column.

The Los Burros gold mines in Monterey county are again attracting some attention. Many people did not believe any gold mines of importance would ever be found in the Coast Range, but some of the claims at Los Burros show very well for the work done.

All the smelting furnaces at Eureka, Nevada, have been closed down in consequence of the suits commenced by the Government against the miners for cutting the "scrub pines" for fuel.

The gold ledges at Texada island, B. C., are causing some local excitement, and when spring opens the claims will be systematically developed.

To-day is the anniversary of the discovery of gold in California. A statue to Marshall, the discoverer, has been completed and is being placed in position at Coloma, near the spot where the first nugget was found.

The Sutro tunnel was sold this week under a decree of foreclosure, and the miners on the Comstock hope for some improvement in terms under a new management.

Gold in California and Australia.

Speaking of the monument now being erected to the memory of James W. Marshall, certain of our cotemporaries severely criticise the manner in which the gold-finder when alive was treated by the State of California, contrasting such treatment with that extended by the English Government to Hargraves, the discoverer of gold in Australia. While it must be admitted that our treatment of Marshall was decidedly shabby, it can hardly be claimed for him that his merits as a discoverer equaled those of the Australian. The Marshall gold find was the result of sheer accident; that of Hargraves of intelligent observation followed by diligent and successful search. All the merit that can be claimed for Marshall in this connection is that he did not, when he first noticed these little pieces of strange-looking metal, pass them by, giving them no further heed, as many men under like circumstances would have done, thereby postponing very likely the grand discovery of gold in California for many a day, and consequently that in Australia as well. Gold had been found and placers worked in a small way at different places in California long before the find at Sutter's mill occurred. But of this Marshall was ignorant, wherefore he must be credited with whatever of thoughtfulness his action on that occasion implies.

With his Australian compeer it was quite different. He had resided in New South Wales many years prior to the gold find there. The country was reputed to be auriferous, samples of gold bearing quartz having been obtained at several places and even quite a large nugget picked up by a shepherd named Macgregor somewhere in the Wellington district. As early as 1844 Sir Roderick Murchison, the distinguished English mineralogist, while traveling in Australia, observing the auriferous indications, had expressed the opinion that valuable gold-fields would some day be found in that region.

Incited by the reported gold discoveries in California, Edward Hammond Hargraves, an English settler and sheep-raiser in New South Wales, left that country in the month of July, 1849, for San Francisco, where he arrived in October of that year. Proceeding to the mines, he spent the winter working in the placers about Jamestown, Tuolumne county.

The following spring he returned to San Francisco, and while there wrote, under date of March 5, 1850, to a friend of his, a merchant in Sydney, expressing the opinion that there existed a gold region within 300 miles of that city, this opinion being based on the resemblance which that country bore to California. So firmly was Hargraves convinced of this, that he would, as he tells us, have at once set out on his return to Sydney, with a view to exploring the region mentioned, only that his funds being low, he did not care to go home empty-handed.

After tarrying in San Francisco several months, he returned to the "diggings," going this time to the northern mines, where his luck improved. First he went to Foster's Bar, on the Yuba, but being unable to secure a claim there, proceeded eight miles further on to what he calls "the Slate Ranges," where he remained till the first of November, his earnings meantime having averaged about 1½ ounces per day.

Being now in funds and having fully resolved to go back to Australia and prospect for gold, he came down to San Francisco, and a few days afterward set sail for Sydney, New South Wales, which place he reached early in January, 1851. On arriving there he explained to his friends the cause of his early return, stating his fixed purpose to set out at once on a prospecting expedition, all of which they treated with derision.

The locality he desired first to visit, and one he had been in 18 years before, was on the Lewes Pond creek, near Guyong, about 300 miles in the interior. Setting out on the 5th of February, he reached that place in good time, finding to his great gratification that his recollections of it had not deceived him. There was the red earth, the siliceous gravel, the quartz veins and other geological features all so like what he had seen in California. He felt that he was in a gold-bearing region, a fact that he was not long in demonstrating. Taking a pick, a trowel and a pan, he proceeded to scratch away the top earth from a schistose dyke that ran across the creek, after which he filled his pan with gravel, and washing it in a water-hole near by found in the bottom a small piece of gold. Following up this trial with several others, nearly all gave a like result, and thus was the long-suspected existence of placer deposits in Australia first established by a practical test, this having occurred on the 12th day of February, 1851. Hargraves made a note of the event, which was afterward given into the keeping of the Colonial Secretary to be preserved as evidence of the day on which it happened.

Before going back to Sydney, Hargraves, desiring to ascertain something as to the probable extent of the placers, visited the Macquarie river, Mitchell's creek and other localities, distant 60 to 75 miles from Guyong, at all of which he found gravel that prospected well in gold. He also dispatched two men to the Wellington district, 100 miles away, who reported the existence of a promising gold-field in that direction.

This accomplished, the successful prospector hastened back to Sydney, and putting himself in communication with the Colonial Secretary, acquainted him with the nature of his discoveries, offering to disclose their localities on condition that the public authorities would award him, in the first instance, the sum of £500, leaving it to the Government to give him such additional compensation as the importance of the discoveries might seem to warrant. To this offer the Secretary made answer that any remuneration for the discovery of gold on Crown lands must depend on its value, the amount to be fixed by the Government after such value had been ascertained.

Acting on this suggestion, Hargraves imparted to the authorities full information on the subject, all of which being made public, an intense excitement, followed by a great rush for the mines, at once ensued. Having been begun, one gold-field after another was discovered, and there being already many inhabitants in the country, the mines became rapidly populated, the output of Australian gold for several years thereafter nearly rivaling that of California. At its next session, the Legislative Council of New South Wales awarded the gold-finder the sum of £10,000, deducting by way of discount the £500 he had already received. The amount, though not large, was princely compared with the paltry monthly stipend Marshall received from the State of California, and which, having been grudgingly paid for a short time, was afterward withheld altogether. While Marshall was not, as a discoverer, entitled to the same consideration as Hargraves, he still merited something at the hands of this rich commonwealth which, having once voted him a pittance, might very properly have continued the same, inasmuch as the recipient, before this gold find, had already rendered the State some service.

MR. J. B. HAGGIN has been interviewed concerning the report that the copper syndicate would make another contract concerning the product of the Anaconda mine. He was not at all communicative relative to the status of negotiations between himself and the syndicate, but did not deny that negotiations are under way looking to a renewal of the contract.

THE crank shaft of the Chollar hoisting engine broke on Tuesday, and one cylinder head blew out while the cage was being brought to the surface. The cage was stopped by brakes and no further damage resulted.

A STRIKE has been made in the Wildgoose mine in Jumbo district, Nevada. A sample of ore assayed $339.25 to the ton, mostly gold. A development has been made 160 feet below the surface.

GAS COAL.—The S. F. Gaslight Co. paid an average price for coal in 1888 of $7.63 per ton. The average price paid in commercial circles was $10.50. The company laid about 20 miles of new mains last year.

ASSAY COMMISSION. — The President has named the Assay Commission to test the coinage for the present calendar year. The California member of the commission is A. J. Bowie of San Francisco.

THE U. S. Geological Survey asks for $350,000 to make surveys and locate reservoirs for water storage to irrigate arid portions of the West.

The State Mineralogist's Report.

We received this week from the California State Mining Bureau the Eighth Annual Report of the State Mineralogist, Wm. Irelan, Jr. There are upward of 900 pages in the volume and numerous illustrations of mines and mining appliances. By the Act approved March 9, 1887, providing for the support of the bureau for the 39th and 40th fiscal years, the sum of $60,000 was appropriated, and the Act provided that at least 50 per cent of this appropriation should be used for geological field-work. In accordance with this, as many assistants have been employed in the field as the appropriation would allow, and it is mainly the results of their work that form this volume.

While we have only been able to glance at the headings of the chapters and the general features of the report, the casual examination leads to the opinion that it is of more practical value to our mining community than any which have preceded it. Less attention is paid to minerals and more to mining, as should be the case, since the museum itself gives all the necessary ocular information concerning the minerals and a mere catalogue is of little general interest.

To each county of the State a special chapter is devoted, giving an account of its mineral resources and its mines, mills, etc. There are also special articles as follows: "On Milling of Gold Ores in California," by John Hays Hammond; "Notes on Hydrometallurgy of Gold and Silver," by C. H. Aaron; "Lithology of Wall Rocks," by Melville Attwood; "Building Stones," by A. Wendell Jackson; "Drift Mining in California," by Russell L. Dunn; "Notes on Western Lead Smelting," by W. S. Keyes; "Water-Wheels," by F. F. Thomas.

In addition, there are chapters on the Russell Process, U. S. Patents in California, Water Rights, Mineral Resources of the State, and Natural and Artificial Cement. There is also a tabular statement of the quartz-mills in the State and of water-wheels used in different counties, all of which, with the reports of the State Mineralogist and the trustees of the bureau, form the report as a whole.

Probably the most important chapter in the book is that by Mr. Hammond on "Milling of Gold Ores in California," a subject the bureau should have long since thoroughly worked up, and which the editors of the PRESS have been urging upon the officials for some years. Even now there remains much available information to be collected, and it can only be gathered by systematic work in the field and personal investigation of all the mills of the State. A great deal appears to have been collected as to milling practices by the mineralogist's assistants the past season, and this is shown in the tabular statement of mills by counties, giving name, power, number, weight, and drop of stamps, tons crushed, and number and kind of screens, but the mineralogist has not drawn any generalizations or conclusions from the data thus compiled.

In the county chapters, each of the prominent mines is described and the developments noted, and the information seems to be so full that there can scarcely be complaint that any locality has been neglected. The information ought to be, and probably is, very correct, as it has been gained, not from letters or hearsay, but by personal examination, and will be valuable to any one interested in mining matters.

Altogether, the report is a satisfactory one, and is really a new departure in such matters. It shows conclusively that the legislative proviso that certain money should be spent in field work was a wise measure, since it has been the means of collecting information and data hitherto unavailable, except in scattered newspapers and other publications. The official report may be obtained by any miner or other citizen applying for it, and no charge is made, the State paying for the work. Although the principal mining done in California is for gold, this is the first one of the many reports published by State officials that ever gave that branch of the subject any special attention. This time the gold mines and mills are given the prominence due them, the bulk of the report being devoted to their consideration. The State Mineralogist and the trustees of the bureau can congratulate themselves in having brought together much practical information, and they ought, after this, to have no trouble in getting appropriations to continue the work so well begun.

The Discoverer of Gold.

To day, January 19th, is the anniversary of the discovery of gold in California, Marshall having picked up the nugget in the tail-race of the Sutter mill, January 19, 1848. The event was one which brought California prominently before the attention of the people of the whole world, and ultimately led to the settlement of the Pacific Coast by citizens of the United States. Thousands of people flocked into California in a few months, and a State was built up in a wonderfully short period, scarcely paralleled in the history of the world.

The people of this State have erected a statue to the memory of James Wilson Marshall, the discoverer of gold in California, and it will shortly be dedicated with appropriate ceremonies. We give on this page a cut showing the figure of Marshall, as it stands on the pedestal. The whole statue stands 40 feet in hight, the base being decorated with suitable tablets. It was designed and made by F. Marion Wells, under the direction of a Board of Commissioners appointed by the State. We publish this as a rough sketch only, intending to give a photo-facsimile as soon as the statue as a whole is ready to be photographed.

There has lately been made an attempt to change the date of the discovery from the 19th to the 24th day of January, such proposed change being based on an entry made in a diary kept by Henry H. Bigler, one of the hands employed under Marshall, and who was at work on or about the mill when the gold find occurred. As we have already in these columns given our reasons for rejecting the Bigler version of this matter, we need not here further discuss the subject.

This statue occupies the summit of a gentle eminence a short distance west of Coloma, the site of the Sutter sawmill, in the race of which the first piece of gold was found. Overlooking the famous mill-race and the early home of Marshall, the locality has been well chosen, it being here also that the mortal remains of the "gold-finder" repose.

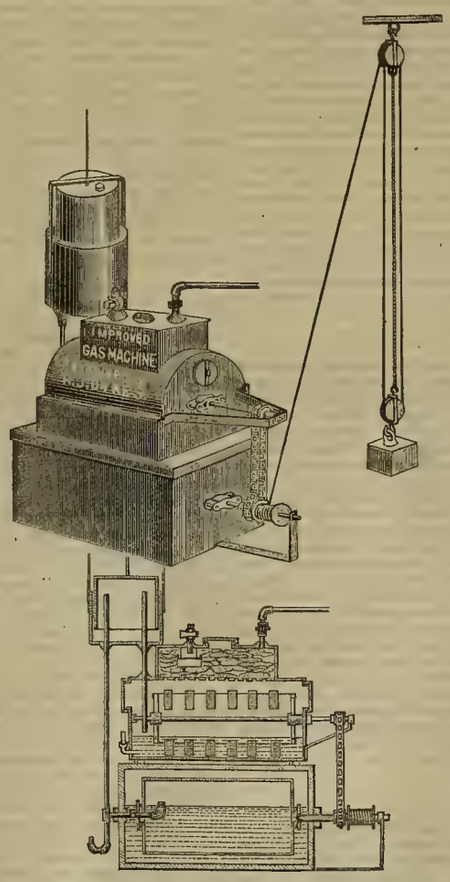
THE FIGURE ON THE MARSHALL STATUE.

An Improved Carburetor.

Hugh J. Dykes of Berkeley has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency an improved carburetor or automatic gas machine. The patent covers one of that class of carburetors in which air is forced into contact with volatile liquid hydrocarbons or oils, whereby it becomes saturated with inflammable vapor and may be conducted through pipes to burners. The invention consists in a rotary frame mounted within a casing containing the liquid hydrocarbon or oil, said frame carrying an absorbent material —such as strips of lampwick—which by the rotations of the frame are necessarily immersed in the body of oil and withdrawn saturated to give forth to the air in said chamber their inflammable vapors. It also consists, in combination with the cylindrical oil-casing or reservoir in which the air is carbureted, of a superposed feed-casing communicating along the center of its base with the oil-casing, and having the edges of its sides depressed to form receptacles for the oil.

The engravings on this page show a general view and section of the machine. By connecting the cylinder of the air-pump with the wick-carrying frame of the carbureting chamber their operation is made independent, whereby, when the capacity of the pump is increased, the operation of the wick-frame is also increased and the increased volume of air is provided for. The aerometer regulates the supply of air and when weighted requires an increase on the weight power for operating the pump cylinder.

The whole machine, it will be observed, is compact in construction and is available for operation in any situation. The depressions in the feed-casing hold enough oil to keep the absorbent material thoroughly saturated. The motion of the cylinder of the air-pump communicates rotation through the endless chain and sprocket pulleys to the frame in the shell, so that the wicks of the frame are brought around successively and immersed in the oil held in the shell, and as these wicks rise from the oil thoroughly saturated therewith they present an extended surface capable of giving off rapid evaporation, and thus give to the air their inflammable vapors, by which this air, rising from contact with the oil body partially carbureted, is completely carbureted, and passing up through the aperture and through the absorbent material in the casing, is relieved of any excess of hydrocarbon vapor, and finally is discharged through the pipe into the burner connection. These machines are in use in several places in this city, as well as in Berkeley, Woodland, Los Angeles, and in Tombstone, A. T. They are manufactured in San Francisco by the inventor. The well-known Cliff House uses these appliances for both lighting and cooking.



DYKE'S AUTOMATIC GAS MACHINE.

The Legislature.

Now that the Legislature has made all the usual appointments, the introduction of bills has commenced.

Assemblyman Sims of Nevada county has presented a bill appropriating $150,000 for the maintenance of the State Mining Bureau.

Among other bills is one by Simpson providing that the rate of wages on public work to cost over $10,000 should be fixed on the basis of the Labor Bureau's statistics of prevailing labor laws.

In the bills introduced in the Assembly the State Prison jute interests are well provided for. In all $502,500 is appropriated for additional machinery and buildings at San Quentin and Folsom, and in addition the revolving fund for the purchase of jute is increased to $100,000.

Among the Senate bills introduced is a bill by Britt, providing that the stationary engineers of San Francisco shall advise the Governor to appoint three examining engineers and a secretary, who shall appoint other examining engineers in every county of the State. The secretary is to get $4 a day and engineers $5. This Board of Examining Engineers is to license engineers of portable and stationary steam engines and boilers.

There is also a bill by McGowan making it a misdemeanor to empty sawdust or explode giant powder in any of the waters of the State.

Camminetti has a bill establishing an industrial training school for youths in every city and county, and providing an appropriation therefor.

Labor Commissioner Tobin has succeeded in obtaining the favor of the Assembly Committee on Labor and Capital for the bill compelling employers to keep properly ventilated workshops, and to provide seats for saleswomen who now stand all day. Also for the bill prohibiting the employment of children of tender years in factories.

Assemblyman McCarthy introduced a bill which provides that municipal governments shall have the power to establish and operate water works.

The Senate Committee on Mines, Drainage and Mining Debris are: Meade (Chairman), Preston, Greely, Langford, Dray, Murphy, Roth and Brice land.

The Assembly Committee on Mines and Mining Interests are: Mahler, Tulloch, LaGrave, Reavis, Gardner, Davis and Coleman.

There is an Assembly Committee also on Agriculture, Mining and Mechanical Arts as follows: Tulloch, Burwell, Reavis, Frank, Atherson, Hersey and Williams.

A Proposed State Debris Commission.

As is well known, a Government Commission is now at work on the debris question, and it is now proposed to have a State Commission also. We are informed that a bill will be introduced during the present session of the Legislature, of which the following is the text:

An Act to create a commission to examine and investigate the conflict between the mining and farming interests and to report thereon.

The people of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Governor of the State of California is hereby authorized and directed to appoint a commission for the purpose of making a thorough examination and investigation of the mining-debris question in the State of California for the purpose of ascertaining whether some plan can be devised whereby the present conflict between the mining and farming interests can be adjusted and the mining industry rehabilitated, and for the complete examination of the non-navigable watercourses of the State, affected by debris, with a view of determining what, if anything, can be done to protect such streams and the arable lands adjacent thereto from injury from mining debris without interfering with the business of mining.

SEC. 2. That commission shall consist of five members, two of whom shall be representative farmers, two shall be representative miners, and the fifth member shall be a competent civil engineer.

SEC. 3. Said commission shall, upon the completion of its work and before the first day of November, 1890, make a full report of its examination and investigation, and of the results thereof and its conclusions thereon to the Governor of the State of California, and shall, as part of such report, make such recommendations upon the subject of such examination and investigation as said commission shall deem proper.

SEC. 4. Said commission shall have power to appoint a secretary who shall receive a salary of one hundred and fifty dollars per month during the time that such commission desires his services. The engineer appointed upon such commission, as above provided, shall receive a salary of three hundred dollars per month. The salaries of the secretary and of said engineer, together with the actual expenses of the commission, shall be paid by the State out of the General Fund.

SEC. 5. This Act shall take effect from and after the day of its passage.

SCIENTIFIC PROGRESS.

Remarkable Volcanic Eruptions.

Next to the great Krakatoa eruption, which occurred in August, 1883, to which reference was made in these columns last week, the eruption which destroyed the peak of Sho-Bandai-san, Japan, on July 15th last, will rank as the most gigantic and most disastrous upheaval of modern times. Partial accounts of the eruption have already been published, but they all fail to give that explanation of the phenomenon which patient and scientific investigation on the scene of the disaster alone could afford. That explanation has now been furnished, and is contained in the report of two highly trained Japanese specialists of the Imperial University of Tokio. The two scientists have embodied the results of their investigations in their report, which is given in the form of a paper read before the Seismological Society of Japan on October 11th. As they carried on their investigations under highly favorable circumstances, their paper is full of interest for the student of natural science.

The peak that was destroyed on July 15th is, or was, one of a group of four conical mountains, forming the walls of an old elevated crater basin, and rising to a hight of some 6000 feet above the sea. Stratified volcanic rocks, the fruits of many successive eruptions, apparently of prehistoric date, are found on the slopes. But, though Japanese records often speak of fire and smoke and poisonous vapors issuing from Bandai-san, the latest known active eruption took place 1081 years ago, and all that remained to warrant the mountain's retention in the list of live volcanoes were a few solfatara in and near the old crater, which from time immemorial has given off steam. On the morning of July 15th this condition of tranquillity was suddenly and violently disturbed, first by a mild preliminary earthquake, followed very soon by a second and prolonged shock of fearful violence. A dense volume of dust rose to the hight of about 4000 feet, accompanied by a succession of 15 or 20 violent explosions, attended by sharp flashes of lightning and a final ejectment of molten lava, preceded by an immense volume of steam and bluish-gray dust (volcanic ash), reduced to a fine powder by the violent mechanical disintegration of the rocks ejected.

This fine dust rose to an altitude of about 15,000 feet and spread out fan-shaped to the leeward, covering upward of 1000 square miles of land and reaching the seashore 62 miles distant. Near the volcano this dust covered the land about six inches deep, while at the sea coast it presented a mere film of dust. The noise of the explosion was distinctly heard 30 miles to the windward and 60 to the leeward. Fully 27 square miles of territory were covered by huge rocks and heavy masses of solid matter to an average depth of many fathoms. All of this prodigious amount of matter was ejected within the very short period of about ten minutes. It should be stated that a considerable amount of this ejected matter consisted of the peak itself, which was tossed in gigantic masses high in the air to fall upon the adjacent slopes and plain.

Steam, the well-known chief agent of most earthquake phenomena, was very apparent on this occasion. The great volumes of steam that must be generated whenever, from any cause, subterranean waters are brought into contact with the molten interior, expand and fill up the rock fissures. If not deep enough down, or if lacking sufficient pressure and volume to break through the superincumbent masses, such ebullitions, though they may wrench and strain and tear the earth's crust internally, are yet hopelessly imprisoned and can only produce on the surface the phenomena of earthquakes or minor seismic vibrations. But there are cases—happily none too common in this our day—when the pent-up vapor succeeds in bursting open its prison roof along some line of least resistance and working havoc on a prodigious scale.

A Remarkable Volcano in San Salvador.

The city of San Salvador in Central America is surrounded by a group of volcanoes, two of which are active, and present a magnificent display to the passengers of steamers sailing along the coast, constantly discharging masses of lava, which flows down their sides in blazing torrents. One of them, Izalco, is as regular as a clock in its eruptions, like the beating of a mighty pulse, every seven minutes. It is impossible to conceive of a grander spectacle than this monster, rising 7000 feet almost directly from the sea, and vomiting forth alternate masses of smoke and flame 1000 feet above the summit alternately every 11 minutes. It is called the lighthouse of Salvador and is in many respects the most remarkable volcano in the world, because its discharges have continued so long and with such regularity, and because the tumult in the earth's bowels is always to be heard. Its explosions are constant, and are audible a hundred miles off. It is the only volcano that has originated on this continent since the discovery by Columbus. It rose from the plain in the spring of 1770, in the center of what had been for nearly a hundred years a magnificent coffee and indigo plantation.

Another Mexican Volcano.

Mount Pelado in the Mexican State of Tabasco has become an active volcano, emitting crimson-dyed water, which has colored Grijaldo river for many miles. People living in the neighborhood of the mountain are in a state of panic, and predict that the mountain will cover the entire district with lava. Tabasco is on the Gulf of Mexico.

The World's Largest Flower.

A Rival in Blossom and Petal to the Victoria Regia.

In the furthest southeastern island of the Phillipine group, upon one of its mountains, Parag, in the neighborhood of the highest peak in the island, the volcano, Apo, a party of botanical and ethnographical explorers recently found at the hight of 2500 feet above the sea level a colossal flower. The discoverer, Dr. Alexander Schadenberg, could scarcely believe his eyes when he saw amid the low-growing bushes the immense buds of this flower, like gigantic brown cabbage-heads. But he was still more astonished when he found a specimen in full bloom, a five-petaled flower nearly a yard in diameter—as large as a carriage wheel, in fact. This enormous blossom was borne on a sort of vine creeping on the ground. It was known by the native who accompanied Dr. Schadenberg, who called it Bo-o. The party had no scale by which the weight of the flower could be ascertained, but they improvised a swinging scale, using their boxes and specimens as weights. Weighing these when opportunity served, it was found that a single flower weighed over 22 pounds. It was impossible to transport the fresh flower, so the travelers photographed it and dried a number of the leaves by the heat of a fire. Dr. Schadenberg then sent the photograph and dried specimens to the Royal Botanical Gardens at Breslau, where the learned director immediately recognized it as a species of Rafflesia, a plant formerly discovered in Sumatra, and named after the English Governor, Sir Stamford Raffles. The new flower was accordingly named Rafflesia Schadenbergia. The five petals of this immense flower are oval and creamy white, and grow around a center filled with countless long violet-hued stamens, thicker and longer in the female or fertile flowers than in the infertile. The fertilization is accomplished by insects whose larvæ breed in the decaying flesh of its thick petals. The fertile flower develops a soft, berry-like fruit, in which countless seeds are imbedded. The flower exhales a poisonous gas, even when first opened.

THE AGE OF TREES.—Where the zone test can be applied, we know that the age imputed to the tree will not err in the way of excess. A clearly marked ring infallibly denotes a season's growth. Assuming an unfavorable season to have resulted in an unusually thin or perhaps an indistinguishable layer, one year's credit will remain unentered in the tree's automatic ledger. On this basis of computation the following ages have been strictly verified in Germany: In that country, as in Finland and Sweden, the pine and fir have attained to from 500 to 700 years. The greatest ascertained age of the larch (in Bavaria) is 274 years, while the silver fir has reached 248. The oldest known specimen of the holm oak (near Aschaffenburg) numbered 410 years; while in all the common oaks about 320 years old the heart was beginning to decay. The maximum ages of other German trees — as found by counting the rings—are as follows: Red beech, 245; ash, 170; elm, 136; birch, 200; aspen, 210; and alder, 145 years. The lime, beloved of the Fatherland, generally evades this test. Probably one of the longest standing of all, it is seldom found in a sound condition at an advanced age.

MOUNTAINS OF IRON are becoming quite common in various parts of the world. The latest discovery of this kind has recently been found in Burmah. Dr. Noetling of the Geological Survey of India, in a recent report on magnetic rock among the Shan Hills of Upper Burmah, describes a mountain or hill at Singaung which "consists of a huge mass of iron ore." Having, he says, noticed on the way numerous pieces of iron ore, which became still more frequent on the southern side of the hill, he examined the latter in several directions. He found the surface everywhere covered with large blocks of iron ore, originating evidently from superficial decomposition of lower beds. He concluded that the whole hill consisted of a large mass of iron ore. He was unable to ascertain the geological conditions under which this ore occurs, or its exact limits and extensions, on account of the dense jungle and the tremendous attraction, rendering his compass useless. He estimates, however, that the hill covers, at least, an area of about a square mile, and that it rises about 200 feet above the level of the Twinnge valley. The ore is hematite peroxide of iron.

A NEW MINERAL COMPOUND.—Dr. Grudman of Hirschberg, Germany, has patented a new process of making magnesia into a carbonate by exposing it to carbonic acid as produced by burning coke in close apartments. It thus forms a substance as hard as magnesia, and capable of taking a fine polish. Mixed with marble-dust it forms an artificial dolemite; with soluble silicates an artificial stucco.

A LARGE METEORITE.—It is said that a newly fallen meteoric stone, weighing 140 pounds, has been found at Elsworth, Wis.

MECHANICAL PROGRESS.

SELECTING IRON FOR BOILERS.—When the heat rays, from any source of heat, strike a body, one of three things may happen: either they penetrate into the mass and are absorbed, or they pass through it, or they are stopped at the surface without penetrating, and are either reflected back in the direction whence they came, or by making the angle of coincidence equal to the angle of reflection, pass off in an oblique direction. Polished surfaces and those with a clean color are usually the ones that reflect heat with the least amount of absorption. Of these, mercury stands in the front rank, and brass comes next. Tin, steel and lead are the reflectors that have only three-quarters the efficiency of brass. White reflects; dark and dull colors absorb heat, as do also wood and earthy substances. But they may be made into reflectors by covering them with a glaze-like crockery. These properties, whether radiating, conducting, absorbing or reflecting, have important practical applications; they show, for instance, that, in the manufacture of boilers, a metal with high conductive properties should be preferred to one possessing it to a lesser degree; that the thickness of the sheet should not be excessive; that the polish of the exterior surface should be very slight; that if it is desired to prevent the heat from radiating from the surface of the boiler or steam cylinder, they should be covered with some poor conductor like wood, charcoal, earthy matter, felt, etc., and then by some high reflector like polished iron, copper or brass. It is by the application of these same principles that in summer we wear light-colored clothing to reflect the heat of the sun, and in winter, thick, dark-colored clothing to retain the heat of the body.

RADIATION FROM STEAM PIPES.—Experiments have recently been made of the comparative efficiency of cast-iron and wrought-iron pipes in giving out heat when arranged as radiators for heating rooms. The tests were made by Mr. William Anderson, C. E., England, with cast and wrought iron surfaces in pipes of different diameters and different thicknesses, as the pipes were ordinary four-inch cast-iron and two-inch wrought-iron pipes. The result of one experiment showed 232 units of heat per square foot per hour for cast-iron pipe and 356 for wrought-iron pipe—a difference of 124 units, or upward of 50 per cent in favor of wrought iron. Another experiment gave 147 for cast iron and 255 for wrought iron, a difference of 78 units. Cast-iron pipe of about twice the thickness gave out 53 per cent less units of heat, from which it can be seen that the thickness of metal in radiators is of great importance, and that if the cast-iron pipe had been the same as the wrought-iron, which thickness is attained in numerous cast-iron radiators, a much different result might have been the consequence. The emissive powers of surfaces do not increase in the same proportion directly as the difference of temperature, as it may be observed that the power of emission varies from 9 to 10 per cent at the given temperatures. Mr. Anderson states, "the rate of emission for differences of temperature of 200° and 100° differed by as much as 22 per cent. At 200° there was 22 per cent more heat given out per square foot per difference of degrees per hour than at 100°." Practically, the difference between wrought and cast iron of the same thickness is not of much importance.

THE MANUFACTURE OF SCREWS.—It is not known when screws were first made and brought into use. The first instance known of machinery being applied to the making of screws was in France, in 1569, by a man named Besson, who contrived a screw-cutting gauge to be used in a lathe. The early method had been to make the heads by pressing the blanks while red-hot between dies, and then to form the threads by the process of filing. In 1741, Besson's device was improved by Hindley, a watchmaker of York; and for a long time the watchmakers of England employed the latter's method in making the small screws used in their work. The first English patent appears to have been issued to Job and Wm. Wyatt, in 1760, for three machines—one for making blanks, another for nicking the heads, and a third for cutting the threads. Between that date and 1840, about 10 patents were issued, only one of which is worthy of notice, namely, that of Miles Berry, dated Jan. 28, 1837, which was for a gimlet-pointed screw.

CEMENT FOR BELTS.—A writer who has had much experience in the use of belts, says that whenever he puts on a new belt he generally runs it with lacing, and runs it for a few days to get the stretch out. Then some Saturday afternoon, when the machinery is stopped, he cuts his belt and skives it down so as to have about six inches lap of the same thickness; then he puts on a thin coat of Le Page's prepared carriage glue, and puts in two lacings lengthways, presses with heavy weights, and lets it stand till Monday. He is using a three-inch belt; before using this cement he was troubled a good deal with belts breaking. If there is anything better he would like to hear from it.

REMOVABLE FIRE-TUBE.—A Russian engineer has arranged the fire-tube of a horizontal boiler in such a manner that it may be removed in its entirety without any disturbance of the boiler end. The fire-tube is of conical shape, and it has an approximately elliptical cross-section. Flanges are formed upon the ends, by means of which it is secured to the body of the boiler, the back flange on the smaller end of the fire-tube, abutting against the rear end of the boiler, and the larger end abutting on the outside of the front end. The opening in the front of the boiler for the admission of the fire-tube is of sufficient size to allow of the insertion of the back flange, and after the bolts have been unfastened, the fire-tube may be withdrawn without disturbing the body of the boiler itself. The fire-tube is provided with vertical cylindrical tubes of small diameter, and by the oval cross-section of the fire-tube a greater number of these cross-tubes may be inserted than has been hitherto possible, and the heating surface increased in consequence.

FIGHTING SHIPS WITH BURNING PETROLEUM. *English Iron* says: According to American contemporaries, a large company, backed by the usual millions of dollars, has proposed to the U. S. Secretary of the Navy "a striking and possibly effective scheme for the defense of Philadelphia harbor, and the harbors of other cities, from the attacks of an enemy's fleet by shooting ignited petroleum at the unfriendly ships from the bottom of the river and burning them up." The originators of the petroleum-defense scheme have induced the American Government to give directions for a preliminary examination of Philadelphia harbor, and a company has been organized to develop the plan and show its practicability. It is proposed to sink perforated iron pipes in the river-bed and the approaches to the harbor, through which petroleum can be forced to the surface of the river by machinery and at a high pressure. In this way a fierce stream of blazing oil can be sent down on the enemy's fleet to destroy it or drive it away. It is claimed by the projectors that a flame can be produced in this way as high as a ship's mast, and sent with terrific force on the attacking vessels many miles from the point where the oil is supplied to the system of submerged pipes, and even iron vessels could not pass through this lake of fire, because it could be made to extend many miles along the river. An experiment in connection with the scheme is to be made at Fort Mifflin shortly, and great things are expected from the pending experiment.

BULL'S METAL—A NEW ALLOY.—It is stated that a new malleable alloy of the bronze kind has been produced by Mr. John Bull of London, by a process for which it is claimed that it secures the introduction and admixture of the component metals in accurately controllable and definite proportions, forming true alloys of high strength and uniformity. Some of the specimens of cast, rolled and turned rods show remarkable uniformity in extension throughout the whole length of the test part, and not so marked a contraction in one spot only as is usual. In one of the test specimens the elastic limit was reached at 24 tons per square inch, above which the metal suddenly extended about two per cent; it then dropped a little in tensile resistance and recovered, as in the case of mild steel, further extension being very slight up to 30.6 tons. After this the extension was uniform up to the point of rupture at 34 76 tons per square inch.

TO PREVENT CAST IRON FROM RUSTING.—The following manner of preventing cast iron from rusting will be found very effective: The castings should be carefully cleaned and then washed in dilute acid. When they are thoroughly dry, the surface should be rubbed with a file or metallic brush. Next, give the casting several coats of raw petroleum, being careful to let each application become dry before applying another. After the last application has become dry, rub with a hairbrush. This will produce a polish that will stand a high degree of heat and keep the piece from rusting.

CASTING IRON COLUMNS.—A correspondent of the *American Machinist* says: "There are some practices common to most foundries which cannot be too severely criticised. Columns are often made with heavy moldings, and bases cast on them, to save trouble and time. This should not be done, as it endangers the safety of the casting; for not unfrequently castings thus made are found to have separated at places where abrupt changes have occurred in the outline."

THE ELECTRO-MAGNET IN A MACHINE SHOP.—An electro magnet with a carrying capacity of 800 pounds is attached to a crane in the Cleveland, O., steel works, and readily picks up and handles billets and other masses of iron without the use of chains, tongs, or other devices. A mere lad is thus enabled to do the work of 14 or 15 men.

CAST STEEL FOR HEAVY SHIP MACHINERY.—There appears to be a strong current of opinion setting in against the use of cast steel in the larger details of ships and ship machinery. The tendency to develop flaws in large castings and the consequent loss and delay entailed may be ascribed as the great objection.

TEMPERING DRILLS.—It is stated that a workman in the Carson, Nevada, mint has made the discovery that drill points may be so tempered electrically that they will penetrate the hardest steel or plate glass by being heated to a cherry red and then driven into a piece of lead.

USEFUL INFORMATION.

Keeping Flowers.

How They May Be Preserved in All Their Fragrance and Beauty

A great deal has been written on the preservation of cut flowers, says the *Journal of Chemistry*, but the matter is still imperfectly understood by most people. It is important to know not only how to take care of them after being cut, but how to cut them. On this latter point a practical hint may be of service to our readers. It might not occur to them that it made any serious difference whether the stems were broken off or cut with a knife or scissors. A sharp knife is the right tool for this purpose, as it leaves the sap vessels of the stems open for the absorption of water, while scissors crush and compress these vessels so that their absorptive power is more or less destroyed. Like injury may be done by breaking off the stems, especially if they are tough. If the flowers are put into water immediately, the ends of the stems should be cut off with a sharp knife, as the sap vessels will probably have become clogged with coagulated matter.

Cut flowers often suffer from too dry atmosphere. It is difficult to avoid this in our artificially heated rooms, but we may at least put the blossoms in the coldest part of the room. Near a window, and especially in a bay-window, the temperature is generally several degrees lower than in other parts of the room, as you will see if you test it with a thermometer. The best authorities say, moreover, that the flowers should have the benefit of light and even of sunshine in most cases, though there is popular prejudice against exposing them to the utter. On the other hand, they suffer, as plants do, from sudden alterations of temperature and from draughts.

In the case of blossoms that fall to pieces easily, it is a good idea to let fall a drop of gum or mucilage into the center, which will glue the petals together at the base. To prevent this from running out before it hardens, the flowers should be kept upright by putting their stems through the bottom of a sieve, or sticking them in sand. With the aid of a camel's-hair brush or a pointed stick, a large number of flowers may be gummed in a short time. When flowers have been carried a long distance in close boxes or cases, they often appear withered and worthless, but with proper treatment they may be revived and restored to their original beauty. Instead of at once being put into vases and exposed to the hot, dry air of the parlor, they should either be spread out on wet flannel or moss, and covered with a dish-cover or inverted box, or else put in pans containing moss and water or wet sand, in which they can be set upright, and then shut up in the dark for a few hours. If they do not regain their freshness under this nursing, there is no hope for them; but in all ordinary cases their recovery is certain.

Butter Without Churning.

The New York *Herald* in a late number says: The art of making butter is about to be revolutionized—that is, if a discovery just made by a lady in West Nyack can be successfully put in operation. The old method of churning will be abolished. Neither horse, dog, nor hand power has a part in the new method. Its discovery was accidental. The discoverer, who has experimented with her new method many times, believes in it thoroughly.

She put the cream of several days' milkings from her pet Jersey cow in a thick cloth one day last summer, and as it was too warm to churn, placed the bag in the ground in a cool place, throwing a shovelful of earth over it so that puss could not get at it, and left it there until she came home the next day. When she took the bag from the ground she found the cream had turned to a great yellow lump of butter, and the only thing left for her to do was to salt and mark it. The buttermilk had entirely disappeared, but there was about a third more than the usual amount of butter obtained by churning.

She has tried the experiment a dozen times since and always obtained better butter than by churning. The only exception was one time when the rain soaked into the ground and mildewed the cream. She is perfectly willing to let the world have the benefit of her discovery, hoping it may in some degree lessen the hard work of farmers' wives.

Whether it is the chemical action of a particular condition of the soil on the cream, or what the cause is, she does not attempt to explain, but the fact remains that when she has buried the cream in the earth for 24 hours it is turned to butter, and good, sweet butter, too.

[The above is not new, as claimed by the *Herald*. The writer heard of such an experiment more than 40 years ago—the experimenter having claimed to have thus produced butter many times.]

KILLING WHALES WITH CANNON.—Steamers engaged in hunting for whales are sometimes armed with heavy guns or small cannon, which are discharged from the ship's deck at the whale. The harpoon which is employed and discharged from the gun is made with four umbrella-like ribs, and is fired from a cannon on the ship into the whale's body. Pressure makes it open up and take a wider and firmer hold, and the whale pulling sets off some nitroglycerine confined in the cone or front part of the harpoon. With all this the whale sometimes runs for many miles, drawing after it the ship, often at the rate of 16 knots an hour, and marking its course with blood. Two thousand feet of heavy rope are fastened to the harpoon, but this, as indicated, does not allow sufficient play for the great monster, which is often 70 to 85 feet long and weighs 100,000 pounds. Afterward, when the whale is dead, or nearly so, an iron chain is put around its body and it is towed into the harbor of the fishing company.

UNEXPLORED MEXICO.—There is much in the way of scientific information yet to be found in Mexico and the States of Central America. Mr. Wm. B Richardson, a young and promising scientist of Boston, was recently commissioned by scientists of the British Museum to take a horseback tour through the unexplored region known as Tamaulipas. He has recently returned from his explorations, having taken a year to complete his work, and having collected in that time a great mass of objects of natural history and no less than 17 specimens of birds unknown to students of ornithology. The results of his researches have been given in a lecture to a large and intellectual audience in Tremont Temple, Boston. The *Advertiser* of that city gives a synopsis of the lecture, from which we quote as follows: Tamaulipas is the most favorably located of all the States of Mexico, its eastern boundary being the Gulf of Mexico, which washes its shores for 150 miles. It is larger than all New England. It is abundantly endowed with nature's resources, fertile soil, superior climate, where the temperature never averages above 97° nor below 60°, and where east winds are unknown. A region rich in mineral and agricultural wealth, oil wells, gold and silver, and with arable land well irrigated and thickly wooded with a timber of a most valuable character for manufacturing and medical purposes and for fuel. Notwithstanding these advantages, this region was unknown until now, because up to a few years ago it was the feudal possession of a noted general, whose subjects knew no law but his, and not until the youthful explorer penetrated its wilds had civilization an opportunity to learn of this enchanting and wealthy region.

LAWYERS IN CHINA.—Up to a few years ago there was not a lawyer in the whole Chinese Empire. How, in the name of Blackstone, did the pig-tailed heathen break a will, anyway? Fancy a Chinaman dying and bequeathing $50,000 to charitable institutions, and no lawyers in the country to persuade the heirs to contest the will. No wonder China is called a benighted country.—*Norristown Herald.*

GOOD HEALTH.

INJURIOUS EFFECTS OF NOISE.—A writer in the *Popular Science Monthly* asserts that noise is one of the most injurious influences of city life. It may not be sufficiently loud to attract the attention of those accustomed to it, but, if continuous, it acts as inevitably upon the nervous system as water in dropping upon a stone. Experiments made upon animals show that when they have been subjected for a number of hours to the vibration of a tuning-fork, their nerve centers become irritated, as certainly as muscular fibers would be affected by an acid or electric shock. The injurious effect of ordinary noises has been recognized by the authorities of European cities, and in some cases the nuisance has been suppressed. Heavily laden carts are not admitted to certain streets of Berlin, and in others they are only allowed to pass on condition that the horses walk. The street cars at Munich have no bells, and those of us who live in places where these bells are not used on Sunday can testify to the relief attendant on the consequent "peace and quiet." The amount of the matter seems to be that the city dweller must regard noise as one of the necessary evils of his condition—one to be borne philosophically, and requiring a large stock of grace and patience. Happy, indeed, are they who, through the long hot months, are only disturbed in their morning slumbers by the song of the birds or the crowing of cocks.

A BUG IN THE EAR.—If you get a bug in the ear, drown him out and be quick about it too. Writers say when a bug gets into the ear, do not be frightened, but drown him with oil or warm water. There is no philosopher, remarks Dr. J. Herbert Claiborne, Jr., in the Medical Classics, who could sit unmoved with a bug or fly stamping a tattoo upon his eardrum. Yes, be frightened, for it will facilitate your movements. Sweet oil is perhaps the best thing to keep him from moving—that is, the first desideratum. The oil, by its thick consistence, will so entangle and bedraggle its legs and wings that the intolerable noise will be stopped. If oil be not at hand, use any liquid that is not poisonous or corrosive. Water will probably be within the reach of every one. This is also more liable to float him out, too, than either sweet oil or glycerine. It has been suggested to blow tobacco smoke into the ear to stupefy the insect. We cannot indorse this advice; tobacco smoke blown into the ear of a child has been known to cause alarming symptoms. When the movements of the intruder have been arrested, syringe the ear gently with warm water. All manner of insects and bugs have been found in the ear, but you can never tell in a given case who the rude caller is that is knocking at the door of your brain till you have him out.

PREVENTION OF ALL INFECTIOUS DISEASES.—The science and practice of medicine and surgery are undergoing a revolution of such magnitude and importance that its limit can hardly be conceived, says Dr. Austin Flint in *Forum*. Looking into the future, in the light of recent discoveries, it does not seem impossible that a time may come when the cause of every infectious disease will be known; when all such diseases will be preventable or easily curable; when protection can be afforded against all diseases such as scarlet fever, measles, yellow fever, whooping-cough, etc., in which one attack secures immunity from subsequent contagion; when, in short, no constitutional disease will be incurable, and such scourges as epidemics will be unknown. These, indeed, may be but a part of what will follow discoveries in bacteriology. The higher the plane of actual knowledge, the more extended is the horizon. What has been accomplished within the past ten years as regards knowledge of the causes, prevention and treatment of diseases far transcends what would have been regarded a quarter of a century ago as the wildest and most impossible speculation.

DANGERS OF CLOSE SHAVING.—It is said on good authority that very close shaving is a dangerous thing to follow up for any considerable time. One who claims to know writes as follows: "Do you know what a close shave means? I never did until I looked at a face the other day through a microscope which had been treated to this luxurious process. Why, the entire skin resembled a piece of raw beef. To make the face perfectly smooth requires not only the removal of the hair, but also a portion of the cuticle, and a close shave means the removal of a layer of skin all around. The blood-vessels thus exposed are not visible to the eye, but under the microscope each little quivering mouth holding a minute blood drop protests against such cruel treatment. The nerve tips are also uncovered, and the pores are left unprotected, which makes the skin tender and unhealthy. This sudden exposure of the inner layer of the skin renders a person liable to have colds, hoarseness, and sore throat, and it is only that the face and neck are pachydermatous—"

RULES FOR FAT PEOPLE AND FOR LEAN.—To increase the weight: Eat, to the extent of satisfying a natural appetite, of fat meats, butter, cream, milk, cocoa, chocolate, bread, potatoes, peas, parsnips, carrots, beets; farinaceous foods, as Indian corn, rice, tapioca, sago, cornstarch, pastry, custards, oatmeal, sugar, sweet wines, and ale. Avoid acids. Exercise as little as possible; sleep all you can, and don't worry or fret. To reduce the weight: Eat, to the extent of satisfying a natural appetite, of lean meat, poultry, game, eggs, milk moderately, green vegetables, turnips, succulent fruits, tea or coffee. Drink limejuice, lemonade, and acid drinks. Avoid fat, butter, cream, sugar, pastry, rice, sago, tapioca, cornstarch, potatoes, carrots, beets, parsnips, and sweet wines. Exercise freely.

ONIONS AND BEEF.—What is the most strengthening food for a convalescent? Well, you know the beef-tea theory has been exploded. The most life giving and digestible food that can be given to one just recovering from an illness is chopped beef. Just take a pound of raw beef, cut off all the fat, slice two onions, and add pepper and salt. Then chop the onions and meat together, turning them over and over until both are reduced almost to a pulp; then spread on rye bread and eat as sandwiches. People talk about celery being a nervine, but let me tell you that there is nothing which quiets the nerves without bad results like onions. The use of them induces sleep and much strength is obtained from them.—*Ex.*

NOT "SURE CURES," BUT HUMBUGS.—A writer in the *Weekly Medical Review* says: "I have collected every catarrh, asthma and hay-fever 'sure cure' that is in the market, numbering in all 58, and have carefully examined them. Eighteen of these 'sure cures' are bold-faced frauds. One ounce of quassia chips, a pound of table salt, 40 gallons of water, will make one barrel of 'sure cure' that sells for $1 a bottle, holding six ounces. The same quantity of water, a pound of muriate of ammonia, a pound of ground cubebs and a little common potash will make another 'cure' that sells for 50 cents a bottle, holding four ounces. These two are the best of the 18 frauds."

EFFECTS OF LIGHTS ON THE EYES.—The practice of having night-lights in children's bedrooms is pronounced very injurious by well-known physicians. Instead of allowing the optic nerves the perfect rest afforded by darkness, the light keeps them in perpetual stimulation, with the result of causing the brain and the rest of the nervous system to suffer.

TELEGRAPHERS' DISEASE.—Telegraph operators, it seems, are developing a disease of their own. One or two cases recently occurred abroad, in which the finger-nails dropped off one after another. The affection is supposed to be due to the constant hammering and pushing with the finger-ends required by the working of the telegraph instrument.

ENGINEERING NOTES.

A PNEUMATIC MARINE MOTOR.—John Secor's pneumatic yacht Eureka was recently launched at New York. Her construction is novel. She is fitted with a series of heavy steel tubes, the muzzles of which open under water. These tubes are divided into a series of chambers, which are filled with fuel gas and air. The contents of these chambers are exploded in rapid succession by means of an electric spark. The force of these explosions expended against the water at the ends of the tubes propels the vessel. Experiments are said to have demonstrated that this novel method of propulsion is feasible. Reversal in either direction is effected by opening suitable gate-valves at each end of the cylinder. The electric spark which causes combustion is generated between two electrodes that feed and regulate automatically, and are so arranged in pairs that should any accident happen to one it is immediately thrown out of the circuit and automatically replaced by its perfect mate. The current is derived from a storage battery.

THE BEHRING STRAITS RAILWAY.—The promoters of the Behring straits railway are encouraged from the fact that steps are being taken to build a railway from a point on the Obi river in Siberia northwest to the coast of the Arctic ocean opposite Nova Zembla, a distance of 260 miles. The proposed terminus is away up in latitude 69, nearly four degrees north of the point in Behring straits where the great Americo-Asiatic railway would cross. But although the Obi railroad would thus penetrate the regions where ice and night reign for almost half the year, it is believed that the line can be worked for six months at a time. In connection with the road it is proposed to establish a line of boats on the Obi and Irtish rivers whereby in connection with the railway the products of a vast region of Siberia can be carried to the Arctic ocean in a few days and thence shipped to London at a large saving of money and time. The cost of the proposed railway is estimated at $10,000,000, or about $40,000 per mile, equipped.

A POSTAL TUBE FOR THE CHANNEL.—One of our English cotemporaries has the following item of interest respecting the projected postal tube under the English channel, to be operated presumably by the pneumatic method of propulsion, though on this point "deponents saith not," viz.: "Whatever objections may be urged against the construction of a channel tunnel, it is not easy to discover grounds for opposing the development of a recently revived scheme. It is proposed (not for the first time, however,) to lay down a postal tube between Dover and Calais. The idea is to suspend two tubes of about a yard each in diameter by means of steel cables across the channel, 40 yards above the level of the sea. The steel cables will be fixed to pillars at distances of about 800 yards, and in each tube a little railway will run with cars capable of carrying 450 pounds in weight. No parcel of greater weight than this will be taken, and the cost is estimated at the modest figure of $5,000,000."

RAILWAY BUILDING IN JAPAN.—From the report of the Japanese Railway Bureau for the past year, which has just appeared, it would seem that, rapidly as it is progressing, railway construction in that country has to meet unusual difficulties, or rather an unusual number of difficulties, owing to the physical geography of Japan. One line of 205 miles in length involves the construction of ten tunnels, 16,000 feet long, and the bridging of 11 rivers. One of these has a velocity in time of flood of 27 feet per second, and in another the brick piers have to be sunk to a depth of 80 feet. A range of mountains is crossed at a hight of 1468 feet. Part of another line ascends to a hight of 3144 feet, and during five months of the year work is rendered impossible by the snow, and sometimes in the summer months an epidemic of cholera has the same effect.—*Engineering.*

BRIDGING THE MISSOURI.—The first bridge over the Missouri river was built at Kansas City 21 years ago and was regarded as a bold undertaking. Now 16 bridges for railways span that stream, namely, at St. Charles, Booneville, Glasgow, Sibley, Randolph, Kansas City, Leavenworth, Atchison, St. Joseph, Rulo, Nebraska City, Plattsmouth, Omaha, Blair, Sioux City and Bismarck, and eight or ten more are not unlikely to be built in the next ten years.

IMPROVED SCREW PROPULSION.—The latest method of increasing the speed of vessels is a screw which is so designed that the center lines of two following blades from spirals run in opposite directions. The blades are so curved that one has its leading part near the machinery, the other has it near the center, so that each blade cuts into the water in advance of the following. It is claimed that greater speed results.

ELECTRICITY AS A MOTOR continues to make rapid progress. There are now in operation 175 miles of electric street railways, with 310 cars, and over 150 miles, which will employ 247 cars more, are noted as projected.—*Railway Age.*

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador *Ledger*, Jan. 12: Mining matters move along smoothly, with no new developments of an important character to report for the past week. At the North Star they are still sinking the winze, and although the distance they intend to sink is not definitely decided, it is likely they will go 100 feet. The conditions of the rich vein of quartz are unchanged. The east drift is also being pushed ahead, in the hope of encountering a good-sized ledge. It is now in a distance of 200 feet, with an occasional small streak of quartz. Many are inclined to the opinion that the main ledge will be found west of the shaft. The Mandich Bros., who are opening up a claim a little north of the Stewart claim, are meeting with encouraging indications. Quartz sprinkled with coarse gold is found. Knight & Co. have just cast two eight-foot water-wheels, which will be shipped to the Gover mine in a few days, where they are intended to operate reversible hoisting machinery. This hoisting plant will be one of the most complete, efficient and economical to be found in the county.

DRYTOWN.—Cor. Amador *Ledger*, Jan. 12: Mining-claim owners and claim-jumpers have been busy the last week or two working on their properties. I am informed that a large body of nice-looking rock has been found in the drift at the 500-foot level of the Cosmopolitan. Considerable improvements have been made at the Gover mill and hoisting works. A steel pipe to convey water from the large reservoir on Quartz mountain has been laid to the mill, and connections made and necessary machinery put in at the mine to do away with steam and run the hoist by water. The main ditch between Sutter creek and Rancharie has been enlarged. It is rumored that the Black Hills claim has been sold to an Eastern company. This mine joins the North Gover and includes the old Pennsylvania and Loyal and is considered a good mine.

AMADOR GOLD MINE.—*Ledger*, Jan. 12: At the Amador gold mine there is the bustle and activity incident to the working of a mother lode mine on a large scale. Substantial improvements are being made all the time. The company is now building iron cars for the surface, and will soon build the tramway cars, which will hold three tons each and be patented after those at the Bunker Hill. The contract for the iron work for the new hoisting plant has been let to the Pacific Iron Works. It will consist of a No. 5 Gates crusher weighing 25,000 pounds, an eight-inch Cornish plunger-pump, and a double-reel hoisting gear of substantial size. The machinery will be run by Pelton wheels. It will take over 100,000 feet of lumber. Unfortunately for the company the bad condition of the roads has seriously interfered with the hauling of lumber and the progress of work has been retarded. An important connection in the mine was made last Saturday when the upraise from the 250-foot level broke through into the bottom of the west shaft. There are now three shafts connected with the 250-foot level, and a station has been made at the south shaft 350 feet, from which lateral drifts and crosscuts will be run.

MISCELLANEOUS.—John Wetzlar, former owner of the mining claim in Hunt's gulch recently purchased by the Morley Mining Co.—an English company—informs us that our report in last week's issue as to there being no rock in the mine is incorrect. He says there are two places where the tunnel has tapped the ledge, and from these it would not be difficult to keep a 10-stamp mill going. He admits, however, that present developments hardly justify the erection of a 20-stamp mill. W. G. Anderson informs us that he shipped three tons of quartz from the New York mine to San Francisco for treatment last week. On Tuesday he received the result of the working by mill process and assay, which gave $15 per ton. At this rate the New York claims ought to prove a veritable bonanza. The shaft of the Plymouth Con. was drained of water in the early part of the week. We have not heard the extent of the damage done in the lower levels by the water.

COSMOPOLITAN.—*Dispatch*, Jan. 12: The east crosscut is 145 feet from the shaft; the face of the crosscut is full of stringers of quartz. The west crosscut is 50 feet from the face and of the same soft slate. They will put in a 10-inch air-pipe on their blowers this week, so as to convey more air down to the drifts.

LIVE OAK.—They have a one-stamp mill on this property, which is situated near Stony creek, and they are running along as if they were satisfied. Tom and Henry Peek are running a tunnel on Schober's ranch, with the expectation of striking a ledge of quartz, which is supposed to run through the hill. They are in about 20 feet.

FOOT AND THOMPSON.—A ten-stamp mill is being erected on this property, which is situated in Calaveras county, about three miles above Big Bar bridge. The work is nearly completed, and is expected to be in running order in a month or so. This mine is worked by a tunnel.

NORTH CALIFORNIA.—The upraise broke through to the surface last Tuesday. They have the Potosi mill full of ore and started to work on the same Thursday morning.

Calaveras.

WORKS STEADILY.—Angels *Echo*, Jan. 9: The Tulloch & Lane mine, situated in the southwestern part of this town, is being worked steadily, and the mill is kept in constant operation. The ore is paying well, in fact, far better than the owners expected, averaging about $8 per ton. This mine is an extension of the celebrated Gold Cliff, also situated near this town.

THE UTICA.—Sinking is going on steadily in the north shaft of the Utica mine. The shaft is at present over 300 feet deep. It is the intention of the owners to sink it over 1000 feet. The water was turned into the new pipe last Monday for the first time. The pipe reaches from the mill in this town to the reservoir on Bald hill, a distance of about two miles. This is the most gigantic piece of work of the kind ever accomplished in the southern mines. The new 60-stamp mill is now in readiness and will be started up as soon as the nozzles for the water-pipe arrive. Everything is running in excellent condition at the Nevills mine. The Angels mine is running in full blast day and night, and making an excellent showing. The chlorine works in this town are still engaged in reducing sulphurets from the Sheep Ranch mine. The Hardy & Hayward mine at Albany Flat has been closed down.

Inyo.

COPPER.—Inyo *Independent*, Jan. 11: Samples of the copper ore now being taken out at the Alabama Hills by Isaac Hitchcock carry 27 11-17 per cent copper and 28 2-5 ounces silver per ton. This would make the value of the ore about $90 per ton. The ledge continues to show up well and appearances indicate a large ore body.

Placer.

SALE OF THE HOGS BACK MINE.—Georgetown *Gazette*, Jan. 10: In June, 1887, the property was bonded to Chas. F. Hoffman, superintendent of the Red Point mine, acting for a company of French gentlemen represented by G. A. de la Bouglise, they paying $3000 cash for the privilege of a bond to run 18 months, carrying the option to purchase the property at any time within that period on payment of $25,000. In the spring of 1888 a new tunnel was started by the French company, under the superintendency of W. C. Ralston, and pushed with all the vigor possible by means of steam air compressor and Burleigh drills supplemented by the strong arms and good judgment of the miners under the foremanship of Jack McCall. By November the tunnel had been driven over 1200 feet, and between that point and the 1300 foot station they broke through the rim, which showed that the new tunnel, which had been run over 80 feet below the old one, was also too high; it was pushed ahead, however, in cement considerably more than 100 feet, when a body of gravel was encountered through which the tunnel was pushed about 40 feet and again into cement, in which material they are still running. Two shafts are being sunk, one of which, at last accounts, had reached a depth of 60 feet without finding bedrock. On Dec. 20, 1888, about one week before the expiration of the original bond, an extension of 60 days' time was granted by the Hogs Back company, but this was not availed of by the French company, Mr. Ralston having come forward on last Tuesday, January 8th, and paid to Mr. Fitzgerald, who has been secretary and treasurer of the Hogs Back company since its organization, the $25,000, and received in return deeds to the property together with all of its stock and all papers, etc., pertaining to the property. From what we can learn of the property we believe it will prove to be one more to be added to the number of paying gravel mines which have made the Forest Hill divide famous.

MAYFLOWER.—Placer *Republican*, Jan. 11: The Mayflower's 20-stamp mill is now running day and night without any stoppage whatever. All the machinery is working very smoothly. The four ore-feeders have increased the crushing capacity of the mill, and the Eureka rubbers secure the saving of all the coated gold and of the floating quicksilver. These two additions to the old mill of the Mayflower are very important improvements. The mine is opened with two breasts in the raise from the main tunnel, one breast going straight down stream, the other due north to connect with the old works. Both breasts look well.

EUREKA.—The Eureka claim contains 2400 acres and has 3½ miles of the channel; also a water-power of no less than 80 miner's inches in the driest part of the year. A tunnel is now running to tap the channel. This work is performed by two shifts day and night. The company expects to cut the channel at 1200 feet, and the indications are exceedingly favorable. This new enterprise in a short time will add another mill to that divide and employ a large number of men. Clark & Chappellet, the most thoroughly posted miners of the Forest Hill divide, will make another big claim there.

A GRAVEL MINE.—*Tidings*, Jan. 11: The good people of Colfax are anticipating an enhancement of their prosperity during the coming year, inasmuch as the Pacific bank of San Francisco has interested itself in a mining enterprise in the locality. The bank commenced operations on their claim—gravel—about two months ago, and are sanguine of tapping a rich channel. The scene of activity is on Bear river at a point about three miles from Colfax.

PAYING WELL.—Placer *Herald*, Jan. 12: The Breece & Wheeler mine is paying richer than ever. A back channel has been struck which carries a different kind of gravel from that which has been worked. Report has it that $10,000 were taken from one carload last week.

Shasta.

LOWER SPRINGS.—Cor. Shasta *Courier*, Jan. 12: Lower Springs is going to show some of the biggest and best mines ever unearthed in the United States. The farmers got stuffed on red soil and think mining far better; but if a claim doesn't prospect on top, they think it no good, but they are fooled again. We have good mines lying idle which cannot be worked for want of money. Poor men own them and can do no good for the camp. Mr. Atkins is going to erect a furnace at the Four Mile house to crush the rock of this vicinity. He has got as good a claim as any, if worked right. The ledge seems to be a solid mass of sulphurets, which, if burnt, show up splendid prospects. Mr. Campton is still working quite a force of men on his mine. Messrs. Penrose & Walton have very near finished their contract on the Walton & Vickers claim. S. H. White has got some good ore out of his mine lately. He cannot sink on account of water. The Eastern Star mine is at a standstill. Mr. White took out about $600 from this claim seven years ago.

NIGGER HILL.—Shasta *Courier*, Jan. 12: If the mine on Nigger Hill, partially prospected by the Dunn brothers, and situated just north of town on Rock creek, is bonded and taken by a strong company, as is anticipated, there will be a great revival in quartz mining matters in that once immensely rich placer camp.

LOST CONFIDENCE.—It is understood that the Lost Confidence mine and mill will start up in the spring with a strong force of men and business will hum.

NELLIE.—Superintendent Everett of the Little Nellie mine, Iron Mountain district, reports everything moving on steadily.

DRY.—Steve Albro was over from his Quartz Hill diggings last Sunday, and says there is insufficient water for placer mining purposes so far. He has some good gravel diggings over there, but they are in the dry belt.

Sierra.

A PURCHASE.—Sierra *Democrat*, Jan. 12: Wm. T. Coleman has bought for San Francisco parties the Carrie mine, situated between the Black Oak and Live Oak mines and on the same ledge. Under the management of its local officers the Black Oak mine has developed into a property of great value. The Live Oak is undoubtedly equally valuable. There is every reason to suppose that the Carrie is identical in formation and grade with the other two. The Buchanan mine has struck richer rock than has ever before been found in the mine, and the mill is in full operation. The new 20-stamp mill of the Eureka Consolidated mine, near Summersville, in this county, belonging to Alvinza Hayward and W. Hobart, will start in operation this week. There are several thousand tons of high-grade ore on the dump ready for the mill. The new device of Louis Blanding for hanging up stamps of quartz-mills, which has been approved by all millmen who have examined it, is to be applied at once to a mill in this county.

Tuolumne.

RUNNING.—*Independent*, Jan. 12: The Experimental Gulch mill has been running this week, and indications point to a good cleanup.

THE RIBBON ROCK.—This mine, an extension of the Old Tuolumne, continues to show flattering prospects. Work is being done in a systematic way in order that the mine may be thoroughly tested before the erection of the works, which will be placed upon the mine during the year.

NEVADA.

Washoe District.

CROWN POINT.—Virginia *Enterprise*, Jan. 12: The 700 drift did not advance during the week, the time being occupied in timbering and repairing. The 700 raise is up 92 feet, having advanced 21 feet since last report. The 800 south drift advanced 24 feet, making its total length 180 feet. The face is in quartz, porphyry and clay. Have cleaned out 375 feet of the old 1100 south drift during the week. It is the intention to reopen the connection with the Belcher on this level to supply a circulation of air.

HALE & NORCROSS.—Have resumed work on the 400 level and will soon be ready to commence extracting ore from this level. On the 500 level the north drift was advanced 115 feet and continues in good ore. The stopes on this level are yielding ore of good quality. Have commenced opening a winze station from the north drift on this level, to follow the downward continuation of the ore. On the 1300 level the south upraise is now advanced 20 feet. It continues in fine-looking quartz of low grade. During the week have hoisted 734 tons of ore, and have shipped to the Merrimac mill 829 tons. Average battery samples assay $22.94 per ton. Have received bullion from the Mexican mill for last month's crushing amounting to $86,015.50.

SAVAGE.—On the 400 level the main west drift from the station was advanced 24 feet. From the north and south drifts on this level we are extracting ore from the stopes and from the south drift on this level; also from Nos. 2 and 3 crosscuts on the 600 level. During the week have hoisted 350 tons of ore, and have shipped to the Rock Point mill for reduction, 438 tons. Average battery samples assay $18.60 per ton. Total yield for the month, $24,398.63.

BELCHER.—The 200 north drift advanced 16 feet since last report and is now out 326 feet. The face is in porphyry, showing streaks of low-grade quartz. Have cut out the difference in grade in the 160 drift as far as the Belcher-Crown Point line. The drift is now in good ore to that point.

CHOLLAR AND POTOSI.—These mines are yielding over 100 tons of ore daily, upon which the Nevada mill runs 40 stamps. The electricians are still fingering the electric plant at the Sutro tunnel level of the Chollar shaft.

SEG. BELCHER.—The joint 1100 south drift advanced 35 feet during the week, making its total length 326 feet. The drift passed through 36 feet of quartz giving low assays, and the face is now in porphyry.

JUSTICE.—Have stopped the 490 level raise and west drift, and have resumed work on the north drift in order to connect with the Alta raise to afford a circulation of air as soon as possible.

CHALLENGE CON.—Have shipped during the week to the Brunswick mill for reduction 210 tons of ore, the average battery samples of which show a value of $33 per ton.

CON. IMPERIAL.—East crosscut No. 2 from the main north lateral drift on the 1100 level (Yellow Jacket) is out 19 feet. The face still continues to show vein material.

OVERMAN.—Extracted 321 tons and 800 pounds of ore, and shipped to the Vivian mill 242 tons and 700 pounds. Shipped one bar of bullion, valued at $7540.31.

CONFIDENCE.—Have shipped during the week to the Brunswick mill for reduction 435 tons of ore, the average battery samples of which show a value of $33 per ton.

ALPHA AND EXCHEQUER.—Drifting north and south on the 500. There is no change to report in the formation, which is quite favorable.

YELLOW JACKET.—Are shipping daily about 100 tons of gold-bearing white rock to the Santiago mill, and are prospecting in the upper levels.

ALTA.—The ore reserves yield about 30 tons daily, which is amalgamated or concentrated, as required, at the mill.

BALTIMORE.—Extracting some ore from the stopes and extending the 350 level drifts.

BULLION.—Drifting laterally north and south from stations in the 640 level winze.

SCORPION.—Still drifting on the 300 level. No change of material to report.

ANDES.—Work will be resumed immediately in the drifts in this mine.

Bernice District.

CUSTOM-MILL.—*Silver State*, Jan. 11: W. W. Williams of Bernice, Churchill county, is preparing to start his mill in the near future upon his own and custom ore furnished by M. W. Hoyt and others, who have mines leased in that mining district. We anticipate that the mine will be kept running for several months after starting. Bernice mining district possesses natural advantages for procuring cheap fuel, timber, etc., and this cannot be said of many mining camps. Wood can be had for $4.50 per cord. The mines are well prospected, and are in good condition to supply ore for the mill. Mr. Williams is about to add a concentrator to his already well-equipped mill.

Eureka District.

ST. PETER'S CONSOLIDATED.—Eureka *Sentinel*, Jan. 12: The new concentrating mill under the superintendency of Wm. Whalen, who is the principal owner of the St. Peter's Consolidated M. Co., was started up last week with good prospects ahead. There are 34 miners at work under the able foremanship of B. F. McBride, a miner of many years' practical experience in this district. Six men are employed at the mill, where there is at present 150 tons of ore ahead ready for treatment. The miners and millmen are paid regularly at the rate of $3 per day. The outlook, as we learn, bids well for the future, and the company has a good reserve in the bank to carry on their business.

Tuscarora District.

BELLE ISLE.—*Times-Review*, Jan. 11: South drift on the vein in the east crosscut, 250-foot level, extended 14 feet.

COMMONWEALTH.—150-foot level: Upraise from west crosscut has been connected with west crosscut from 100-foot level, and is showing some low-grade ore. Timbering in the south and east lateral drifts is progressing well. No. 1 west crosscut has been advanced 15 feet and is looking very favorable, having cut some seams of ore. No. 2 west crosscut, running to connect with east lateral winze, has been advanced 16 feet. This crosscut will have to be run 40 feet before reaching the bottom of the winze. Line crosscut has been advanced 12 feet; the rock is the same as found in the east lateral above.

NEVADA QUEEN.—No. 2 east crosscut, 200-foot level, has been advanced 14 feet, cutting seams of spar carrying some mineral. North drift, 450-foot level, has been advanced 10 feet, and is much more favorable looking rock which shows some sulphurets. Stopes are looking very well. Only a few miners are employed stoping, as most of the ore being hauled to the concentrator is taken from the dumps, the ore-houses being kept full in case of storms. The concentrating works are running steadily; work for the week shows 87 per cent.

NAVAJO.—Crosscut from the west vein, 150-foot level, extended 5 feet. The stopes are looking better and the mill is running all right. Some time was lost at the mill during the week in cleaning the boiler.

NORTH COMMONWEALTH AND DEL MONTE COMBINATION SHAFT.—Steam has been gotten up in the new works, and everything moves off nicely. The water in the shaft has been lowered 15 feet.

NORTH BELLE ISLE.—Stopes above the 400 level are looking well. Good progress is being made with the Union mill.

Tybo District.

THE DIMICK MINE REPORTED SOLD.—Eureka *Sentinel*, Jan. 12: An arrangement has been made by which Eugene N. Robinson of Seligman has become interested in the Dimick mine at Tybo, the particulars of which are not at present for publication; but it is reported that Mr. Robinson gets half of the mine, and will put it in a thoroughly operative condition. The Dimick mine is said to be one of the best properties in Nye county. It has produced large quantities of ore, considerable of which has worked very high in silver and lead. Several shipments were made to the furnaces in Eureka with results netting in the hundreds. The Dimick property adjoins the Two G. mine, which in former years yielded millions, and would yet pay splendidly under good management.

Wellington District.

DEVELOPING.—Reno *Journal*, Jan. 12: For several years A. C. Pratt has been at work developing a mining property known as the Young and Fish in Wellington district, in Douglas county, and now the property promises to become, when properly opened and suitable machinery erected, a heavy bullion-producer. They have a small two-stamp prospecting-mill in operation, but owing to the scarcity of water even this small affair cannot be kept in constant operation. It is their intention to drive a tunnel a distance of 500 feet for the purpose of getting a supply of water. This has now been driven in 340 feet. There is in the neighborhood of 1000 feet of openings on the mine and from every one paying ore has been extracted and reduced in the little mill, and the mine thus far has been self-sustaining.

ARIZONA.

HARQUA HALLA.—Lordsburg *Liberal*, Jan. 12: L. B. Durnil of this place went out there a couple of weeks ago to see what was to be seen. He came back this week and the *Liberal* is able to give what he saw. For the benefit of our readers out of town who may not be acquainted with Mr. Durnil, we will say he is perfectly reliable and a man of good judgment. In the first place the strike is four days' travel from Phœnix, the nearest outfitting point, Mr. Durnil went from Phœnix by the way of Vulture, a better road, and it took him five days. On arriving there he found half a dozen men, although when he was there several prospectors punched burros into camp and pushed on, still prospecting. The limestone cap was there and the hole through it; the lime was some two feet thick and immediately under it it was said the nuggets were found, and then an iron ore which may contain gold, but it doesn't show it to the naked eye. The hole instead of being seven feet deep is scant five. The ore is all piled up there, some of it being sacked. Mr. Durnil looked it all over, and instead of finding it full of free gold he was unable to find any. The place had the appearance of being a pocket, if it is anything, and the fact that the locators discovered last November and have dug only five feet, that they will not give a working bond and want to sell for cash, seems to indicate that they, too, think it a pocket. About a mile from this opening is another ledge which runs at right angles to this one. It has been uncovered in a couple of places and has a greater show of permanence. Expert Sevenoaks of San Francisco, supposed to represent Senator Hearst, has been there and offered to bond the hole and sink on it, but the owners, Stein,

Hudson and Sullivan, refused. They want to sell, not bond. The wonderful nuggets were conspicuous for their absence. Mr. Durnil, however, saw one piece of quartz which contained free gold. It was well worn, evidently a piece of float. Mr. Durnil's opinion is that no person wants to go there except to prospect, and that there are hundreds of as good places to prospect, especially as the outfitters at Phœnix charge $25 for a burro, and other things in proportion.

MINERAL OUTPUT.—*Journal-Miner*, Jan. 10: Yavapai county's mineral output for 1887 was about $1,600,000 in round numbers. Freighting between the United Verde copper mines, at Jerome, and Witherellville has been resumed. The district in which the new strike in the Harqua Hala mountains was recently made is easy of access from Prescott. Reports say that the recent floods did considerable damage to the dam and ditch of the Etta company, at the Verde. Mr. Johnson's pack train is at work packing ore from the Catoctin mine. Geo. W. Sines received returns yesterday from a small lot of ore shipped to the sampling works from the Mollie Stark mine owned by him, in the Bradshaw mountains, which showed a value of $78 in gold. Ex Sheriff Mulvenon returned from Turkey creek yesterday. He says that the mining outlook there continues very favorable. A number of men are engaged in sinking the shaft of the Scotch Lassie. Thos. Carroll, from Jerome, says that camp is very quiet at present. The smelter has closed down on account of bad roads preventing them from getting supplies in, or the product out. About 20 or 25 men are still employed in the mines. The Crowned King Mining Co. has been compelled to close down its mill for some time, in order to put in new pans and settlers, which will take from 60 to 90 days. Mr. Place is now in Prescott to secure trains to haul their machinery to their camp. Work, however, is still being pushed on the mines, which are said to show up very large bodies of high-grade ore

THE NEW MINES.—Prescott *Courier*, Jan. 10: The rush from Southern Arizona and California to the new gold mines near Centennial, Yuma county, continues. The latest is that U. S. Senator George Hearst has paid $250,000 for the discovery location on the rich gold vein. We hear that John H. Burgess of Phœnix has a good claim in the district.

DIXIE.—Articles of incorporation of the Dixie Mining Co. will shortly appear in the *Courier*. Mr. Boaz has gone to the States to look up and ship machinery for a mill. Some of the mines have paid well.

COLORADO.

SALE.—Georgetown *Courier*, Jan. 11: Following close upon the sale of Sites' property reported last week, comes another sale of Hight's property, completed yesterday. The group of lodes is situated on the north face of Leavenworth mountain, and within the city limits of Georgetown, and is composed of the Edna Extension, Gold and Silver Coin, Burrell, Golden Eagle and Grand View No. 2 lodes. The purchaser is an English friend of Mr. West of Georgetown, who paid a visit to our mountains during the fall. The consideration was $18,000. Several other quite important sales are pending in this district.

NOTES.—The strike made on the Cashier some time ago is holding out very well. It is said that the Colorado Central mine never looked so well as it does to-day. The new owners of the Big Blue are to begin work in earnest. We understand 30 men are to be put on at once. The mineral from this mine runs high. Several of the large mining companies of Leadville have started a suit to test the validity of the tax levied upon the net output of mines, the owners claiming that the Act is unconstitutional.

DAKOTA.

THE REDUCTION WORKS STARTED.—Deadwood *Pioneer*, Jan. 8: The reduction works have started at last. On Sunday the last finishing touch was given to the machinery, when the carrier, taking the ore from the Blake crusher to the drying furnace, was completed. Supt. Clark ordered the engine started early in the day, and directed that the first run should be on salt used in roasting. The salt was thrown into the Blake crusher and went through all the operations of crushing, drying and sifting until it was shot into the bin from which it will be drawn from time to time as wanted. The machinery worked to perfection. Not a hitch, not a break, not even a hot-box. So carefully has the great mill been constructed that on the first day's trial it ran as smoothly as if it had seen six months' service. After the salt has been all ground the mill will be run on matte. This will only take about a day, and before the week is out the regular crushing of ore will be begun. Leaching will be started by the 15th, and before the 20th the last doubting Thomas who hopes the reduction works will succeed will have the actual works before him and will be converted.

IDAHO.

BANNER.—Idaho *World*, Jan. 11: Jas. Flood from Banner says the shaft on the Crown Point was down 400 feet and a station being cut out, when he left. A sump will be excavated of 13 feet below the station. This shaft was sunk to the depth of 200 feet some years ago, and a contract let three or four months ago to sink it 200 feet deeper. Both the Crown Point and Wolverine mines, owned by the Elmira Co., will be worked from this shaft. Work is still going ahead in the Banner—stoping and drifting on the 500-foot level.

MONTANA.

CAMPS OF DEER LODGE COUNTY.—*New Northwest*, Jan. 11: Mr. E. D. Holland, Supt. of the Hatta, in Dunkleberg district, eight miles southeast of New Chicago, on which operations were begun in May, 1887, informs us the 5½ by 7-foot prospecting shaft on that mine was down 315 feet on the 1st of January, 1889. At that depth water was struck in quantity that could not be pumped with the appliances at hand. He then returned to the 300-foot level and is drifting north. The ore ranges from 20 ounces up to 300 ounces. At the 300-foot level, where work is now being done, there is three to six feet of carbonate ore averaging 50 ounces. Drs. Mitchell and Mussigbrod, who own the Forest Rose in Dunkleberg district, and on which there is an incline shaft to a depth of 325 feet, where they have six to nine feet of ore, have concluded to develop it themselves by a working shaft. The shaft will be sunk 325 feet with levels at every hundred feet and at the bottom to the incline. The mine is in limestone and there is no water. There is already on the mine, besides the 325-foot shaft, an 80-foot shaft and 60-foot shaft all in ore, and the owners have expended about $12,000 in development. A large proportion of this has been returned to them from the sale of ores, they having taken out considerable quantities and shipped to Wickes, to Pueblo and the Holden Works, Denver, the shipments averaging about 50 ounces silver and between 40 and 50 per cent lead. Mr. D. M. Dunkleberg, in the same district, which is named for him, is working four men in a drift from the bottom of the 240-foot incline on the Jackson lode. He has a good vein of ore. Mr. Sam Ritchey, Supt. of the New Minnie Palmer Co., Beartown district, began work with the new company Nov. 25th with three men, got out timbers for tunnel and track, and up to Jan. 1st had pushed the header of the old tunnel 25 feet further. At last accounts the header was in porphyry. Mr. R. thinks he will strike the lead within 25 feet, and will then be at a depth of over 220 feet on the lead. The nearly 19 tons of ore shipped from the Champion mine, in Oro Fino district, to the Anaconda works, sampled 145.2 ounces in silver and $3.62 in gold per ton, and Supt. E. P. Mills was on Tuesday handed a check for $2079.50 as the net product of the shipment. This is a splendid working result from the first shipment of Champion ore.

ORO FINO DISTRICT.—*Inter-Mountain*, Jan. 10: The Champion Co. is now sinking to the 350-foot level and is getting some very flattering assays. Nineteen tons shipped to Anaconda for reduction netted the company $2078, averaging 146 ounces silver and $3 gold per ton. The Mountain Lion negotiations with a St. Louis Co. for the future development of the mine have been terminated successfully and the company will at once place a hoist and pumping plant. This district now appears to be on the high road to a successful development of the worth of these two properties, which will be ample to place it among Deer Lodge's regular bullion-shippers.

THE RED LION.—H. W. Sparks, superintendent of the Red Lion Co., was in the city to-day. The Red Lion mine is about four miles west of Cable, and the company has been newly incorporated. J. R. Boyce, Jr., of Butte, is president of the company, and Clinton H. Moore, superintendent of the Pyrenees, is one of its officers. The mine has 213 feet of levels and drifts run, and a winze 35 feet in depth. It carries free-milling gold ore. A number of eight and ten ton runs in the Pyrenees mill have yielded from $8 to $10 per ton. The company is negotiating for a mill with a capacity for from 10 to 15 tons of ore per day.

THE ANDERSON DISTRICT.—James Anderson came in last evening from the Anderson district near Radersburg, and brought with him some fine specimens from the Green copper mine, four miles north of Radersburg and about seven miles from Townsend. The shaft on it is down to a depth of 63 feet, and Mr. Anderson states he has a well-defined vein of ore ten inches in width.

NEW MEXICO.

STRIKE.—Rio Grande *Republican*, Jan. 12: Capt. John S. Crawford, well known here, has made a strike at Kingston. In driving the tunnel on the Enterprise mine he cut 32 feet of ore which runs exceedingly high, some of it assaying $3000 to the ton. The tunnel was in 600 feet before this ore was found.

NEW MILLS.—A letter from Parson's camp, on the Rio Bonito, says that 10 Huntington mills have been bought and a hundred and twenty horse-power engine. A tramway will be built from the Hopeful mine to the new mill, and it is expected there will be a big boom in that section in the spring.

OREGON.

CORNUCOPIA.—Bedrock *Democrat*, Jan. 11: Mr. H. Webb, one of the owners of the Companion mine, returned a few days since from Cornucopia and gives a most encouraging account of the future outlook of the camp. Speaking of the operations of the Oregon G. M. Co., Mr. Webb says that Supt. Smith has done more real practical work since assuming the management than was done during all the previous time. On the Red Jacket mine alone over 500 feet of development work has been done and the mine opened out in grand shape. During that time upward of $25 000 worth of ore has been run through the mill and hundreds of tons remain on the dump awaiting reduction. Mr. Webb says the coming spring and summer will bring about a new era of prosperity for the camp.

PLACER DISTRICT.—We are reliably informed that during the past summer some very rich placer prospects have been discovered on East Eagle creek, between Sparta and Cornucopia, and that a company has been organized for their working the coming summer. The company is composed of several wealthy Eastern people, which is an assurance that the mines will be equipped with all the latest appliances for extensive work. It is said that Eagle creek gives evidence of gold in paying quantities for a distance of several miles and will afford lucrative employment for hundreds of men. If this should prove true a great camp will be the result.

UTAH.

ORE SHIPMENTS.—Park City *Record*, Jan. 12: The Woodside leasers have increased their ore shipments to nearly a million pounds a week, and it is expected to make the output for market run up to a hundred tons daily. The ore body is now shown to be over five feet thick. The Crescent's large new steam pump arrived this week and the force at the mine is kept busy putting it up and laying the pipe down the shaft. A prominent mine-owner and prospector of Blue Ledge district claims that the backwardness of his district is due to the fact that so much money has been spent in the yet vain task of finding the continuation of the Ontario vein eastward. He believes that the same amount of capital put into developments further to the north would ere this have opened up the big rich vein. The Ontario eastern drain tunnel will, he thinks, develop the district in the most desirable way.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents to DEWEY & CO.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING JAN. 8 1889.

395,804.—GATE—Jos. Albers, Wells, Ogn.

395 866.—PILE COVERING—Anderson & Elias, S. F.

395,876.—CHICKEN-BROODER—L. C. Byce, Petaluma, Cal.

395,957.—PULVERIZER AND AMALGAMATOR—E. Derbec, S. F.

395,700.—HAND-GUARD FOR ROCK DRILLS—B. Giovanni, S. F.

395,901.—CAR AXLE—W. Hayes, Los Angeles, Cal.

395,770.—FEED-WATER PURIFIER—A. Heberer, Alameda, Cal.

395,780.—STEAM BOILER—A. Heberer, Alameda, Cal.

395 831.—GANG PLOW—Wm. Holloway, Gilroy, Cal.

395,911.—POP SAFETY VALVE—F. A. Miller, Oakland, Cal.

395,847.—HAME TUG—G. W. Moliere, Ocean View, Cal.

395,916. — RAISIN-STEMMER — C. L. North, Fresno, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CHICKEN BROODER.—Lyman C. Byce, Petaluma, Cal. No. 395,876. Dated Jan. 8, 1889. This artificial mother for chicks consists in a novel arrangement of the heating chamber, the air chamber, the chick or living chamber and the flues. The object is to provide a brooder in which there shall be an equal distribution of the heat, so that all portions of the floor of the chick-chamber shall be uniformly heated and the products of combustion disposed of to the best advantage.

GANG PLOW.—Wm. Holloway, Gilroy, Santa Clara county. No. 395,831. Dated Jan. 8, 1889. The invention consists in the novel land-gauge wheel and the mechanism for operating it, and also in the arrangement of the carrying-wheels, their crank axles and connections, whereby the plow is regulated as to depth, leveled and turned to or from the land. The object is to provide a gang plow having an effective land-gauge wheel whereby the inventor is enabled to dispense with the ordinary landsides on the plow bottoms, and generally, to provide a simple and readily adjustable implement.

PILE COVERING.—Henry Anderson, Oakland, and Hugh Elias, S. F. No. 395,866 Dated Jan. 8, 1889. The pile is first denuded of its bark and then coated with any substance or compound for preserving the wood. A metallic jacket or cover is then placed over the pile. The inclosing sheet or jacket is preferably made in one or two pieces, the edges being bolted together at the flanges prepared for the purpose. We recently illustrated and described this invention in detail in the PRESS.

DRIED-FRUIT CLEANER.—John Harrell, Plymouth, Amador county. No. 395,621. Dated January 1, 1889. This is a machine specially adapted to cleaning and freshening up or renovating dried fruit. The barrel is charged with the fruit and then rotated. Buckets or flanges within pick and carry it up and drop it through or between wires or rods which are sufficiently numerous and close enough together to cause the fruit in passing between them to scrape against them on all sides, and thus they remove the fuzz, etc., thoroughly clean the fruit, the dust and dirt dropping out through the spaces between the slots of the periphery. These spaces also afford opportunity for the sulphurous acid vapor to enter, when such is used.

CONDUIT ELECTRIC RAILWAY.—Byron Jennings, San Jose. No. 395,442. Dated Jan. 1, 1889. This invention consists of a double line of parallel surface tracks upon which the cars travel, the inner rails of which are fixed upon or formed with the two adjacent slot irons of a single underground tube or conduit, within which a single set of conductors are contained, and these serve for the two lines of cars moving in opposite directions, turn-outs and double tubes being employed where the cars meet and pass each other. The invention further consists in the employment of a means for protecting said conductors from dirt and connecting them with the cars in which the motor is situated, and a means for connecting the conductors and preventing a break in the current without the use of switches or other mechanism at points where turn-outs are constructed for the purpose of allowing the cars to pass each other.

CORK-EXTRACTOR.—George Edwards, Berkeley. No. 395,618. Dated January 1, 1889. This invention relates to that class of cork-extractors in which a frame or stock rests on the top of the bottle and the corkscrew is guided down through the foot of the frame into the cork. This patent is best described in the "claim" allowed as follows: "An improved cork-extractor consisting of a frame or stock having an annular foot and a tubular top, with notches, a tubular power-screw carried on the top and having a free lineal movement thereon, said screw having a top disk, a corkscrew the twist or thread of which is the reverse of that of the power-screw, said corkscrew having a stem passing freely through a tubular power-screw and provided with a head flange fitting on the top disk of said power-screw, the pawl or catch-bar on the top disk and having projecting ends and the notches on the stem-head flange, the handle cap fitting over the top disk and engaging the projecting ends of the catch-bar, and the nut seated on the power-screw and having projections or teeth whereby it is detachably connected with the notched top of the frame or stock."

Mining Share Market.

The mining stock market the past week was only moderatively active, with quite a spurt in Chollar and Potosi, but which fell back under realizing sales owing to the Chollar shaft breaking. With Chollar and Potosi receding, Best and Belcher and Gould and Curry came to the front under reports of an improvement in the former mine causing some of the shorts filling. The mills in the Six Mile canyon are reported to be closed down owing to the cold, freezing weather, but the other mills are running all right. The ore being crushed at the mills shows a steady increase in value. The settlement of the Sutro tunnel property is hailed with unmistakable signs of pleasure by the mining community, who now look in the near future for something more substantial than promises. The Tuscarora and Quijotoa stocks showed a fair degree of activity at a slight advance in prices. The Bodies were kept quiet at steady prices.

The new mill in the Tuscarora district, it is claimed, will be ready to start up next month on "concentrates."

For the first time, it is said, in several years, the Chollar mine, on the Comstock, has commenced regular shipments of ore. Two shipments aggregating over $59,000 have been received from the mine.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

WESTERN BASKET MANUFACTURING CO., Jan. 4. Capital stock, $100 000. Directors—C. W. Weston, G. H. Carlson, M. E. Willis, James D. Graham and Henry C. George.

LA FAVRE CONDIMENT AND PACKING CO., Jan. 4. Capital stock, $1,000,000. Directors—A. Greenebaum, T. A. Haben, J. A. Smith, Nathan Biba and S. Lebenbaum.

PRINCE OF WALES PACKING CO., Jan. 12. Object, to do a general fish-preserving business. Capital stock, $100,000. Directors—F. Cutting, F. P. Kendall, N. W. Tallant, K. C. Kent and Thos. McCauley.

PACIFIC STONE CO., Jan. 12. Capital stock, $100,000. Directors—Matthew McGowan, Thos. Butler, Alexander McLennan, E. J. McGowan and D. S. Chisholm.

GLACIER FISHING & PACKING CO., Jan. 14. Capital stock, $100,000. Directors—Thos. Pollard, E. J. Dodge, G. H. Collins, James Eva and James Madison.

PELTON WATER-WHEEL CO., Jan. 14. Object, to manufacture and sell Pelton water-wheels. Capital stock, $200,000. Directors—A. P. Bravton, Jr., Chas. J. Nickerson, Lester A. Pelton, P. Phelps and Benjamin H. Wyman, Jr.

CALIFORNIA STONE CO., Jan. 15. Object, to work certain stone quarries in Kern county. Capital stock, $25,000. Directors—George Mearns, Geo. S. Mearns, Alpheus Lewis, Robt. A. Lewis and R. B. Turner.

Meetings and Elections.

SAN FRANCISCO STOCK EXCHANGE.—President, Jere Lynch; vice-president, W. E. Norwood; secretary, Fred Hadley; treasurer, George T. Marye, Jr.; caller of the board, O. V. Walker.

PACIFIC STOCK EXCHANGE.—Louis Marshal, president; D. A. Greene, vice-president; John B. Bourne, chairman; R. C. Tobin, treasurer; George Ubl, secretary; J. Herzberg, M. S. Martin and T. O'Connor, executive committee.

BLACK DIAMOND COAL CO.—Trustees, Thomas Bell, P. B. Cornwall, J. B. Haggin, Alvinza Hayward, S. P. Smith. At a subsequent meeting of the newly elected board; the following officers were re-elected: P. B. Cornwall, president; Jas. H. Dobinson, secretary. From the president's annual report it appears that the company has had a prosperous year, with a promising outlook.

SIERRA NEVADA M. CO.—Chas. H. Fish, president; A. W. Havens, vice-president. Trustees—Herman Zadig, Con O'Connor and C. Hirschfeld. E. L. Parker was re-elected secretary and D. B. Lyman superintendent, with the Nevada bank as treasurer.

Successful Patent Solicitors.

As Dewey & Co have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

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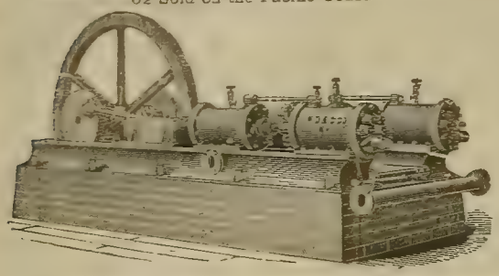

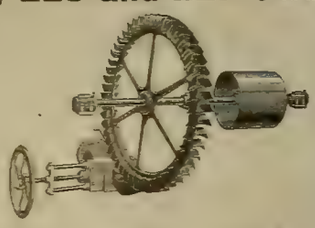

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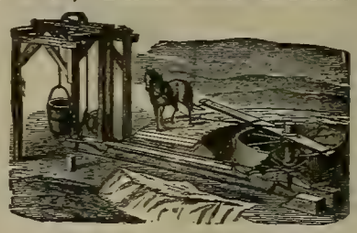

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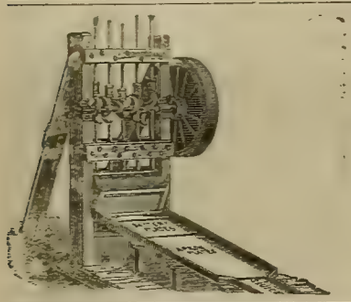

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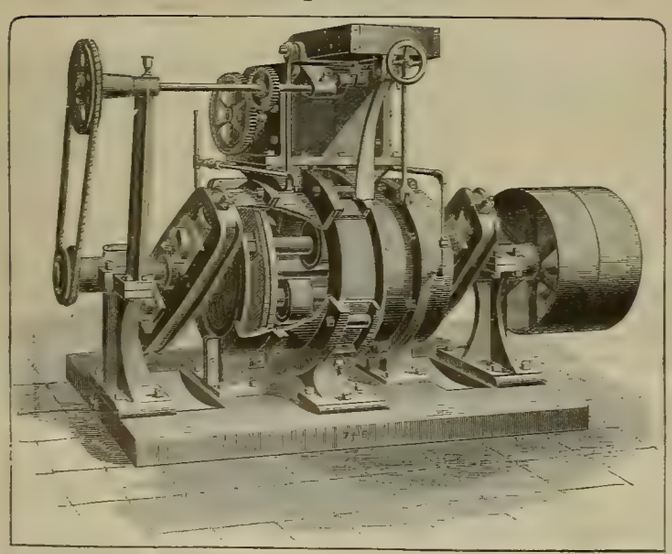

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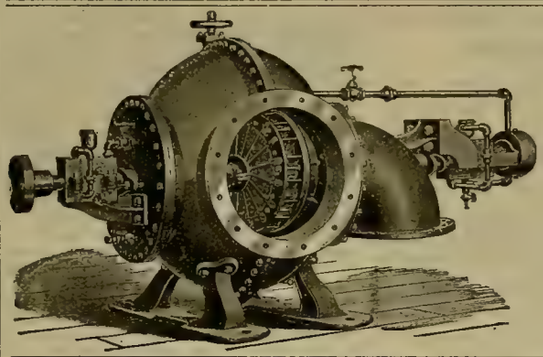

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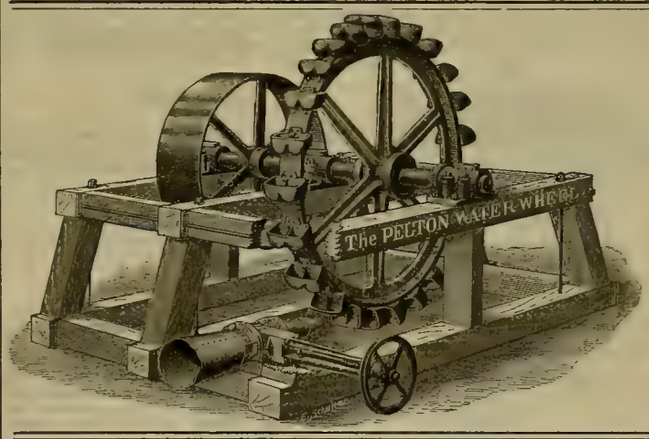

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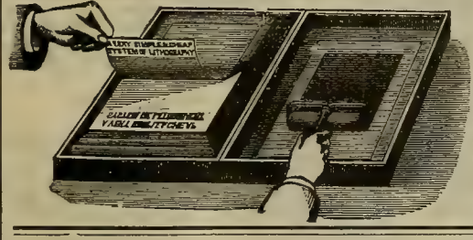

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MARKET REPORTS.

Local Market.

SAN FRANCISCO, Jan. 17, 1889.

Trade continues quiet, but then there are signs of business soon setting in. Large wholesale houses are replenishing their stocks of goods, and will start their traveling salesmen on the road at an early date. Collections are reported to be only fair, but as money is generally easy, this is not felt in any particular quarter. The banks report a fair inquiry for accommodations, but as the supply of available funds is said to be large, no difficulty is met by persons in negotiating good paper. For speculative purposes the call for funds is said to be light, particularly on wheat and mining stocks. The general public has no doubt been getting out of the latter, owing to the decided strong depression which set in last November, and continued well into this month. From the mining districts news continues favorable, particularly from the Comstock mines. Improvements are reported in three of the Gold Hill mines, in two in the Middle group, and in three in the North Ends, but for purposes known only to the inside, particulars are suppressed. It is very generally conceded that within the next 60 days more active and important work will be commenced in nearly all the mines at Virginia City, with crosscutting in two of the Gold Hill group. It is to be hoped that the Sutro Tunnel Co. and the mill-owners will make a reduction in their charge; for with a royalty of $1 a ton on all ores going in bullion under $40 a ton, and $2 a ton on all ore going in bullion over $40 a ton, and milling charges of $7 a ton, leaves a very small profit to owners of mines containing low-grade ore. Reliable parties place the profit last year of the owners of the mills at Virginia City on ores crushed by the mills at over $1,000,000, and on tailings, etc., at over $500,000, making a total of over $1,500,000. It is quite safe to say that the original cost of the mills was not much over that sum, which shows that there are millions in the business to the inside and assessments to the outside holders of mining stocks. It is claimed that this will be rectified by the Mining Stock Association in the course of a few weeks, unless the mine-owners themselves reduce the cost of reduction or milling. The Chollar mine is added to the list of bullion-producers on the Comstock. The shipments of bullion for December account from the mine aggregate about $59,000. The pulp assay of this mine, and as for that of the other mines on the lode, is increasing in value.

SILVER—The steamer which left this port the past week for China took out for Hongkong $142,795 in Mexican dollars, and $277,000 in silver bullion; for Yokohama it took out $40,000 in Mexican dollars, and for Hiogo, $96,000 in silver bullion. To supply the above bullion the market was well cleaned up, the Selby Smelting Works only having a few bars left over. While the price of silver was quoted in New York at 92¾c, as high as 93 1-20c was paid here—a difference in our favor of nearly one-third of a cent. The market held steady at 93 to 93 1-20c up to Tuesday, when it jumped to 93¾c, bid in sympathy with an advance abroad.

The production of silver on this coast last year is estimated at $54,348,420. The above includes the West Coast States of Mexico and also British Columbia.

New York telegrams quote silver at 93c. In our market 93c is bid, but it is claimed that a slight advance would be paid.

QUICKSILVER—The market continued active throughout the past week, with the demand both for export and home consumption. The price ranged from $42.50 to $43 a flask.

LEAD—The market is quiet, but the tone is firmer as the season for a more active demand approaches. It is claimed that the consumption on this coast will be all of 10 per cent more this year than in 1888. The value of lead mined last year on this coast is placed at $11,263,630.

COPPER—The market is dull and heavy.

IRON—There is absolutely nothing doing. Consumers are looking forward to a very active campaign this year, but as yet do not show any signs of anticipating their wants. Importers are in the meantime storing.

COAL—The market shows more life for household coal, due to a cold-weather demand and also confirmation of a reported fire in the Black Diamond mine. Large handlers of coal think the fire scare is largely exaggerated. The strike in the Wellington mine has been settled and work resumed. For spot, coal is firm, but distant arrivals and also shipments are offering at a decided concession for spot and near-by cargoes.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Jan. 17, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42½	92¾	$17 50	$3 85	$21 85
Friday	42 7-16	92⅝	17 40	3 85	21 70
Saturday	42 7-16	92⅝	17 30	3 80	21 70
Monday	42½	92¾	17 35	3 87½	21 70
Tuesday	42⅝	93⅛	17 25	3 87½	21 80
Wednesday	42⅝	93⅛	17 15	3 87½	21 75

Borax is firm at 8⅞@9¼c for refined California, and 8@8¾c for concentrated. Quicksilver is quiet at 62@63c. Refined petroleum—Barrels, 7c; plain cases, 9c. Lake copper is very quiet at $17 bid, spot, $17.20; January, $17.25; February, $17.30.

Borax is firm, with stronger feeling. Lake copper was quiet and sold nominally at $17.15@17.25. For the first three months of the year 1888 the output was 54 275 tons; in 1887, 47,633 tons. Eight hundred and thirty tons of pig lead was sold by auction at $3.85¼@3.89, and in regular market at about $3.90. Petroleum is lower than for a long period. Barrels, $7@6.90; plain cases, $9.

A DISPATCH from Victoria, B C., states that reports from the newly discovered gold ledges at Texada island are encouraging. A large number of prospectors have arrived, and already over 50 claims have been located. It is expected there will be great excitement in the spring.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Best & Belcher M Co	Nevada	42	25	Jan 10	Feb 15	Mar 7	L Osborn	309 Montgomery St
Big Canyon G M Co	California	1	20	Dec 20	Jan 22	Feb 7	T W Nolin	230 Montgomery St
Commonwealth Con M Co	Nevada	7	50	Nov 24	Jan 4	Jan 31	H Dean	309 Montgomery St
Concordia M C	Nevada	2	50	Nov 12	Jan 24	Feb 12	G O Higgins	121 Montgomery St
California Slate Co	California	3	30	Dec 13	Jan 19	Feb 18	J O Hansome	10 California St
Gould & Curry M Co	Nevada	61	30	Jan 10	Feb 14	Mar 7	A K Durbrow	309 Montgomery St
Gt Western Quicksilver M Co	Cal	3	10	Nov 28	Jan 7	Jan 28	A Halsey	328 Montgomery St
Gover M Co	California	1	15	Nov 28	Jan 5	Jan 29	L G Harvey	13 Fremont St
Gray Eagle M Co	Nevada	10	05	Nov 12	Jan 2	Jan 22	O H Bogart	327 Pine St
Hoosac Bar Con M Co	California	2	10	Dec 7	Jan 14	Feb 4	D M Kent	330 Pine St
Kossuth M Co	Nevada	10	10	Nov 21	Dec 24	Jan 19	E P Flint	328 Montgomery St
Lord of Lorn M Co	Nevada	4	10	Nov 13	Dec 28	Jan 22	L G Harvey	313 California St
Montrose M Co	Colorado	1	1¼	Oct 3	Dec 24	Jan 28	F E Luty	330 Pine St
North Gould & Curry M Co	Nevada	10	20	Dec 18	Jan 18	Feb 4	C H Mason	331 Montgomery St
Nevada Queen M Co	Nevada	4	50	Dec 21	Jan 28	Feb 25	H Deas	309 Montgomery St
North Belle Isle M Co	Nevada	16	50	Jan 3	Feb 6	Feb 27	J W Pew	310 Pine St
Overman M Co	Nevada	59	25	Jan 15	Feb 19	Mar 12	G D Edwards	414 California St
Omilak M Co	Alaska	6	20	Dec 4	Jan 5	Jan 24	D M Kent	330 Pine St
Occidental Con M Co	Nevada	3	25	Dec 27	Jan 31	Feb 25	A K Durbrow	309 Montgomery St
Puget Sound Iron Co	Wash Ter	13	1 00	Dec 29	Feb 2	Feb 25	A Halsey	328 Montgomery St
Russell Reduction & M Co	California	4	05	Dec 15	Jan 21	Feb 12	J Morizio	328 Montgomery St
Seg Belcher & Mides Con M Co	Nev	2	25	Dec 3	Jan 7	Jan 28	E B Holmes	309 Montgomery St
Savage M Co	Nevada	72	50	Jan 7	Feb 11	Mar 4	E B Holmes	309 Montgomery St
Sunerior M Co	Nevada	24	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
S F Natural Gas & Oil Co	California	1	25	Jan 3	Feb 8	Feb 28	J Scoville	309 Montgomery St
St Louis M Co			05	Jan 16	Feb 18	Mar 16	W M Montgomery	309 Montgomery St
Union Con M Co	Nevada	37	25	Jan 4	Feb 8	Mar 1	J M Buffington	303 California St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Belcher S M Co	Nevada	J Crockett	327 Pine St	Annual	Jan 28
Crocker M Co	Arizona	A Waterman	309 Montgomery St	Annual	Jan 21
Crescent M & M Co		J H Isham	310 Pine St	Annual	Jan 21
Cholo Creek M & M Co		L Osborn	309 Montgomery St	Annual	Feb 4
Candiev M Co		F E Luty	330 Pine St	Special	Jan 28
Head Center Con M Co	Arizona	J W Pew	310 Pine St	Annual	Jan 21
Kossuth M Co	Nevada	E P Flint	328 Montgomery St	Annual	Jan 21
Lone Star G & G M Co	California	A W Blundell	1422 Clay St	Annual	Jan 19
Lucky Hill Con M Co			Baldwin Hotel	Annual	Feb 14
North Commonwealth M Co	Nevada	J W Pew	310 Pine St	Annual	Jan 22
Quartz Mountain M Co	California	E Hestres	217 Sansome St	Annual	Jan 22
Spring Valley G M Co	California	H Pichoir	320 Sansome St	Special	Feb 26
Utah Con M Co	Nevada	A H Fish	309 Montgomery St	Annual	Jan 30

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Jan 10
Caledonia M Co	Nevada	A B Chenevaut	328 Montgomery St	08	Nov 26
Candelaria Con M Co	Mexico	C T Givens	221 Market St	50	Nov 12
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Idaho M Co	California		Grass Valley	50	Oct 11
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Dec 10

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 27.		WEEK ENDING Jan. 3.		WEEK ENDING Jan. 10.		WEEK ENDING Jan. 17.	
Alpha	2.65	2.90	2.55	3.15	2.40	2.80	2.25	2.65
Alta	2.65	2.90	2.65	2.90	2.60	2.80	2.65	2.80
Andes	1.00	1.25	1.00	1.30	1.05	1.15	1.05	1.20
Argenta	....	.10	....	.10	....	.10	....	.10
Belcher	6.00	6.75	5.75	7⅜	5.00	6.00	4.80	5⅜
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	6.00	8.25	7¼	7.50	5.50	7.50	5.25	6.00
Bullion	1.35	1.45	1.20	1.45	1.20	1.40	1.25	1.55
Baltimore	.35	.45	.35	.40	.35	.40	....	....
Belle Isle	....	.35	.40	.45	.35	.45	.40	.45
Bodie Con	1.25	1.35	1.35	2.80	1.60	2.15	1.50	1.75
Benton	....	2.00	2.65	3.00	2.75	3.00	3.25	6½
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.45	.55	.50	.75	.60	.65	....	.55
Con. Va. & Cal	9⅜	10⅜	9⅜	10⅜	8⅜	10	8⅜	9¼
Challenge	5.00	5¼	5.00	6⅜	4.60	5¼	4.50	6.25
Champion	....	....	....	....	....	....	....	....
Chollar	3.00	3.50	3.10	3.50	2.85	3.50	2.70	4.10
Confidence	....	.15	.15	16⅜	13⅜	15	13⅜	14¼
Con. Imperial	.75	.90	.70	.90	.70	.90	.75	.85
Caledonia	.40	.50	....	.45	....	.45	.40	.45
Con. Pacific	....	....	....	....	....	.15	....	....
Crown Point	6⅜	7.50	6.50	7.75	5⅜	7.00	5.25	6⅜
Crocker	.70	.85	.80	.90	.80	1.05	.80	.95
Central	....	....	....	....	....	....	....	....
Dudley	....	....	....	....	....	....	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	....	....	....	....	....	....	....
Exchequer	1.15	1.25	1.15	1.25	1.10	1.25	1.00	1.35
Grand Prize	.65	.85	.65	.75	.70	.90	.75	1.05
Gould & Curry	3.55	4.15	3.65	4.65	3.60	3.60	2.75	3.15
Hale & Norcross	5⅛	5⅝	5.25	5.75	4.90	5.50	4.85	5⅜
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	.25	.35	....	.35	.25	.35	.35	.40
Justice	1.75	2.00	1.70	2.45	2.10	2.45	2.10	2.45
Kentuck	2.20	2.80	2.75	2.85	2.20	2.25	2.25	2.80
Lady Wash	.45	.50	.50	.55	.50	.55	.55	.65
Martin White	....	....	....	....	....	....	....	....
Mono	1.00	1.05	1.05	1.70	1.25	1.55	1.10	1.25
Mexican	4.00	4.50	3.70	4.65	3.40	4.00	3.25	3.90
Mt. Diablo	....	....	....	....	....	2.75	2.50	2.60
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.60	1.65	1.75	1.80	1.60	1.70	1.45	1 70
North Belle Isle	2.65	2.85	2.60	2.90	2.25	2.50	2.45	2.70
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.55	2.80	2.55	2.95	2.50	2.90	2.75	3.20
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.60	2.00	1.60	2.00	1.50	1.75	1.50	1.60
Ophir	6⅜	7.00	6.25	7.50	5.25	6.50	5¼	6⅛
Overman	1.50	1.70	1.55	1.85	1.55	1.70	1.55	1.70
Potosi	2.55	2.80	2.50	2.65	2.00	2.60	2.75	3.15
Peerless	1.25	1.30	1.20	1.45	1.20	1.40	1.10	1.35
Peer	.40	.45	.40	.45	.40	.60	.35	.40
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	3.45	3.50	3.25	3.95	3.00	3.40	2.70	3.30
S. B. & M	2.80	3.00	2.75	3.20	3.00	3.50	3.15	3.45
Sierra Nevada	3.15	3.55	3.10	3.45	3.00	3.30	3.00	3.65
Silver Hill	.80	.85	.75	.95	.85	1.00	.85	.95
Silver King	....	....	....	....	....	1.50	1.25	1.40
Scorpion	....	.50	.50	.55	.45	.50	.50	.55
Syndicate	....	.10	.15	....	....	.15	....	.10
Union Con	3.05	3.40	2.90	3.60	2.75	3.10	2.70	3.20
Utah	1.25	1.40	1.20	1.45	1.25	1.35	1.20	1.50
Yellow Jacket	4.90	5⅜	4.75	5⅜	4.60	5¼	4.40	5¼
....	....	....	....	....	....	....	....	....

Sales at San Francisco Stock Exchange.

THURSDAY, Jan. 17.

100	Andes	1.15	
250	Alta	2.80	
150	Alpha	2.50	
150	Belcher	5¼	
755	B. & Belcher	5¼	
300	Benton	6.25	
50	Bulwer	.55c	
50	Bullion	1.45	
200	Challenge	5.00	
610	Chollar	3.80	
610	Con Va & Cal	8.75	
1200	Con. Imperial	.75c	
120	Crocker	1.00	
250	Crown Point	6.00	
350	Commonwealth	5.50	
150	Exchequer	1.15	
150	Grand Prize	1.05	
250	Gould & Curry	3.15	
300	Hale & Nor	5⅜	
50	Justice	2.35	
50	Lady Wash	.55c	
150	Mexican	4.00	
250	Nev. Queen	3.15	
50	N. Belle Is	2.55	
300	Navajo	1.50	
140	Opnir	6¼	
100	Overman	1.55	
50	Occidental Con	1.65	
850	Potosi	2.90	
1000	Peer	.45c	
300	Peerless	1.45	
350	Savage	3.25	
460	Sierra Nevada	3.50	
50	S. B. & M	3.30	
10	Silver Hill	.90c	
300	Silver King	1.25	
100	Utah	1.40	
100	Union	3.00	
3 0	W Comstock	.55c	
150	Weldon	.60c	
205	Yellow Jacket	5.00	

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Cons. California and Virginia, Jan. 12, $68,917; Hale and Norcross (for December), $89,015; Savage (for December), $24,393; Overman, 12, $7540; Hanauer, 12, $2100.

NEW ADJUSTABLE FIRE-HOSE BRIDGE.—During the past week several private exhibitions have been given of a newly invented bridge for fire hose, by means of which all stoppage of cable cars and the general blockading of traffic upon our streets during a fire can hereafter be obviated. This device, invented by B. E. Hendricksen, the architect, consists of a portable trough or cradle made of light tubing and supported by adjustable legs having extension ends whereby the elevation of the bridge can be regulated to suit any hight of car or vehicle. One section or cradle is of sufficient length to cross one line of tracks, but any number of tracks or any width of streets can be crossed by fastening the requisite number of sections together. These cradles are intended to be carried under the seats of cars or upon hook and ladder trucks, and, being light and portable, can readily be erected when required, and in this manner the great inconvenience now experienced by the cable-car companies and the traveling public generally, whenever the fire-hose is laid across the streets and tracks, will be prevented.

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The works are situated on A. & P. R. R., Calico Mining District, Daggett, Cal., and contain a first-class Engine and Boiler with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPY & CHILDS, 123 California street, San Francisco.

THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Lefler, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No. 1, 32 ft.; No. 2, 94 ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

EXTENSIVE GOLD MINE FOR SALE.

To be sold at public auction by the undersigned, at the Merchants' Exchange, in the City of Halifax, on Thursday the Fourteenth day of March next, at twelve o'clock noon, that extensive, valuable and well-equipped GOLD MINE known as the Dufferin Gold Mine, situate on the Atlantic coast, about ninety miles east of said city. Daily mail from Halifax. Telegraph office at Salmon river, four miles from the works. Salmon river harbor never freezes, and is safe and easy of access. The mine embraces 342 areas, each 150x250 feet, all in one block. The entire area measures fifteen hundred feet in width across, and eight thousand five hundred and fifty feet along the lodes. The leases have nearly fourteen years to run, and can at any time be renewed for a period of twenty-one years, upon payment of two dollars per area. Within this area is a belt of veins dipping on each side of an anticlinal. They have been found by tests made on the surface to extend upwards of 4,000 feet. The ore has been partially removed to a depth of 200 feet over a distance of about 700 feet, and to a depth averaging about 70 feet over an additional 1,000 feet in length or thereabouts. The veins are of various width, the largest averaging about ten feet of solid quartz.

This mine was discovered in the Autumn of 1880, but was not worked to any extent until the Autumn of 1881. It has yielded up to the end of November, 31,012 ounces of gold from 64,508 tons of quartz, according to the sworn returns made to the Mines Office. The gold can be produced at a cost which will leave a very handsome margin of profit.

The mine is operated by machinery worked by water power, the power being transmitted by a line of wire rope running from the water wheel to the mine—a distance of about 4,750 feet—and lying parallel to the outcrop of said veins, at a distance therefrom of about fifty feet. The Salmon river crosses the property twice. It supplies the hoisting and pumping power, and the same water is afterwards used to drive the crusher. The latter has thirty-eight stamps, and there is ample water power to operate three times that number. Sixty stamps can be operated with present machinery. Of the 120 horse-power existing for pumping and hoisting only about twenty-five is used. There are about 700 acres of well timbered and well watered land owned with the mine. This partly covers the areas, and where it does not immediately adjoins them. It is also provided with a steam plant to operate hoisting gear and pumps in case of accident to the transmission power, a sawmill, sufficient for the requirements of the property, a tramway from the mine to the crusher for carrying quartz, and stables, offices, and boarding-houses, sufficient to accommodate a large number of employees.

The mine is owned and has been operated by a partnership, and owing to the death of one of the principal owners it has to be sold to enable his estate to be settled. A good title will be given.

Terms, ten per cent cash, balance within thirty days from day of sale. The deposit to be forfeited in case the purchaser fails to complete the purchase within that time. Further particulars can be had on reference to N. H. MEAGHER, Q. C., Bedford Row, Halifax, or to JAMES DUGGAN & SONS, Auctioneers, Bedford Row.

STOCKHOLDERS' MEETING.

OFFICE OF

The Superior Mill and Mining Company.

A SPECIAL MEETING of the stockholders of the Superior Mill and Mining Company will be held at the office of the company, Room 11, 303 California Street, San Francisco, California, on Wednesday, February 20, 1889, at 1 o'clock P. M., for the purpose of taking into consideration the increasing of the capital stock of said company from ten million (10,000,000) dollars, divided into one hundred thousand (100,000) shares of the par value of one hundred (100) dollars per share, to fifteen million (15,000,000) dollars, divided into one hundred and fifty thousand (150,000) shares of the par value of one hundred (100) dollars each. Transfer books will close on Monday, February 18, 1889, at 3 o'clock P. M. By order of the Board of Directors.

J. M BUFFINGTON, Secretary.

OFFICE—Room 11, No. 303 California Street, San Francisco, California.

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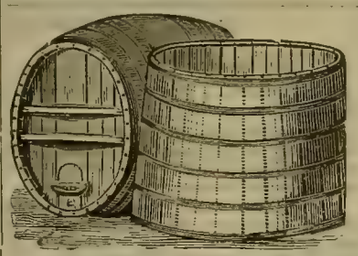

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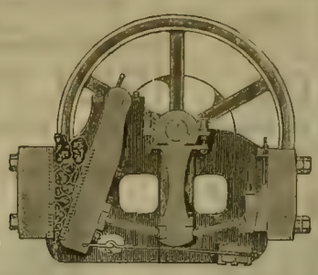

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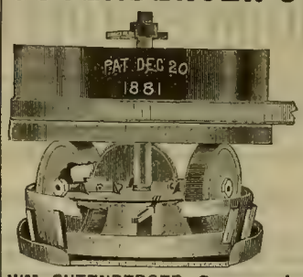

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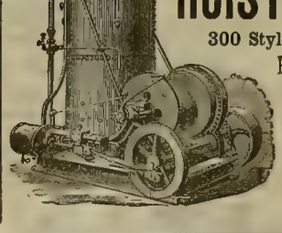

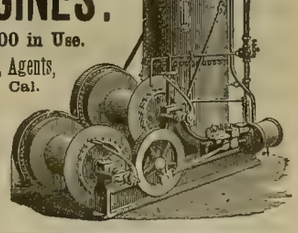

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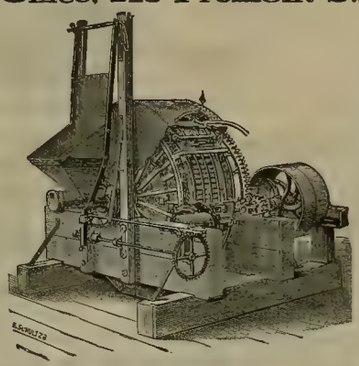

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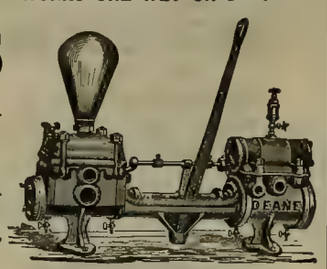

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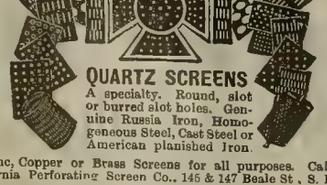

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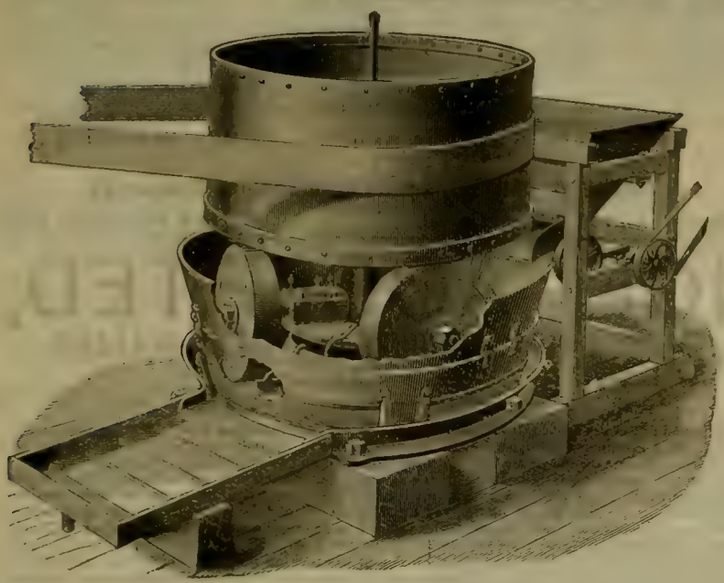

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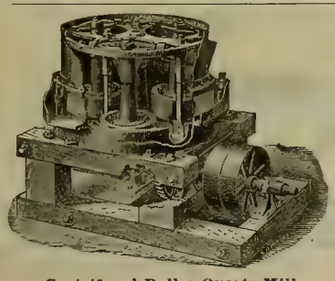

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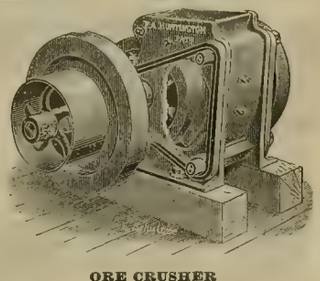

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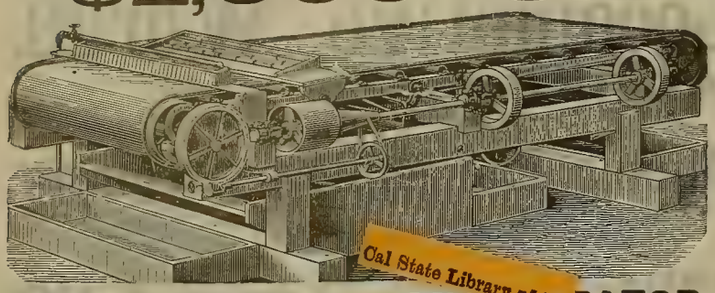

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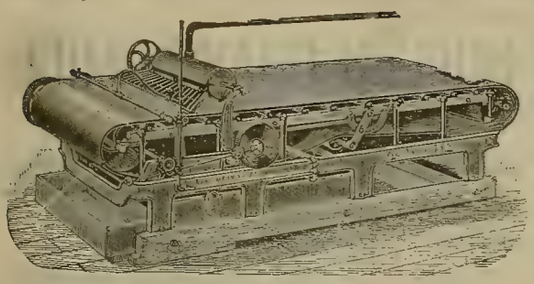

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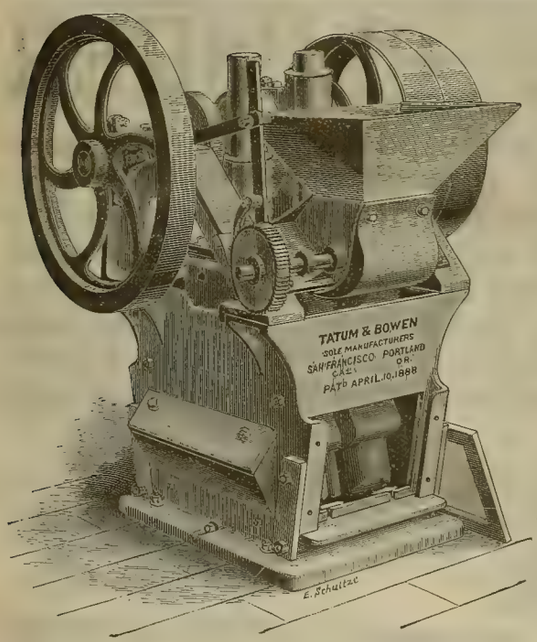

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It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

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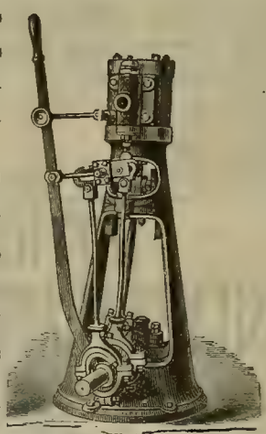

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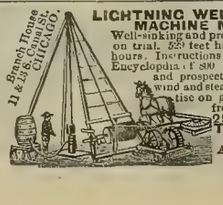

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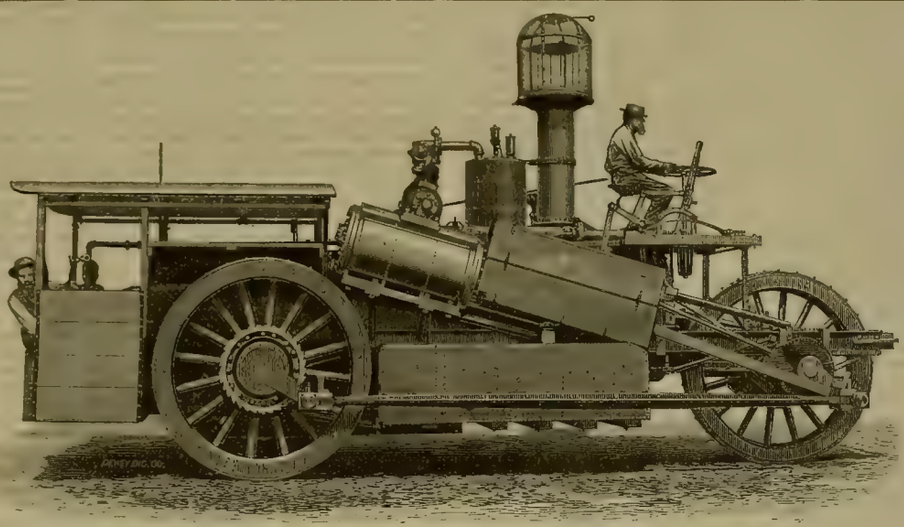
SAN FRANCISCO, SATURDAY, JANUARY 26, 1889.

VOLUME LVII. Number 4.

A Practical Traction Engine.

For the past ten years Messrs. Roberts & Doan of Sacramento have been experimenting in building and running traction engines for the purpose of hauling freight in the mountains and plains of California. They at last succeeded in building an engine with direct connection similar to a locomotive, which has finally accomplished the long-desired point of doing away with gearing for this class of engines. It does away with all crystallizing of iron and makes traction engines practicable for hauling heavy loads.

We give an engraving of the improved engine on this page. It is mounted on springs and can be speeded fast or slow, as desired. All of the principal parts are built of wrought iron or steel, which makes the engine specially strong. The working parts are



THE ROBERTS & DOAN DIRECT-ACTING TRACTION ENGINE.

all covered in to protect them from dust.

The first experimental engine built weighs about 30 tons when in running order with steam up. It has two 19x40 inch cylinders and 150 pounds of steam are carried. The boiler is of locomotive fire-box form. There are three traction wheels 6½ feet in diameter, 14-inch face.

The engine has been two summers and falls hauling lumber at Shed 27 on the C. P. R. R., near Emigrant Gap, Placer county, California.

The road is 6½ miles in length. The engine makes two round trips per day, equaling 25 miles, with 1½ hours spare or over time each trip of six hours, hauling 25M feet of mountain pine. This partially seasoned weighs on an average of three pounds per foot, or 37½ tons, which is hauled on six large 2¾-spindle wagons, one foot wider than the regular gauge. The grades, going with a load, are from 8 inches to 16 inches to the rod, or from 215 to 430 feet to the mile. One grade of 215 feet is two miles in length. The engine runs up this grade at the rate of four miles per hour easily, if needed, but the average speed loaded is 3½ miles per hour. Most of the grade going back light is 10 to 13 inches to the rod. The road is more or less rocky, and the grade is 266 to 347 feet per mile. In places the road is extremely soft and dusty. The engine can reasonably be counted on hauling 100 tons on a level on common dirt roads, with a train of 15 to 16 large wagons, exclusive of a fuel and water wagon of 7½ tons, where the fuel and water stations are seven to eight miles apart. The engine can run loaded at a speed of five miles per hour, or faster if the road is macadamized. The engines are easily steered up-hill and

(*Concluded on page 57.*)

Fig. 1.

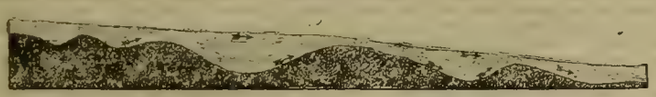


Fig. 2.

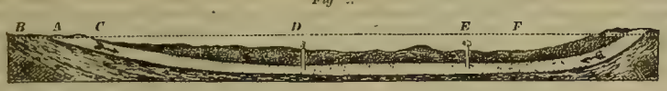


Fig. 3.

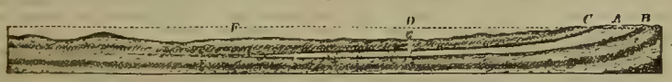


Fig. 4.

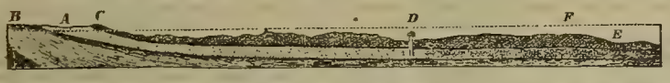


Fig. 5.

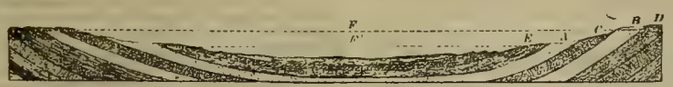


Fig. 6.

Fig. 7.

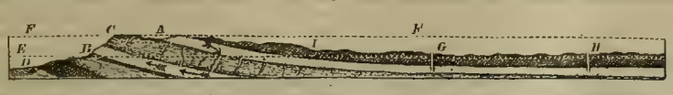


Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

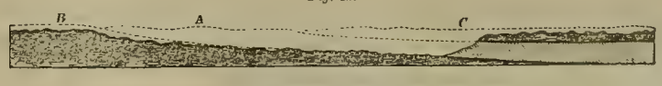
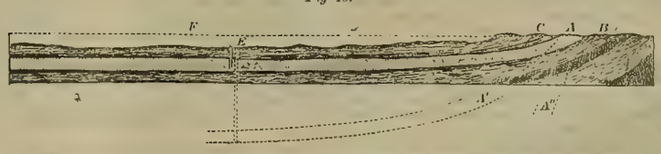


Fig 13.



GEOLOGICAL CONDITIONS AFFECTING THE FLOW OF ARTESIAN WELLS.—See page 60.

CORRESPONDENCE.

We admit unindorsed, opinions of correspondents.—EDS

Montana Gold Mines.

[From our Correspondent, R. G. HUSTON.]

The Jay Gould, located in Lewis and Clarke county, has with only a 10-stamp mill in operation, over $300,000 credited to her dividend account. Close by, on a continuation of the Jay Gould veins, are the West Jay Gould Co. properties of five locations. Development was actively prosecuted by this company during the past season, and they are so well assured of the worth of their properties that they have commenced the erection of a 10-stamp mill and have all the necessary material on the ground. Their developments consist of a tunnel driven into the mountain to crossout the vein at right angles, now in some 1300 feet; and from surveys made of the ledge they expect to strike the main vein of the original Jay Gould in less than 200 feet. At 800 feet they crossout what appears to be a parallel vein and have run levels east and west on vein 100 feet. It shows from five to seven feet of ore that will mill from $8 to $15 per ton. The outlook of this side vein decided the company to build their plant at once, and they now have everything in readiness to build. The Homestake Stemple district, formerly owned by Negus and Jacobs, who each amassed a handsome competence from its product, has changed hands lately, and the company now in possession will again set the Homestake mill to dropping stamps. Both the former owners soon after their mine had placed them beyond the reach of want paid the debt of nature, and during the administration of their respective estates the property has lain idle. The new company which has acquired the title will soon make the Stemple district known by the shipment of bullion.

The Alpha and Omega Co. properties are a continuation of the Homestake vein, and have a 10 stamp mill running on ore from the Badger mine. Not much is known of results, as it is a close corporation, and the owners do not care to show up their product to the world so long as it is satisfactory to themselves.

Mines West of the Main Range.

The Columbia and Winthrop properties, comparatively new discoveries, are located just across the main range of the Continental Divide in Deer Lodge county, on the headwaters of the Big Blackfoot. The Columbia is a contact vein—porphyry and slate formation. It is owned by Messrs. Price, Wells & Word of Helena. They have an incline shaft sunk on the vein 300 feet, and levels run at that station nearly 100 feet each way, developing an ore body on the footwall four feet in thickness. Numerous assays made from this body at different points in the levels show a general average of between $15 and $20. This is surely a flattering prospect and one that will be improved with a plant for reduction within the next 12 months.

This will be a new bullion-producer to add to the general prosperity of Deer Lodge Co., and its close proximity to many valuable known mines, such as the Drumlummon, Empire, Gloster, Jay Gould and a dozen others with large dividend balances standing to their credit, places it in a favored location. Its being wholly a gold prospect is again in its favor, as there is nothing can depreciate the value of its product.

SOUTHERN COLORADO COAL.—According to the Geological Survey, says the *Colliery Engineer*, Colorado is destined to be the Pennsylvania of the West. Within 60 miles of Pueblo there are 1,000,000 acres of coal lands, with veins now being worked from 6 to 9 feet in measurement. The coal output in Colorado for 1887 was 1,791,735 tons, of which 1,055,676 tons were produced in three counties adjacent to Pueblo on the west and south. The amount of coal in the canyon district is estimated at 150,000,000 tons. This coal is the best bituminous coal known. The retail price in Pueblo of bituminous coal for domestic purposes ranged from $3.50 to $5 per ton. What is known as "mining" or "pea" coal, used for factory purposes, sells at from $1 to $1 50 per ton. The average value of the coal on the cars at the mines is $3 25 per ton. Thus the coal production of 1887 reached the aggregate value of $3 941,817. The average number of persons employed in and around the mines during the year is estimated at 3000. The average price paid to miners for digging and loading the coal and timbering their working places is 86½c per ton of 2000 pounds of screened coal. The average cost of producing the coal on the cars at the mines, including royalty, is $1 73 per ton.

GOOD ORE.—It is stated that a mill will soon be erected on the Cleveland claim, which was recently located by John Tilton and is situated on the South Yuba river near Edwards' Crossing. The ledge, which gives surface indications of being 20 feet wide, has been run in on a distance of about three feet, and specimens of the ore have assayed as high as $100 a ton, milling test. Twenty five and one fourth pounds of samples from an extension of the Cleveland were tested by the milling process at the Nevada Metallurgical Works in San Francisco last week, and the ore paid at the rate per ton of $9 80 in silver and free gold, and the sulphurets at the rate of $17.27 to the ton of ore.—*Nevada Transcript.*

Quicksilver in California.

The Altoona Deposits of Trinity County.

At this time, when the consumption of quicksilver is everywhere on the increase while production is falling off, causing the price of that metal to steadily appreciate, whatever relates to new sources of supply becomes of interest.

During the past two or three years the price of quicksilver has advanced fully 40 per cent, but this without causing any corresponding increment of production.

That the advanced prices ruling of late have failed to stimulate production to the extent expected has been due to the desire of the owners of our producing mines to economize their resources, which they find they have in many instances been exhausting at an unprofitable and rapid rate.

The fact is, the smaller cinnabar deposits of California, though very numerous, are not likely to prove as rich or extensive as they were once thought to be. Certainly this must be so, or more of these deposits would at the present time be worked, seeing such large numbers of them were during the former era of high prices opened up and equipped with plant. That the owners of these properties distrust their value may be inferred from the fact that work upon none of them has been resumed. The common trouble with the most of these deposits is, that while they are limited in extent, the ore is of rather low grade, to which must be superadded in some cases poor natural facilities for working them.

At the Altoona or Zellerbach quicksilver mine in Trinity county, the conditions are said to be very favorable, yet, owing to the property having been involved in litigation, but little has for several years past been done with that mine.

What might be accomplished here, were the property put in shape for active production, is shown by its history in the past. Prior to the legal troubles alluded to, there was taken out here $300,000 worth of quicksilver simply with retorts, no furnace having ever been erected on the mine.

At the rate quicksilver is now selling, the value of the metal so extracted would have amounted to $450,000. Judging from recent developments, it is thought that there is as much ore standing in the same level and above the lower adit tunnel as has already been taken out.

By the inefficient and wasteful methods heretofore employed in obtaining and reducing the ore, over 30 per cent of the metal was lost, which, had it been closely saved, would have added another hundred thousand dollars to the amount actually realized. The ore already disposed of carried an average of 2½ per cent metal, at least.

The Altoona mine is on the westerly slope of the Trinity mountains in the eastern part of the county, at an altitude of 4750 feet above sea level, being about 15 miles distant in a westerly direction from Southern's station on the California & Oregon railroad. It occupies a section of a cinnabar-bearing belt that here strikes north and south along the mountain. This belt, which is composed of porphyry, traversed by occasional dykes of serpentine, has an average width of 1200 feet, and carries a great number of cinnabar veins; these veins, which vary in thickness from a few inches to 25 feet, correspond in strike with the trend of the main mineral belt.

The mining operations hitherto conducted here have been by sluicing. The ore being soft and decomposed, yielded to the shovel without the labor of blasting and picking, the mineral it contained being collected after the manner of placer gold washing. The ore so collected, after being mixed with lime, has been reduced by the slow, costly and wasteful method of retorting in ordinary retorts.

How large a percentage of the ore was lost by the plan of gathering it here pursued is shown by the fact that the tailings that escaped from these sluices have since been collected and concentrated over and over with profit.

Only from one of the veins belonging to the Zellerbach property has any ore been removed, the stoped portion of the vein having a depth of 100 by a length of 400 feet, the width of the vein at this point averaging from 4 to 25 feet. The ore taken out carried about three per cent quicksilver, and but for the imperfect manner of the treatment adopted would doubtless have yielded a larger percentage of metal than was obtained from it.

Besides some surface prospecting and a shaft sunk on one of the numerous veins to a depth of 47 feet, a vertical shaft has been put down on the principal vein to a depth of 120 feet, this shaft being connected at the bottom with a drain tunnel. We are informed that in every instance the prospecting work done here has developed high-grade ore. In the vein opened up by the 47 foot shaft, it is said there occurs fully one foot of ore that contains 20 per cent metal.

What is required to bring this property into a large and profitable production is the erection of a suitable plant, to include roasting furnace, steam hoisting works, etc., and the further development of the principal ore bodies already opened up, exploration being afterward kept well in advance of ore extraction. The owners are of the opinion that with a very moderate outlay for equipment a monthly production of 500 flasks of quicksilver could be made here. This amount could be increased by the erection of additional furnaces, and at a less cost than would be required in most other localities, there being an abundance of fine timber on the ground with water enough for motive-power a good portion of the year.

Mr. Zellerbach, who got possession of the property last August, has with limited means at his command since retimbered the shaft and had 100,000 brick burnt for the erection of a furnace, besides making various minor improvements on the mine, which, in other respects, remains in about the same condition as when work was suspended upon it eight years ago.

There is now a good wagon-road leading from Redding, on the California & Oregon railroad, to the mines, via Shasta and Trinity Center.

A similar road could, with a moderate expenditure, be built connecting this property with that railroad at a point further north, the distance to be traversed being not over 16 miles.

The Situation in Eureka District.

The Eureka *Sentinel* says: It is generally believed in Eureka that the present thinning out of our population will result eventually in benefit to the camp, for the reason that a more enterprising lot of people will come in and take the places of those that are leaving. One thing is certain, the growlers who have always claimed that there were no permanent mines in the district except those of Ruby Hill, whose ill-founded belief prevented them from ever going to see for themselves, or who never took chances in anything but day's pay in their lives, are among those who are seeking pastures new. The new-comers will not be troubled much with the nonsensical ideas of those old fossils who never had pluck enough to either combat the false impressions they received from others who pretended to know everything about mines or prospects which they never saw, but will go to work and dig up something for themselves that will pay. There are still among us a hardy lot of men who believe that there is great intrinsic merit in some of the normal prospects of which the surrounding hills are full. These are the men whose abiding faith will induce them to remain, and many of them will yet get rich. It will be strange, indeed, if some of the almost numberless prospects in this district do not eventually turn out big, but unless they are developed, if they ever prove to be worth a bean, will be a still stranger thing. The timber suits have discouraged the greater number of the inhabitants hereabout, but there are a few long-headed prospectors who are familiar with the mountains in every direction, who are here to stay, and who think this is a good time to look about them for something better than they have yet struck. Some of them will be successful, and the result will be the discovery of other such mines as the Diamond, that was recently bonded to the Salt Lake people. It is rather unfortunate that many of the more adventurous prospectors are poor, being the result of improvidence, or taking more burden on themselves than they could carry. It is unfortunate that our merchants, in times of depression such as we have to face at present, cannot carry those men who are always plying the hammer and pick in search of hidden bonanzas. It may be that some of these hardy adventurers will have to yield to the pressure of hard luck and need of help, but others will be rewarded for their perseverance. Some there are who will ask: "What shall we do with ore if we find any?" They will not have to bother much about finding a market, for although our smelters have closed up shop for the present, we have an outlet to Vallejo Junction and Salt Lake still left us. Besides, the timber troubles will not last forever. These timber suits will probably be quashed, and our representatives in Congress will doubtless find us relief at the Nation's Capital, whence the present trouble emanated, no matter whether at the instigation of mischief-makers or not. Here is a chance for Mr. Bartine to win laurels for himself.

PINE GROVE.—From a California mining-man who recently came in from Pine Grove, it is learned that that little-heard-of camp is of a great deal more importance than is generally supposed. He said, in course of conversation with a *News* reporter, that the country thereabout shows indications of great possibilities in the mining line. The country has never been thoroughly prospected. Men have located small ledges, which yielded ore assaying from $60 to $100 on the surface, worked them until the ore began to deteriorate, and then abandoned them. The Wheeler mine and the Wilson mine are the only two upon which much work is now being done. The owners of these mines are taking out considerable ore and making some money, but, our informant says, lack the enterprise to do development work, which he thinks would lead to the discovery of veritable bonanzas. The ore of the district is all free-milling gold.—*Esmeralda News.*

THE bullion product of the Hale and Norcross mine for the month of December was valued at $89 234 63, and included $39,979.80 in gold and $49,254 83 in silver.

THE Sierra Buttes Gold Mining Co. of Sierra county made a cleanup of $21,000 for the month of December.

Dry Crushing and Concentrating.

In the annual report of Randolph Adams, superintendent of the Silver King mine, Arizona, he says:

During the operation of the mine the ore from January 1st to December 25th, 28,548 tons of ore were hoisted, 22,272 tons being treated in No. 1 mill, together with 348 11 tons of old reserve, and 6276 tons in No. 2 mill, in addition to which the latter mill handled 5306 tons of old white tailings by raw amalgamation. The product included:

	Ounces Silver.
Bullion, 45 bars, containing	60,226 44
Silver sulphide, 4646.85 lbs., containing	34 867.32
Concentrations, 726,872 tons, containing	612,708.09
Total ounces silver	707,801.85

Mill No. 1 was operated throughout the year until the morning of December 31st. There was treated 22,620 tons of an average assay value of 26 91 ounces per ton, with a production of 606,665 tons of concentrates, averaging 834.55 ounces per ton. The concentrates produced represented 2.68 per cent of the ore treated, the contained silver being 47.94 per cent native, and the rest in combined form. The proportion of native was 6 01 per cent less than in 1887, owing to the treatment of ore from the 300 level, which was rich in sulphurets, but contained a small proportion of native. The average extraction by first concentration was 83 17 per cent, with a working loss of 4.53 ounces per ton. The method of second-class concentration carried on in 1887 was operated during the first five months of the year, during which time 296 tons of second-class concentrates were produced, averaging 39 32 ounces per ton, the average tailings being 2 82 ounces per ton; the final extraction was 89 52 per cent of original value of ore. There was at the beginning 210 tons of second-class concentrate on hand; 350 tons have been treated in mill No. 2, and there are 156 tons on hand which it was not profitable to handle in No. 2 mill except when treated in conjunction with first-class ore, which could not be accomplished at the time of its production.

The operations of No. 2 mill were varied and continuous during the year until October 6th, when mill treatment was confined to No. 1. In the latter part of 1887 the large pile of old "white tailings" was being utilized, while experiment was carried on in leaching ore from the 250 level. The raw amalgamation of tailings was continued through April, 5306.8 tons being treated, of an average of 10.87 ounces per ton, producing 33 660.02 ounces of silver with an extraction of 58.4 per cent and a working loss of 4.52 ounces per ton. The experimental work on leaching in the latter part of 1887 proving the efficiency of the process for the ore then in sight in the 250, and of undoubted occurrence in the 300 level, it was decided to make the necessary addition of leaching vats to convert No. 2 mill into a leaching plant. Thirteen leaching vats of eight tons' capacity, with eight precipitating-tanks, were set in double tier with the necessary adjuncts of solution and calcium sulphide tanks. A filter press was supplied, and small muffle furnace built for the roasting of the precipitate. The method employed was the ordinary leaching process, with sodium hyposulphite for extraction, and calcium sulphide for precipitation. The process was used actively during the months of March to July inclusive, treating 2146 39 tons of ore of an average roasted value of 20.62 ounces per ton, producing 4646 85 pounds of roasted sulphide averaging 15,007 ounces per ton. The average chlorination was 78 61 per cent, and the extraction somewhat better, being 79.1 per cent. The first treatment was on ore from the 250 and sill of the 300 levels, containing a large quantity of chalcopyrite and associated sulphides, though little tetrahedrite and stromeyerite. As the work progressed through the 300 level, there was a marked increase in the quantity of tetrahedrite, and the antimony contained in it caused an increase in roaster loss from volatilization of the combined silver. As efficient work in leaching required a longer roast than for amalgamation, and consequently greater loss ensued, the latter process was again instituted in June, 887.52 tons being treated in that month and July, the ore averaging 29 40 ounces per ton, with an extraction of 84.9 per cent (average chlorination having been 84 5 per cent) and a loss of 4 44 ounces per ton.

Of silver, 21,904 ounces were produced in 23 bars, averaging 457 in fineness.

When the upper two floors of the 300 had been reached, the valuable mineral was almost entirely tetrahedrite and stromeyerite. While roasting for amalgamation reduced the roaster loss, it still continued heavy, in some instances as much as 25 per cent. It then became apparent by experiment that dry crushing and concentration, while producing a product of lower market value, would more than overcome the losses incident to roasting. Arrangements were therefore made to crush dry in No. 2 mill, through 14-mesh screen, agitate the pulp in a pan with water, and treat by concentration on the second-class vanners of No. 1 mill. This method was operated from July 22d to October 5th, treating 3286 tons of ore, a mixture from the 800 and 300 levels, of an average value of 35 82 ounces per ton, with a resulting product of 120,207 tons of concentrate, containing 106,418 ounces of silver. Percentage extracted was 90 4 per cent, and the material produced was 3 66 per cent of ore crushed.

In conjunction with the amalgamating work

in mill No. 2 on first-class ore, 525 04 tons of a mixture of second-class concentrate and low-grade tailings were treated, with a product of 2½ bars of bullion 893 fine, and containing 4661 50 ounces silver.

Legislative Committees.

Following are the standing committees of the California Legislature as announced Jan. 15th:

Senate.

Agriculture—Dixon, Reed, Heacock, Langford, Flint, Hinshaw, McComas, Mead, DeLong.

Appointment and Expenditure—Roth, Welch, Hamill, Sprague, Bowers, Fraser, Byrnes, Spellacy, Hinshaw.

Attaches, Contingent Expenses and Mileage—Murphy, Fraser, Preston, Dixon, Welch.

Banks and Banking—Boggs, Langford, Preston, Hamill, Dargie.

Chinese and Chinese Immigration—Pinder, Banks, Mead, Meany, Greely, Britt, Campbell.

City, City and County, and Town Gov'ts—Moffitt, McComas, Bowers, Langford, Crandall, Roth, McDonald.

Commerce and Navigation—Spellacy, Murphy, Bowers, Langford, DeLong, Byrnes, Pinder.

Constitutional Amendments—Boggs, Heacock, Crandall, Yell, Wilson, Dixon.

Corporations—Goucher, McGowan, Campbell, Heacock, Dargie, Hinshaw, Wilson, Roth, Langford, Mead, Pinder.

Claims—Meany, Roth, Heacock, Hinshaw, Langford, Fraser, Wilson.

Counties and County Gov'ts and Township Organization—Hinshaw, Caminetti, Britt, Moffitt, Boggs, Conklin, Dray.

Educational—Caminetti, Conklin, Flint, Preston, Moffitt, Murphy, Jones.

Elections—Yell, Campbell, Crandall, DeLong, Meany, Pinder, Williams.

Engrossed Bills—Hamill, Greely, Sprague, Banks, Mead, Dixon, Welch.

Enrolled Bills—Mead, Williams, Jones, Bowers, McGowan, Fraser.

Federal Relations—Britt, Hinshaw, McDonald, Crandall, McCowan.

Finance—Moffitt, DeLong, Dray, Boggs, Langford, Caminetti, Crandall.

Fish and Game—Pinder, McCowan, Campbell, Williams, Briceland, Sprague.

Forestry, Yosemite Valley and Mariposa Big Tree Grove—Meany, Boggs, Byrnes, Wilson, Roth.

Harbors, Rivers and Coast Defenses—Langford, Bowers, Banks, Hamill, Spellacy.

Hospitals—Briceland, Byrnes, Bowers, Mead, Roth.

Immigration other than Chinese—Welch, Williams, Britt, Fraser, Conklin.

Irrigation and Water Rights—Caminetti, Bowers, McComas, Dargie, Roth, Meany, Heacock, Dixon, Mead.

Judiciary—Jones, Caminetti, Crandall, Goucher, Heacock, McGowan, Moffitt, Sprague, White, Wilson, Yell.

Labor and Capital—Britt, Byrnes, Banks, Welch, Boggs.

Mines, Drainage and Debris—Mead, Preston, Greely, Langford, Dray, Roth, Murphy, Briceland.

Military—Yell, Wilson, Jones, Goucher, McGowan, Pinder, Bowers.

Public Buildings, other than Prison—Williams, McDonald, Meany, Dargie, Moffitt, Conklin, Dray.

Public Morals—Spellacy, Briceland, Fraser.

Public Printing—McDonald, Moffitt, Dargie.

Public Swamp and Overflowed Lands—Langford, Greely, Hinshaw, Dray, Boggs.

Roads and Highways—Roth, Boggs, Hinshaw, Dixon, McComas, Flint, Campbell.

Rules—Hamill, Welch, Flint.

State Library—Murphy, McComas, Caminetti.

State Prison and Prison Buildings—Goucher, Langford, Boggs, McComas, DeLong, Hinshaw, Caminetti, Wilson, Heacock.

Viticulture—Langford, Hinshaw, Sprague, McComas, Dixon.

Assembly.

Attaches and Employes—Long, Mulgrew, Tucker, Young, Maher.

Elections—Burwell, Long, McCarthy, Hall, Stande, Davis, Brown.

Judiciary—Seawell, Storke, Hall, Shanahan, Tully, Renison, Whitehurst, Tucker, Coombs, Salomon, Hyde, Young, Dibble, Lowe, Hart.

Constitutional Amendments—Storke, Whitehurst, Hall, Tully, Coombs, Damron, Young.

Federal Relations—Renison, Shanahan, Whitehurst, Hyde, Salomon, Culver, Mathews.

State Hospitals—Mathews, Mulgrew, Burwell, Searey, Atherton, Brierly, Murray.

Internal Improvements—Kiernan, Murray, Dinon, Lowe, Edwards.

Ways and Means—Shanahan, Whitehurst, Storke, Ostrom, Mathews, Coombs, Alexander, Atherton, Dibble.

State Prisons—Adams, Black, Brannan, Ostrom, Berry, Fawcett, Simpson, Atherton, Maher.

Election Laws and Apportionment—Hall, McVay, LaGrave, Rundell, Storke, Dibble, Hersey, Edwards, Ragsdale.

Labor and Capital—Dobbin, McCarthy, Reagan, Mullaney, Kiernan, Simpson, Johnson, Williams, Maher.

Swamp and Overflowed Lands—McMullin, Crawford, Mullaney, Burnett, LaGrave, Fassett, Campbell, Brickwedel, Hook.

Water Rights and Drainage—Whitehurst, Bangs, Wear, Brannan, Ostrom, Sykes, Petrie, Turner, Chapman.

Agriculture—Berry, Adams, McMullin, Rundell, Fassett, Porter, Campbell.

Chinese Immigration—McCarthy, Searey, Mullaney, Dobbin, Tully, Chapman, Porter, Brickwedel, Hersey.

Corporations—Ostrom, Mulgrew, Berry, Stande, Seawell, Dibble, Ewing, Turner, Alexander.

Agricultural, Mining and Mechanical Arts—Tulloch, Burwell, Reavis, Frank, Atherton, Hersey, Williams.

Commerce and Navigation—Reagan, Black, Burnett, Young, Ewing.

County and Township Gov'ts—Bangs, Murray (San Francisco), Tucker, Storke, Reynolds, Culver, Coleman, Brickwedel, Chapman.

Crimes and Penalties—Tully, Seawell, Bangs, Coombs, Dibble.

Viticulture—McMullin, James, Adams, Frank, Coombs, Edwards, Brown.

Claims—Mulgrew, Black, Shanahan, Reavy, Young, Salomon, McKeown.

Counties and County Boundaries—Mullaney, McVay, Rundell, Shanahan, Renison, Ragsdale, Hart, Sims, Sykes.

Fish and Game—Frank, Reavis, Dobbin, Culver, Ewing, Murray, Mahler.

Education—Crawford, Black, Wear, Bangs, Petrie, Brierly, Turner.

Silk Culture—Dinan, James, Hall, Johnson, Coleman.

Homesteads and Land—Reavis, Crawford, Dinan, Reagan, Fassett, Coleman, Simpson.

Irrigation—Tucker, Berry, Wear, Bangs, Mathews, James, McMullen, Adams, Holmes, Davis, Brierly, Hook, Edwards.

Military Affairs—Murray, Searey, McCarthy, Holmes, Johnson.

Mines and Mining Interests—Mahler, Tulloch, LaGrave, Reavis, Gardner, Davis, Coleman.

Municipal Corporations—Burwell, Burnett, McVay, Reynolds, Seawell, Berry, Salomon, Damron, Johnson, Simpson, Chapman.

Public Expenditures and Accounts—Wear, Ostrom, Burnett, Brown, Alexander.

Boring for Coal.

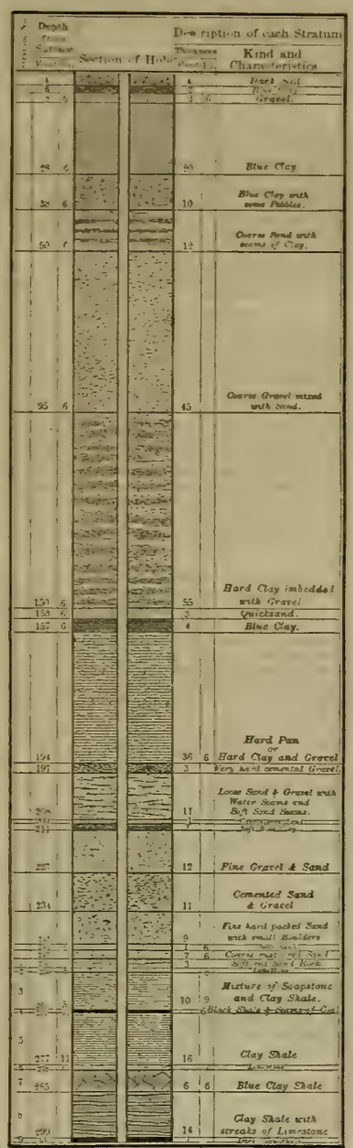
In the MINING AND SCIENTIFIC PRESS of Dec. 8, 1888, page 381, we gave an illustration of the Dauntless diamond-pointed rock drill, and a description of its construction and operation. This is a core drill; that is, it is so made that the core bored is brought to the surface. It is specially adapted for coal prospecting. We give on this page a diagram showing a section of coal measures cut at Saybrook, Ill., by this drill. The work was done for Mr. H. Cheney, by the Bullock Manufacturing Co., who made the drill, and who have as agents on this coast Messrs. Parke & Lacy.

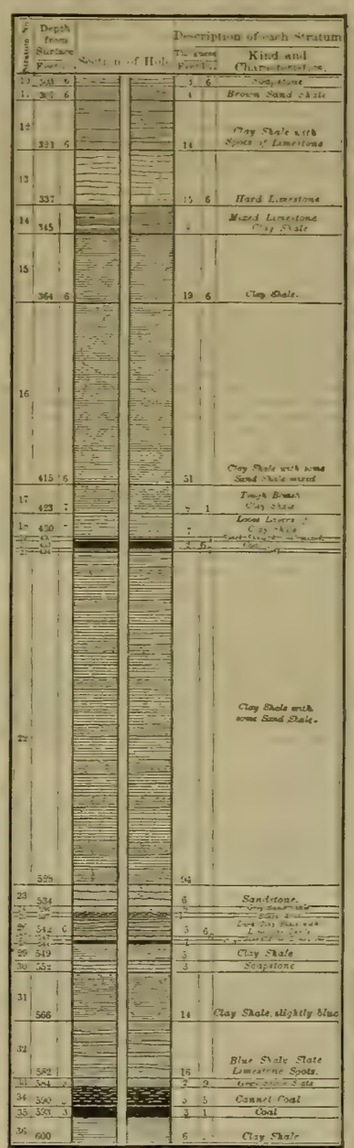
Mr. Cheney in speaking of the previous efforts to find coal in the measures referred to, says: There have been nine attempts made in all with the ordinary form of "churn" drills. In every instance the holes have proved failures, as it was found impossible to secure test cuttings that would give a definite or reliable record of the strata penetrated and at the same time tell the thickness of the different measures. While there were indications of coal, the cuttings or drillings were so mixed with the different kinds of material already passed through that I could never obtain anything like a favorable opinion from any reputable mining man as to the probability of our ever finding a paying vein of workable coal. Consequently the moneyed men in our community lost all faith in the project. So strong was this feeling that I found it useless to try to raise funds either by public or private subscription to defray the expense of having your company put down a final test hole with your improved core drills. Imagine, gentlemen, my feelings toward the old "churn" drills and the men who represent and sell them for coal prospecting, when I found that my time (eight months) and several thousand dollars had all been spent in vain with one of these "things."

The work done by your "Dauntless" drill has not only been entirely satisfactory to me, but has also removed the last lingering doubt in the minds of our citizens that we have a large and valuable deposit of coal at this point, for at a depth of 590 feet the bit penetrated a vein of coal eight feet six inches thick. I tell you it was a great triumph to see that core brought to the surface; broken in a few places, of course, but all there. It was a sight never to be forgotten by those who witnessed it.

Permit me to congratulate you upon having produced so wonderful a machine, combining great strength and beauty of design, running as smoothly as a sewing machine, "taking out a solid cylindrical core showing the exact thickness and character of every measure passed through."

The patent weighing thrust register is a most valuable addition to the machine, for it enables the operator to tell just what the bit is doing at all times, however deep the hole. I consider this of vital importance, for with this register, a two-foot rule and ordinary care and intelligence, any man can tell when the bit passes from one stratum to another and the exact thickness of every measure.


Depth from Surface
Section of Hole
Description of each Stratum
Thickness
Kind and Characteristics
Blue Clay
Blue Clay with some Pebbles.
Coarse Sand with seams of Clay.
Coarse Gravel mixed with Sand.
Hard Clay imbedded with Gravel
Quicksand.
Blue Clay.
Hard Pan or Hard Clay and Gravel
Very hard cemented Gravel.
Loose Sand & Gravel with Water Seams and Soft Sand Seams.
Fine Gravel & Sand
Cemented Sand & Gravel
Fine hard packed Sand with small Boulders
Mixture of Soapstone and Clay Shale.
Clay Shale
Blue Clay Shale
Clay Shale with streaks of Limestone



SECTION OF COAL MEASURES CUT BY "DAUNTLESS" CORE DRILL.

THE BREAKING STRAIN of iron and steel does not (as hitherto assumed) indicate the quality. A high breaking strain may be due to extreme softness. The contraction of area at the fracture forms an essential element in estimating the quality.—*Ex.*

Alaskan Placers.

No class of men require the quality of hope as those who seek for gold in the out-of-the-way places in which frugal, secretive Dame Nature has secreted it. That they possess this quality in the highest degree, the history of this coast plainly shows. So thought the Portland *News* reporter as he conversed with A. J. Long at the St. Charles hotel. Mr. Long is a typical placer miner and prospector. He landed in California in 1848. From that time until the present Mr. Long has followed with varying fortune the business of prospecting and mining. He went to all the different mining excitements, including Mariposa, Kern river, Yreka, Fraser river, and last but not least, Alaska. Mr. Long is one of the few '49ers who is possessed of a fair competence, but this does not deter him from still venturing on long tripe after pay placers.

"I returned from Alaska," said Mr. Long to the *News* reporter, "a few weeks since, and though I have mined everywhere on this coast, the best diggings I ever struck were in Alaska, and I intend to return again during the coming summer."

"In what part of Alaska were you, Mr. Long?"

"There were 22 of us in a place 300 miles north of Sitka and 50 miles from the Yukon river. It took 17 days to make the trip overland, and my back was sore from the pack of 35 pounds which I carried. We went in about the middle of July and remained until the latter part of September. While there, we had our supplies packed in by the Indians, who charged 50 cents a pound for such work. Living, therefore, was high, though a man could live economically for $6 per day, if he did not put on any great amount of style."

"How much could you take out a day?"

"Three of us worked together and we averaged about $47 a day for each."

"About how much did each of the three have at the end of the season?"

"About $4000 each. Some of the others of the party of 22, who were mining near us, took out more than we did. I intend to go back this year, and if I take out as much this season as I did last, I will give up mining. We have our sluices made and I expect we will take out more than we did last year."

"What do you think of Alaska generally as a mining country, Mr. Long?"

"I think it is a good gold country as far north as a man can live. The formation where the gold is found is granite, like it is in California. You know those red spots which used to be so rich in Placer and Nevada counties, California; well, I found them in Alaska, and they are richer, if anything, than they were in California. The characteristics of the gold-bearing country in Alaska are much the same as they were in California, with the difference that it is much colder up there. The gold was in size from the value of a mill to $4 specimens. It is fine gold, too, and sells for $17.75 to the ounce.

"I consider Alaska to be a first-class placer gold country, and any man who is a 'rustler' can make money in the mines there. You hear of many men who return disgusted from the mines of Alaska. In the days of California's greatest prosperity, the steamers were crowded on each returning trip with men who declared that California was not worth a cent, and who advised everybody not to go there. Besides this, many of those who have made lots of money in Alaska deny it for fear that the country will be overcrowded with miners and so cut off their chances of making more. Some who have made thousands of dollars there are the loudest in their denunciations of the country."

WASTE FILLING.—The superintendent of the Silver King mine, Arizona, says in his annual report that the method adopted for securing the ground with waste filling after ore extraction has been continued close up through the open ground. All levels which have been worked are now solidly filled except a small space in the upper 500 and lower 400; a few feet on the 250 level, fifth floor, and on the sill of the 143, so that the old workings are in no danger of seriously affecting the old shaft by sudden movement. In this work 2765 tons of waste were lowered from the 143 to the 300, and 1714 tons from the surface to the 350, 500, 600 and 800 levels; the remainder being furnished by sorting the ore.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ALPHI.—*Ledger*, Jan. 19: There has been a flutter of excitement over this property the past week. A company has lately been incorporated to work it on the North Star plan. Work was commenced last week in enlarging an old shaft which had been sunk to the depth of 50 feet. This shaft was sunk on the ledge, and in its enlargement to a double-compartment shaft, ore of a grade exceeding all anticipations was taken out. Pieces of quartz pounded in a mortar gave prospects indicating a milling value of from $15 to $20 per ton. Free coarse gold is often met with in the quartz, visible to the naked eye. Specimens are daily picked from the dump showing free gold. The ledge is a very strong one, judging from surface indications. It is from 10 to 15 feet wide. Of course, it is not expected that it is all milling rock, but if one-third of it is of fair grade, it will pay handsomely. It is the opinion of experts who have seen it that it gives promise of proving a big mine.

STOLCKEN & CLEVELAND.—A French company has bonded this gravel or cement claim, located at Volcano, for four months. They are busily engaged running a tunnel into the hill north of town, and expect to reach the gold-bearing channel of cement at a distance of 350 feet. They are in about 100 feet at present. The prospects are considered very favorable for the development of a valuable mine here. The gold is found in a hard cement, which has to be reduced in a stamp-mill. A number of persons have made a living by panning out in the neighborhood of this claim. So heavily freighted with gold is this cement that even a pan a day is sufficient to enable one to earn a fair living.

GOVER.—The new pipe to conduct water to both mine and mill from the main canal at a point in R. M. Ford's ranch near Quartz mountain is all laid and proved satisfactory; the two water-wheels for the application of this power are in position. This improvement is a grand step in the economical working of this property.

MECHANICS.—This mine is located 1¼ miles east of Sutter Creek. There is a strong ledge as shown by the croppings, extending several hundred feet. Negotiations are in progress looking to the bonding of this property. The mine is certainly deserving of a fair and thorough test by the approved gold-saving methods now in vogue.

ZEILE.—The shaft has been sunk to a depth of 1070 feet, at which point they are now cutting a station. This is 270 feet below the lowest level now being operated, and in this distance two new levels will be opened, one at 935, the other at 1070 feet.

MISCELLANEOUS.—At the Gillick mine near Volcano they are still engaged in crosscutting at a depth of nearly 100 feet. It is reported that the mortgagees of the Amador Queen mine have granted the company 60 days extension of time to pay off the liens; that is, they have agreed to wait that long before taking steps to foreclose. At the Talisman they are engaged in drifting north at the 800-foot level, with very encouraging prospects. The Keystone is still sinking. They have attained a depth of 1400 feet. The stockholders of the North Gover are seriously contemplating organizing a company to take a bond of the property and develop it on the same principle as the Drytown Consolidated and other mines. This mine joins the Gover on the north, and according to all reports is a very promising location.

STOPPED AND STARTED.—Cor. Amador *Dispatch*, Jan. 19: Quite a stir was caused here on Monday last, by the announcement of the failure of the Lambing mine on Dry creek. The miners are all thrown out of employment, and are often seen on the street discussing how to proceed to get their money; about $1500 is due them for work. On Wednesday a compromise was effected by which the attachment was released, and the mine will probably resume work. It is said that some of the disaffected miners will not be permitted to work.

Calaveras.

PLACERS.—Angels *Record*, Jan. 17: The insufficient supply of water has impelled placer mining to a considerable extent, though some claims are making preparations to pipe as soon as an abundance of water is assured. Among these is the claim in Douglas Flat, owned by Chas. Prey and Kuhn, who will commence piping to-morrow. Billy Thomas is working an offshoot of the great central mill channel. Many are of the opinion that there is a continuation of this offshoot down toward Six-Mile creek. There are numbers of mining men in town looking up mining property. There can be no doubt that in the early spring, increased activity will be noticeable in mining matters.

WEST POINT.—Calaveras *Chronicle*, Jan. 19: The Blazing Star mine and mill are running night and day. Rumor says that the Lone Star will soon be started with a heavy force of men. Work is progressing favorably at the Riverside, with good prospects ahead.

El Dorado.

GRAVEL.—Placerville *Observer*, Jan. 15: Jim Marshall is reported to have struck rich gravel in the old Kendall mine at Dogtown. Rich cement gravel is now being taken from the Linden mine on Cedar ravine. Supt. E. B. Burdick is pushing the tunnel at the Equator mine with all possible speed. The Equator promises to be one of the prominent mines of this county.

SEAM.—Georgetown *Gazette*, Jan. 17: John and Geo. Buchler have struck a rich-paying seam on their premises in the southern limits of town. The seam is about three inches wide, and the boys are sinking on it in the midst of their vineyard. How much they have taken out is not known to the public, but judging from the fine lot of specimens which the boys have shown, and the character of the gold, it is believed they have uncovered a big thing.

Inyo.

BORAX.—Inyo *Independent*, Jan. 19: The Coleman Borax Works, now idle, are expected soon to resume operations on a large scale. The Charlton Borax Co. delivers three 18-mule loads of borax weekly—perhaps 30 tons. Much is expected from the revival of the borax and mining industries of the desert when the narrow-gauge shall have been extended from Keeler.

LOCATED.—Quite a number of mining claims have been located during the past few days. Some are new claims and others are mines upon which the assessment work had not been done and are relocated.

Kern.

SULPHUR.—*Kern Co. Echo*, Jan. 17: While surveying recently in the San Emigdio country, Willis Cheney discovered a very rich deposit of sulphur. Much of the rock looks like pure sulphur and is readily ignited with a single match. Mr. Cheney, W. B. Carr and several other prominent gentlemen of Bakersfield have located claims.

Mariposa.

PINE TREE.—Mariposa *Gazette*, Jan. 19: We understand that work on the Pine Tree mine near Bear Valley is to be prosecuted with greater force than heretofore. Burleigh drills are to be used, and pipe is already ordered to convey water to the mine. They have about 15 men at work.

WATER SCARCE.—Miners all over the county are complaining about the scarcity of water. A good rain of a few days would be of immense benefit every way to us now. The ground is wet, but the creeks are low, and consequently miners cannot work to any advantage. Capt. Diltz was in town one day last week, and reports the lack of water as interfering seriously with work at his mine. He can do nothing except timber up and get ready to utilize the first rain which falls. With 12 inches of water, Capt. Diltz could do a vast amount of work washing down the sides of the mountain and exposing the rich strata which form his mine. He has a project which we hope he may be able to carry out, of going to Pittsburg and procuring pipe to convey the Snow creek water to his mine.

THE GRANT.—There is a rumor afloat that there has been a change in the ownership of the company controlling the Mariposa Grant. Just where and how the report started we are unable to say, but we give the voice of the whole county when we say we hope it is so, if it will make any change or improvement in the condition of matters. Over a year ago when the present owners bought the big estate, people rejoiced and many of them rushed into needless extravagance and expenditures because the Grant was sold and money was to come with amazing velocity. But all the year of 1888 passed without much tangible good resulting from the purchase, and it begins to look as if 1889 would follow in the same way. True, some quiet prospecting has been done, and some scant improvements have been made, but none of the grand achievements which might have marked the year in our country's history have been made.

WHITLOCKS.—Mariposa *News*, Jan. 12: The work of sinking the shaft below the bottom of the old works of the Grove & Ellingham mine is progressing rapidly. It is now down about 25 feet on the ledge and the rock looks well. The vein is about four feet wide. About 50 pounds of ore has been sent to Hite's Cove to be assayed. The indications are that this will be one of the best mines in the county.

RED CLOUD.—Things are at a standstill at the Red Cloud. Work has been suspended some weeks. The pumping machinery was stopped recently. The company are owing about $10,000, mostly to the miners. They cannot pay it without another assessment. They want the miners to run the mine till they get their wages out of it. The miners cannot well do so as, it will take about $1500 to get to the pay chute. So the matter rests and Red Cloud is idle.

COULTERVILLE.—Mariposa *News*, Jan. 19: The celebrated Cook mines are about to be sold to a foreign syndicate. There is now on display at McCarthey's drug store two of the rarest specimens of gold known to mining, that is, two pieces of pure crystallized gold. They weigh $50 and $90. These are the purest and most perfect specimens known. They were taken out of the Defiant mine, owned by J. M. Murphey and P. M. Lower. It is located on the ridge between Solomon gulch and the North Fork.

THE GRANT.—Senator Jones has purchased Flood's interest in the Grant. There will be no change in the offices at all. The company has ordered pipe from New York, so as to use Burleigh's in the Pine Tree mine, using compressors from the river.

WHITLOCK'S.—Grove & Ellingham are getting along finely with their mine at Whitlock's. They have sunk a shaft about 260 feet, and have struck an eight-foot ledge, which is said to be very good, so we learn.

HART'S.—Hart's mine at Sebastopol is in first-class working order, and work will be begun at once.

Nevada.

SINKING THE SHAFT.—*Tidings*, Jan. 17: It has been resolved by the directors of the W. Y. O. D. Mining Co. to sink the shaft on their property to a depth of 600 feet before pushing other development work. A depth of over 360 feet has been attained to date and the work is being diligently prosecuted by men working in eight-hour shifts. Gold-bearing stringers are cut frequently. Progressing as at present, the depth desired will have been obtained four months hence.

NORTH BANNER.—Grass Valley *Tidings*, Jan. 21: Unless all signs and indications known to mining men fail, the North Banner Mining Co. will during the years to come be substantially rewarded for the faith and indomitable perseverance displayed in its operations. The mine is paying its way and each month contributing to the treasury nest-egg. Developments at the North Banner during 1888 warranted the construction of a new and approved mill and pointed out the necessity for a departure in the method of mining in force. This was by tunnel, the lowest of which was 1000 feet in length and about 300 feet from surface at its face. Deeper working was required, so an incline shaft was started in the tunnel and an upraise to surface made. Down the upraise water was conducted by pipe, hoisting and pumping machinery were set up in the tunnel, a Pelton wheel attached and work proceeded. The pump is one of eight inches, yet the water used to drive it and the hoisting machinery does not exceed eight miner's inches. The shaft is now over 90 feet below the floor of the tunnel and depth is added daily by nine men working in eight-hour shifts. In the face of the shaft the ledge shows up encouragingly. The new mill is of ten stamps with all the latest and tested gold-saving accessories, and is handily situated at the mouth of the tunnel spoken of. This, too, is run by water-power, Pelton wheels being employed. Thirty-five men all told are in the employ of the company." What ore is being extracted is coming from the tunnel backs where the ledge is from three to four feet in size. The weekly cleanups (not complete by any means) average 100 ounces of gold aside from the sulphurets, which are very rich. The mill is run day and night. Fourteen dollars in free gold per ton is found to be the yield. This, under existing circumstances, is equivalent to a yearly profit of from $25,000 to $30,000, and should the returns not materially vary it is contemplated to add 10 or even 20 stamps to the mill two years hence. Although the North Banner is situated in Nevada mining district, it is owned and operated by Grass Valleyans.

THE BIG SHAFT.—Eureka *Sentinel*, Jan. 19: President Fries, of the Eureka Consolidated Mining Co., lately told a representative of this journal that his company would begin sinking the new deep shaft in the early spring, if the Richmond would chip in its share. He thought the work of draining Ruby Hill should be done on joint account, as the Richmond would derive quite as much benefit as his company. He had little faith, however, in the Richmond joining in the enterprise. Mr. Probert seems to be strongly opposed to the arrangement and nothing can be done without his consent. Mr. Fries thought his company would not undertake the work alone; and so they stand.

Placer.

THE HATHAWAY MINE.—*Herald*, Jan. 19: We are informed by Mr. F. X. Lavalle that the mill and hoisting works on the Hathaway mine are running. Mr. Lavalle considers the hoisting-works superior to any before erected in the Ophir mining district. The ledge is three feet in width, and has averaged for the 400 and odd tons that have been crushed, over half an ounce to the ton. Even with ore of a lower grade, the mine is a valuable property, since its width enables the company to get out ore in such quantities that the proceeds will equal those of ledges carrying high-grade ore.

Plumas.

GENESEE.—Cor. Greenville *Bulletin*, Jan. 17: There is at present little doing in the mines of this district. None of the mills or arastras are running, although some ore is being taken out. A short time ago $150 worth of gold was obtained in two days from a new ledge found within the Green Ledge lines. The quartz from this new find was coarse and hungry looking; the kind of ore a theoretical miner would not look at; thus proving once more that gold is wherever you find it. Work in the Genesee shaft will be resumed as soon as there is a certainty of being able to run without interruption from cold weather. This part of the country will be an interesting one this coming season in a mining sense, as good bodies of ore are expected to be developed.

Shasta.

A BIG MINE.—Redding *Free Press*, Jan. 17: From George Klein, who was down from Deadwood Thursday, we learn that on the invitation of Mr. W. T. Coleman he visited the Montezuma mine, which he sold to him two years ago for $5000. The mine is near the summit of Trinity mountains and he entered the tunnel in Shasta county and came out in Trinity county. After entering the tunnel he traveled for 900 feet west, then at right angles for 200 feet, which brought him into the Montezuma ground, where he found a force of men extracting ore from a vein over eight feet thick, every pound of which was good paying ore. Such a sight can only be appreciated by an old quartz miner. The stope is up about 30 feet and it looks as if there were no end until the surface is reached, a distance of 150 feet. The quartz in the bottom of this tunnel seems to go down in good faith and the ore shows free gold to the naked eye. As Mr. Coleman is a very energetic man he will soon prove that this is the boss mine of the two counties. The Brown Bear mine after making some repairs during the holidays started up, and as usual is running on first-class rock. The Little Gem mine, which the company purchased from Gibson, is proving itself to be not only running west but also east from the gulch, and is turning out very rich ore. The McDonald mine is turning out rich as usual.

WHISKYTOWN.—Redding *Free Press*, Jan. 17: The neighborhood of Whiskytown is having quite a mining boom. General Cunningham of San Francisco having succeeded Mr. Ferebush as superintendent of the Iron Mast mine on Grizzly gulch, has placed a large force of men to work on its further development. Farther up the gulch Geo. Knox is taking out some excellent ore from the Emigrant mine, and his arastra is kept constantly at work with good results. Charles Barnes is opening up a back channel on the old Dr. Belt placer mine and is well satisfied with his prospects. J. S. Strode and Joseph Jones have taken out some fine ore from a pocket mine near the town. The vein is somewhat small, but yields a good supply of the precious metal. Many new prospectors have arrived. There is not a vacant cabin on the gulch and many new ones are being erected. The old-time appearance of the gulch and surroundings is renewed and Whiskytown is again lively with business.

MINING INTERESTS.—Redding *Free Press*, Jan. 19: Now that the Walker Bros. are interested in Old Diggings and the Sierra Butte Mining Company has purchased Jack Conant's big mine on Squaw creek, the mining interests of Shasta county have been materially advanced. Capital we have long needed to develop our mineral resources. Until Wm. T. Coleman became interested in Deadwood that camp was imperfectly known and hardly worthy of attention, but now its reputation is established. In Old Diggings there are numerous good locations, notably the Hart & Day mine and the property owned by Riley & Bliss. The Walker Bros. have plenty of capital, and when their locations are developed the whole district will boom.

Siskiyou.

SUSPENSION OF WORK.—Yreka *Journal*, Jan. 19: The cold weather lately has caused a suspension of mining in most of the mining camps, on account of freezing the water supply, and obliging ditch-men to empty their ditches, as once frozen over they would be useless for some time. The weather will no doubt change to warmer temperature in a few days, with prospects of more storms to make good times for miners. The quartz miners continue to get out quartz from the tunnels, and those engaged in drifting can also continue work, but other mining requires warmer weather than at present, as the ground is frozen as well as the water in the small streams.

Sierra.

BALD MT. EXTENSION.—*Mountain Messenger*, Jan. 17: The upper main tunnel of the Bald Mountain Extension Co., three miles by the road above Forest City, was at latest advices in 2300 feet; face, soft-picking rock with considerable water. Twenty-eight feet were made last week.

San Bernardino.

RICH ORE.—San Bernardino *Index*, Jan. 15: Yesterday an *Index* reporter was shown at the office of Evans, Linville & Evans, some handsome samples of ore from the Black Metal mine, on the Colorado river, about 50 miles south of the Needles. The mine is the property of Monaghan & Murphy of the Needles, and Pete Maguire. It is worked steadily, the ore being sorted and the finest quality being shipped to San Francisco, where it is sold to the smelters all the way from $200 to $400 per ton. The low-grade ore which will not pay to ship is thrown on the dump, where there are now fully 1000 tons of ore that will work $35 per ton. It is reported that the owners of this rich mine are negotiating to sell it to parties in Los Angeles for $55,000. In case the sale is made, reduction works will be put up on the site, and work will be prosecuted on an extensive scale. This will add another prosperous camp to San Bernardino county.

Trinity.

TRINITY CENTER.—*Journal*, Jan. 17: There will be a big boom in mining as soon as the roads are opened This end of the county, especially in Coffee Creek district, is as little known as it was 25 and 30 years ago. There have been some fine mines discovered and lots of gold taken out during the past summer and fall; there is room for many more here and plenty of good, pure mountain water the year round, and wood to be had for cutting it.

Tulare.

MICA.—Tulare *Times*, Jan. 17: At a depth of 755 feet in the artesian well being bored on the ranch of C. G. Lamberson, near Tulare Lake, a bed of mica, six inches thick, was bored through. Just before striking this bed of mica a flow of water was found, and under the mica was a bed of blue clay or soil. This is the well in which gas was found at a depth of 444 feet, and which when lighted at the top of the pipe would burn all night. The first gas flow was shut off, and smaller flows have since been found and closed, as the well is being sunk with the object of getting water and not gas.

Tuolumne.

COARSE GOLD.—Tuolumne *Independent*, Jan. 17: The sight of about $700 worth of coarse placer gold this week reminded us of the days long gone by, when it would merely be a drop in the bucket, and was a heap easier to get than eggs.

CARRIE.—J. L. Tonkins, an experienced manager, has been appointed superintendent of the Carrie mine, recently purchased by Messrs. Wm. T. Coleman and A. F. Cooper of San Francisco. It is located at Soulsbyville, between the Black Oak and Live Oak mines, being on the same vein, and is expected to prove equally as rich as these splendid properties. Mr. Tonkins will immediately commence the work of sinking and development, and proceed to erect the necessary buildings.

NEVADA.

Washoe District.

SAVAGE.—Virginia *Enterprise*, Jan. 19: On the 400 level the main west drift has been extended 36 feet. Southwest crosscut No. 2 has been advanced 43 feet. From the north and south drifts on this level ore is being extracted from the old stopes. During the week have hoisted 402 tons of ore; have shipped to the Rock Point mill 498 tons, and have reduced 490 tons. Average of battery assays, $21.36 a ton.

HALE & NORCROSS.—On the 400 level the south upraise has attained a hight of 51 feet. Have not yet commenced extracting ore from this level. On the 500 level the north drift is out 133 feet and continues in good ore. The stopes above this level are yielding ore of good quality. Have completed the winze station and have commenced sinking in the ore below this level. The stopes from the 600 to the 700 level continue to look well and are yielding the usual amount of ore. On the 1300 level the south upraise has attained a hight of 33 feet. It continues in the same fine-looking quartz and shows bunches of good ore. Have started a drift north from the station on this level which is out 62 feet. During the week have hoisted 1170 tons of ore; have shipped to the Mexican mill 1059 tons, and have reduced 1076 tons. Average of battery assays, $23.75 a ton. Have bullion on hand and previously shipped for the month amounting to $32,172.

CHOLLAR & POTOSI.—These mines are yielding over 100 tons of ore daily, upon which the Nevada mill runs four stamps. The electrical plant has not yet started up. The company has shipped to San Francisco $42,593 since the Nevada mill started up on their ore.

CON. CAL. & VA. — Ore is being stoped from all the levels from the 1400 down to the 1950 level. The usual amount of ore is being shipped to the Morgan and Eureka mills, and the average of battery assays will be about the same as last week—some $30 a ton.

CONFIDENCE.—The raise from the 1200 level still shows fair ore. On the 1300 level the south drift is in material that carries some metal. The usual amount of ore has been shipped to the Brunswick mill. Average of battery assays, $33.

GOULD & CURRY.—A drift from the 300 level upraise is encountering promising stringers of quartz. The north drift on the 450 level is in material carrying some metal. A considerable amount of repair work is being done on the 625 level.

JUSTICE.—The north drift to the Alta upraise is being pushed as rapidly as possible, as a circulation of air is needed. The ore-producing sections are looking well. The mill is crushing about 40 tons of ore a day.

CHALLENGE CON.—Are shipping about 200 tons of ore a week to the Brunswick mill. Battery sam-

ples average about $32. Have sent below $11,542, the proceeds of 975 tons of ore worked in December.

BEST & BELCHER.—The north drift on the 300 level continues in material that shows value by assay. The winze below the 300 level is in favorable looking vein material.

OVERMAN.—During the past week 270 tons and 800 pounds of ore were extracted, and 335 tons were shipped to the Vivian mill. All work is progressing about as usual.

ALPHA & EXCHEQUER. Good headway is making in the drifts north and south on the 500 level. Quartz streaks carrying some metal are occasionally encountered.

BELCHER.—The 200 level north drift is out 336 feet. A pipe and blower have been put in to drive out the foul air. Good headway is making on the 160 to connect with the 200 drift.

CROWN POINT.—The raise on the 700 level connected with the old southeast drift on the 14th inst. Are now clearing up and timbering the drift.

OCCIDENTAL.—Are still extracting ore from the 300 level. It is of good quality. Some fair ore is also coming in from the 500 level.

NORTH OCCIDENTAL.—Ore assaying $40 a ton is still being taken out in small lots. Some ore is also being extracted from the 250 level.

OPHIR.—The south drift on the 1465 level continues to be advanced in vein material composed of clay, quartz and porphyry.

SCORPION.—During the past week the west crosscut on the 400 level was extended 14 feet, making a total distance of 282 feet.

UNION CON. & MEXICAN.—The joint north drift on the 1465 level is in Mexican ground a distance of nearly 500 feet.

SIERRA NEVADA.—The southeast drift on the 520 level incline rise is passing up through quartz showing value.

ALTA.—Ore-producing sections yielding as usual. The mill is running steadily and the concentrates show well.

YELLOW JACKET.—Are shipping to the mills 100 tons a day of fair ore, and are doing some repair work.

CON. IMPERIAL. — No. 2 east crosscut on the 1100 level is a mixture of clay, quartz and porphyry.

BALTIMORE. — Much good ore is being extracted and stowed away on the 350 level.

SEG BELCHER.—The joint drift on the 1100 is out 363 feet. Face in porphyry.

UTAH.—Main west drift on 600 level still in soft vein material.

ANDES.—Work will soon be resumed in the lower levels.

Golconda District.

IRON ORE FOR FLUX.—*Silver State*, Jan. 17: General Buckner, who owns a large deposit of iron ore in Winnemucca mountain, has entered into a contract to supply several tons of the ore daily to the Adelaide Copper Co. at Golconda, who use it for flux. A road is now being built up Winnemucca canyon to the mine, and when it is completed the ore will be hauled by teams to the railroad and shipped thence to Golconda by rail. This ore, it is said, makes better flux than that brought from Palisade or Utah, as it contains very little silicate.

Tuscarora District.

GRAND PRIZE.—*Times-Review*, Jan. 19: Winze No. 1, 300-foot level, has been extended downward a distance of 7 feet and shows a width of 2½ feet of good ore in the bottom.

NEVADA QUEEN.—The north drift, 450-foot level, has been advanced 13 feet. The face is showing some low-grade ore assaying $13 per ton. The stopes continue about the same, but are being extended farther north. East crosscut from west gangway has been extended 18 feet. The concentrator has been running steadily and is doing good work. The heavy storms and cold weather have not interfered with the running. The assays show the work to be 80 per cent average for present month.

COMMONWEALTH.—225-foot level: No. 1 west crosscut from south drift has been advanced 14 feet through seams of ore. No. 2 west crosscut has been extended 14 feet, showing faces of good ore. Line crosscut to the east has been advanced 18 feet. 300-foot level: No. 1 west crosscut from the station has been advanced 18 feet. Gangway has been advanced 11 feet. Rock continues hard.

NAVAJO.—An upraise has been started in the vein south of the stopes above the 350-foot level, and is showing some good ore. The stopes continue to yield the full amount and are looking well. Mill is running all right.

NORTH BELLE ISLE.—Intermediate drift south from No. 1 winze below the 300-foot level has been extended five feet, showing low-grade ore. Everything running well.

NORTH COMMONWEALTH AND DEL MONTE COMBINATION SHAFT.—The hoisting machinery is running nicely; shaft has been sunk and timbered seven feet.

BELLE ISLE.—South drift from east crosscut, 250-foot level, has been extended eight feet in vein matter giving low assays.

FOUND TREASURE.—Branch drift, 150-foot level, has been extended four feet.

ARIZONA.

NOTES. — Prescott *Courier*, Jan. 16: Charley Quinn, a No. 1 miner, who has been delving in Diamond Joe's Congress mine, west of Prescott, arrived in town yesterday. The deepest workings are, he says, about 560 feet below the surface and rich ore abounds everywhere. Crosscutting the largest vein is progressing very favorably. His idea is that the Congress is the greatest gold mine in the West. Between 60 and 70 men are at work there. The Catoctin, 12 or 14 miles south of Prescott, is another favorite property. It has produced a great many tons of rich silver ore. The vein is said to be five feet thick. John F. Blandy, M. E., is here from Upper Lynx creek, where snow is now quite deep. Miners are, however, pushing things, and will have plenty of ore to ship as soon as weather and roads shall have settled. Mr. Moore, of the Ore Sampling Works, is preparing several odd lots for shipment. Although snow is quite deep in the Hassayampa district, work is kept up on the Senator, Storm Cloud and Howard mines.

PLACERS.—*Journal-Miner*, Jan. 17: The owners of the Lynx Creek placers are looking forward to a big and productive run this year. The snowfall near the head of Lynx creek will no doubt furnish an abundance of water for an unusually long season this year. These diggings have already yielded thousands of dollars in gold, while hundreds of thousands more are in sight. The mines belonging to Shirley & Sattes, located in Crook canyon, have lately been examined by two different mining experts. Their reports being favorable, the properties have been bonded to Eastern capitalists. Considerable work has been done on the Alligator and Washington mines during the past three months, and it is reported that there is sufficient pay ore in sight to justify the erection of a 10-stamp mill. The ore carrying a great deal of sulphurets, concentrators will have to be used.

TOMBSTONE.—The Tombstone *Prospector* says that the rich discoveries of the past week in Tombstone district and vicinity have been the means of inducing many miners to go to work, and never before in the history of the recent years has so much work been going on in this district as at the present time. It does look as though an era of prosperity had at last settled down on the old camp, and that those who have stood by the ship when she was on the verge of foundering were to receive their reward for their faith in the fickle goddess.

BRITISH COLUMBIA.

MADE TWO CLEANUPS.—Donald *Truth*, Jan. 15: The latest news from Perry creek is that the new tunnel has been run in 35 feet farther than the old tunnel, some 550 feet in all. In clearing off the bedrock, the dirt and boulders had to be hoisted up to and run out through the upper or old tunnel, which made the work proceed rather slowly. When bedrock was reached, it was found to be as smooth as glass and sloping. The first washup netted $231, and the second $154.50. The channel is widening, and the company expects to strike big pay when ground outside the canyon is reached.

SHIPMENTS.—Ore shipments continue from the Monarch mine at Field, a total of 700 tons having been sent to the company's smelter at Vancouver. The 700 tons represent a money value of $35,000. Coal from the mines at Anthracite is also beginning to go westward, a few carloads arriving daily at Donald, whence it is forwarded to Port Moody for transhipment to San Francisco.

COLORADO.

TO BE BETTER.—Elk Mountain *Pilot*, Jan. 19: It seems to be in the air that mining is going to be better the coming summer than it has been for the last two or three years. Parties whom we talk with that have recently been in the East say that capital seems to have more confidence in mining than ever before, and that there will be greater inquiry for property with true merit than ever before. This is very encouraging news for localities like ours, where it requires capital to put the mines on a paying basis.

ORE.—The finest specimen of ore we have seen on exhibition for a long time came from A. B. Williamson's Keystone mine, between here and Irwin. It is a solid chunk of lead ore weighing about 130 pounds, containing some antimonial silver, and is no doubt a fair average of the ore in the vein, which Mr. Williamson says is 16 feet wide.

DAKOTA.

REDUCTION WORKS.—Deadwood *Pioneer*, Jan. 15: The reduction works began on Friday running night shifts. The works will continue from this on running night and day. The day shift will be under supervision of the superintendent, Mr. R. D. Clark, and the night shifts under that of Mr. Harry Clark, the assistant superintendent. The crushing-mill, including the rock-breakers and rolls, now runs smoothly and at its full capacity, crushing from 60 to 70 tons of ore per day. The system of pumps which will circulate the leaching liquors are in place and ready for instant use. The leaching vats have been fitted with the false bottoms and faucets and are ready for the charges of roasted ore. But one thing is lacking, the hoppers for the roaster were ordered from Fremont some weeks ago but have not yet arrived. When put in place the mill will be absolutely complete from one end to the other and ready for the charging of the roasting furnaces. Operations will then begin at once.

IDAHO.

LEASED.—Idaho *Avalanche*, Jan. 15: Mr. John Lamb, we understand, has leased the Golden Chariot and Minnesota mines, and has gone to work on the same, assisted by a force of miners who know something about the rich chutes of ore in those mines, and who will extract the ore therefrom as soon as possible. There is no doubt that there are places in those mines that will pay well.

UPPER HOT SPRINGS.—Ketchum *Keystone*, Jan. 17: Some valuable mining claims are being brought to light in the vicinity of the Upper Hot Springs, about ten miles from Ketchum, on the road leading to the Smoky district. The formation is very favorable for mineral, being a contact between limestone and granite. The ore is galena and carbonate in character, and of a good grade. About a mile and a half in a westerly direction from the Warm Springs some three or four claims have been located upon what is known as "Warrior Hill." The Warrior No. 1 has a well-defined ledge and has been explored by tunnels at different levels on the ledge, a distance of 300 or 400 feet, exposing high-grade carbonate and galena ore. A considerable quantity of ore was shipped from this mine the past season with satisfactory results. Warrior No. 2 is a continuation, no doubt, of the Warrior No. 1 ledge, carrying the same character of ore, and showing a fine outcrop upon the surface. The mining outlook on "Warrior Hill" is very encouraging.

STRIKE.—We are informed by parties over from Custer that there has been a rich strike made in the Fourth of July mine at Bonanza. The ore is sulphuret of silver, and assays it is said $1000 per ton. Some fine ore has been encountered lately in the workings of the Southern Belle claim, on Trail creek, about a mile from town.

SAWTOOTH.—From parties who came down from Sawtooth on Thursday the *Keystone* learns that the Cornish pump at the Silver King mine has been repaired and the machinery generally is again working in good order. It is also reported that a fine development has been made in the lower level of the mine.

MONTANA.

THE LOWLAND DISTRICT.—*Inter-Mountain*, Jan. 19: Not much has been said in the papers recently about the Lowland district, but some 50 to 75 men have been busy as bees all winter there. Andrew Nelson, superintendent of the Ruby mine, was in the city last evening, and from him a reporter learned that considerable work is being done on the Ruby. There are at present 12 men at work on the mine, and four additional miners will be put on to-day. The drift east on the 50-foot level has been run 80 feet, and the drift west on the same level is in 50 feet. Stoping is being done in both drifts, and some very good ore is being taken out. Forty tons of ore per week is being shipped from this mine to various mills, but most of it coming to Butte. The Kit Carson mine, belonging to Gov. Hauser, is being worked and very rich ore is being shipped. The Carson has been a paying property for five years. Otto Moldenhauer owns the Quitzow, just north of the Ruby, and has run a tunnel on it to a depth of 125 feet. He has a vein from two to five feet in width, with low-grade ore assaying from 15 to 25 ounces in silver. Other prospects in the neighborhood on which from one to three men are working are the Mary Ann, Black Bear, Hamburg, Morton, Wolfstone, St. Louis, Blue Eye and Silver Arrow. All of these except the Wolfstone are owned in Butte.

ANACONDA.—*Review*, Jan. 19: There has been considerable activity in mining circles west of Anaconda the past two weeks, which has assumed important proportions, the principal event being the incorporation of the Red Lion Mining Co. It was decided to at once put up a 15-ton mill for milling gold ore. The mine is located about five miles northwest of Georgetown on a line between the Cable and Granite, on what is known as Cable or Iron mountain. Salton Cameron, while representing some claims near the old Stewart mill, just west of Silver lake, struck a very fine ledge of ore which gives great promise. He is now at work on this claim taking out ore and sacking it for shipment. We learn of a very important strike in the Southern Cross mine, on the 250-foot level, which has made the holders of that stock quite jubilant. We learn that development work on the Antelope mine in Oleson gulch has been successful in uncovering a very fine body of ore. There are a number of other parties at work on mines in this vicinity, and it is probable that as soon as warm weather sets in we will learn of still further important strikes in this section which is bound to come to the front.

THE CARRIE.—*Inter-Mountain*, Jan. 12: A strike was made in the Carrie mine, located near P. A. Largey's residence, a few days ago, which promises handsome returns. The strike is made in the drift west from the shaft, at the 100-foot level. The vein shows three feet of ore which will mill between 50 and 70 ounces in silver and from five to ten dollars in gold. The strike has been opened up for 208 feet and a drift is being run below the strike. A quantity of the ore has been milled at the Butte Sampling Works and shows about what is stated above, though the assays are very much higher. About 20 tons of ore a day are being hoisted now, and stoping has just commenced. The Carrie is owned by P. A. Largey, and is under bond and lease at a handsome figure to Messrs. Hornbrook, Deitrick, Cunningham, Lynch, and Christiansen.

AT BEAR GULCH.—*Inter-Mountain*, Jan. 17: Mr. R. B. Loomis of Bear gulch, in Deer Lodge county, came up to day to Butte. He reports but little mining being done in that section this winter; the placer mining being prevented by cold weather. He himself and a few others are doing a little washing in a rather primitive way, during the winter, but not more than a half dozen men are employed. There are several placers belonging to Leshau and Elfritz, James Halford & Co., Patrick Brogan and the Abascal estate, which paid well all last summer and apparently have work ahead for several years. Beartown is one of the oldest mining camps in the Territory. There have been from time to time quartz discoveries in the gulch, but capital seems slow in coming in. The owners have confidence in their properties, however, and continue development.

THE PYRENEES.—The Pyrenees mine, owned by Butte people and located at Georgetown, is running full blast this winter. The shaft is now down to the 300, and drifting has begun from that point. The mill and the two new Frue vanners which the company has put in are running constantly on ore taken from the upper levels of the mine. Twice a week shipments of concentrates are made to the Colorado smelter in this city.

NEW MEXICO.

THE KEYSTONE MINE.—Kingston *Shaft*, Jan. 12: W. George Wearing, M. E. and manager of the Flagler Reduction Works at Silver City, during his visit here last week went over to the North Percha, and among other mines in that section went through the Keystone, and was very well pleased with the outlook of the mine. He remarked that he had never seen so fine a showing anywhere during his experience at the same stage of development. A walk into drift No. 3 on the 150-foot level makes one feel as though in a silver vault. The breast of ore which is nearly four feet in width sparkles with native silver. The ore taken from this drift, drift No. 3 on the 150-foot level, for its entire length will mill 200 ounces to the ton. The average width of this chute from the time it was struck to the present time has been from 20 inches to 4 feet. It is more than probable that reduction works will soon be erected at this mine, which will be a great benefit to the camp in general and a source of steady profit to the owners of the Keystone.

GOLD HILL.—Silver City *Enterprise*, Jan. 15: W. C. Tonkin, manager of the Ruby Silver Mining Co. of Gold Hill, is now in Kansas City to make final arrangements for erecting a mill at the mine. The recent shipment of ore to Socorro ran: First-class, 571 ounces; second-class, 136 ounces. The Ruby Silver produces about the best average grade of ore in this section, and has a sufficient amount of it in sight to justify the erection of a plant. While the mill is being erected extensive development work will be done in the mine.

PINOS ALTOS.—The Golden Giant is now under lease to Jo Williams, one of the owners. Considerable time has been spent in putting the mine in order, and now that this has been accomplished this claim will again add its product to the monthly output. The Esperanza, the southern extension of the Giant, is showing up well. Free gold is visible in places, and the ore looks as if it would mill at the rate of $25 per ton.

OREGON.

ANOTHER MINING DEAL.—The *Democrat* mentioned at various times during the past summer that a discovery of gold had been made at McCord gulch in Pocahontas district in an earthy formation of clay substance, something never before known in this country. One gentleman, who seemed to be more familiar with the formation than any one else, pronounced it similar to the wonderful Australian reefs, from which gold had been extracted in immense quantities. The Pocahontas property was located by Edward Hardy and others of this city, and repeated experiments made by them resulted in wonderfully rich gold prospects and encouraged them in the belief that they owned a mine. Yesterday County Clerk E. H. Mix received from New York papers to be placed on record by which the Big Aleck mining property is sold, transferred and conveyed for the sum of $150,000 and other provisions to the effect that a large mill is to be erected at an early day on the property. This sale will be the means of putting considerable money in circulation in Baker City, for the new company will operate on an extensive scale. The mine is situated only about six miles west of the city.

A $70,000 CLEANUP.—Bedrock *Democrat*, Jan. 15: We understand that the cleanup of the C. T. Bradley Mining Company, at Sanger, for the month of December amounted to $70,000, the largest monthly output ever obtained from this mine. This is simply an illustration of what a good mine under able management will do. It will be a glorious day for Baker county when many more of the valuable mines are placed under like management. This done and hundreds of properties will be turning out their $70,000 monthly.

COPPER MINES.—Messrs. Hager, Hand and Connor, of whom the *Democrat* made mention several days ago as having gone to the head of Goose creek to examine copper indications there, have returned, and it is understood they are very favorably impressed with the prospects and intend letting a contract for considerable development.

UTAH.

OZOKERITE.—Salt Lake *Tribune*, Jan. 17: The Ozokerite M. Co., a New York organization, opened some mines in Pleasant Valley Junction some four or five years ago and spent much money in securing claims and opening them. R. J. Kroupa, the present general superintendent, visited all the mineral wax mines and factories in Europe and then came to Pleasant Valley and took charge of the property belonging to the company. Under his administration the company has spent about $35,000 in development the past two years. He has 13 varieties of ozokerite, found on claims owned by his company. These run from samples soft like wax to blocks almost like flint, and varying much in percentage of paraffine. Open cuts 100 feet long and shafts 50 feet deep have been made in various places and hoisting machinery put in. The first carload of ozokerite was lately shipped to New York. Mr. Kroupa exhibits mineral wax from Russia, adhering each side of rock salt, and compares it with wax from their mines where it was bordered with gypsum instead of salt, and looks just like the Russia article, said to be the best ever found. The Co. have a factory in New York, where they turn out immense quantities of waxed papers for wrapping perishable goods.

LEASERS.—*Park Record*, Jan. 18: The Woodside leasers have increased their shipments to about 100 tons daily, and the new 180-foot tunnel will be finished in a couple of days. Dividend No. 23 on Daly stock for January has been declared, payable on the 30th inst. It is of 25 cents a share, aggregates $37,500 and makes the total of Daly dividends to date, $900,000, and all paid within two years. The Sampson reorganization is practically effected. The new company, the Alliance, will start with a capital stock of $100,000, and subscriptions will be called in and the money put up for pushing developments at the mine with the opening of spring. D. F. Condon has resumed developments on his Creole property just west of the lower part of town. Work is being done in the lower or east tunnel and it is now in toward the ledge about 60 feet. The first of the week John Anderson, Chas. Robertson, Elias Erickson and Chas. Johnson obtained a six months' lease on Andrew Lundin's half interest in the North Pole claim, adjoining the Woodside leasers' bonanza. The leasers have commenced sinking a shaft.

ORE AND BULLION SHIPMENTS.—During the week the Mackintosh sampler received 1,074,890 pounds of Woodside leasers' ore; 362,100 of Ontario, and 74,970 of Daly ore; total, 1,511,960 pounds. The Crescent has just resumed ore shipments. For the week just ended the Ontario shipped 35 bars of bullion, containing 18,891.14 fine ounces of silver.

STOCKTON.—Salt Lake *Tribune*, Jan. 15: S. M. Bennett of Stockton came to the city last evening and reports matters moving along finely in that camp. At the Calumet a large body of fine galena ore has been struck in the past few days, on a lower level. On the Central, being operated by Mr. Bennett, a new vein of ore was tapped a few days ago. It shows over two feet of fine ore and has been cut six feet in length. The vein is four feet wide and has been improving much in appearance lately as development is pushed forward.

TUNNEL.—The General Connor tunnel, at Stockton, was in 657 feet yesterday, and is being pushed ahead at the rate of two feet per day. It will crosscut, at right angles, six veins in the group of six mines. This tunnel is 4½x6½ feet, and is being driven, under contract, at $5 per foot, and the contractors are making above wages.

MECHANICAL PROGRESS.

Iron Fiber—Bending and Breaking.

When we wish to break a bar of iron, we usually cut a channel with a cold chisel around the entire bar at the point where the break is desired. This having been done, we place the bar on an anvil with the channel slightly over its edge. A smart blow on the outlying portion will cause a fracture, which, at first sight, has all the appearance of crystallization. Now, if we take this same bar and cut a channel on one side, and subject it to the same treatment with the channeled face up, the crystalline appearance will show slightly, in close proximity to the bottom of the channel, but the main body of the bar will be bent and partly broken, displaying a fiber with a long, silky appearance.

Again, if we take this bar with no previous preparation and subject it to the same treatment, we shall find that, instead of breaking, it will simply bend, showing no fracture whatever. The question arises why, with the same blow, do these different specimens of iron show such widely different results? It has been said that the blow on the cold chisel disturbed the fiber of the iron, weakening it and putting it in condition to fracture at the point cut. Being desirous of demonstrating this matter and for reasons given below, we obtained a bar of iron 1¼ in. wide and ⅜ in. thick. Instead of using a cold chisel, we made use of file, and put a channel around the entire bar. We then placed the bar on an anvil, with the channel slightly over the edge, struck the outlying portion a smart blow, and it flew from the bar like cast iron. The fracture presented a crystalline appearance. This experiment satisfied us that something other than the disturbance of the fiber by the cold chisel was the cause of this sudden disruption and consequent crystalline appearance.

Some have argued that when the original skin of the iron was broken or cut, the strength was greatly reduced, and that fracture in bending was well-nigh certain.

To settle this theory, we cut again a channel around the bar, and put it upon a planer and planed away the surface for some distance each side of the channel, until the channel was entirely "planed out." The bar was reduced in thickness nearly one-third, but the "original skin" of the iron was gone. We next subjected this to the same treatment as described above, and it bent beautifully, with no indication of fracture. This demonstrated to our satisfaction that the "original skin" of the iron was not, in this kind of strain, what saved iron from fracture. (It should be stated here that iron of good quality has been broken with an apparent crystalline fracture, where no channeling or previous preparation has been made—see Kirkaldy's experiments on wrought iron and steel—but the circumstances were different from those under discussion here.) When we bend a bar of iron slowly, the fibers on the convex or outer surface of the bend are disturbed very greatly, comparatively, and this distention or elongation of fiber decreases as approach is made to the other side of the bar, where a crumbling of the surface fiber will take place.

From a careful examination of the bent portion, the different layers of fibers, so to speak, appear to have slipped or slid one over the other, to an extent depending upon the degree of strain brought to bear upon each. Sections cut from the bent portion, when examined with a microscope, show more or less distinctly that the laminæ and iron threads have become disturbed and loosened in their cinder envelopes, particularly on the outer side of the bend. If the bending is repeated back and forth several times, the loosening up of the fiber is distinctly seen without the aid of a glass.

Having briefly considered the action of iron fiber in the process of bending, we return to the question of fracture. Why does the bar break suddenly and with a crystalline appearance under a smart blow, at the point marked or channeled with a file? When a bar of iron is bent, the other fibers receive the strain first, breaking its severity as it is transmitted to those underlying. The disturbing force is distributed over the entire portion of the elongated fiber, diminishing each way from the point of greatest strain. Now it will be seen that by cutting a channel through the outer layer of fiber, the strain is confined to the point where the channel is cut. The fiber on either side to the depth of the channel is not acted upon at all, and exerts no influence as a protection to the underlying layers of fiber; hence, when the blow is received, the effect is confined to the channel, the fiber having little or no opportunity to protect itself, and it breaks short off. When a channel was cut in the bar on both sides, and then planed out, the bar was virtually restored to its normal condition, and its behavior was the same as when in its original condition.

Had we space, allusion might be made to inferior qualities of iron where, in piling, the center portions are very poor indeed, while the outside bars are of unexceptionally good quality. This kind of iron presents a good surface, but in bending and breaking, its inferior quality is readily discovered. But the experiments which we made were with good bar iron.—*From a Sibley College lecture by J. M. Allen.*

Grinding and Polishing Edged Tools.

Quite a number of men are employed in the grinding and polishing of all kinds of edged tools, such as razors, knives, axes, hatchets, scissors, etc., says the Philadelphia *Call*. These are in addition to small corps of itinerant grinders who carry with them their own foot-power machine, and who, for a small stipend, put in good shape the tools necessary for housekeepers in making hash, or butchers in making sausage or scrapple.

In a regular grinding establishment the stones used are of various kinds. Those used for the coarser work come from New Castle, Del. For a still finer grade of work an imported stone—from England—is put into operation. The finest stones in use in this business are those imported from France, and these are used in grinding the better grade of tools. For the polishing there are different grades of emery-wheels. These are made from circular pieces of wood upon the rim of which a preparation of emery dust and glue is placed, of fine or coarse quality, as may be desired.

In some of the places where this work is done extensively, there are three branches, the rough grinding, the grinding, and the polishing, and of these three the first is the hardest and the poorest paid. It is wet and very laborious work, but this work is done only where the tools are heavy and large. This is followed by grinding on the finer stone, and then comes the polishing, which is done on either fine or coarse wheels, as the tool may require. When this is done they are ready for their work of cutting or shaving, as the case may be.

There are 22 firms in Philadelphia who do this work, and they employ from two to seven men each. A practical man will do this work out and out, and when it is done by the week the wages range from $13 to $17. Where it is done by the piece, which is the case in some places, the men will earn from $14 to $19 a week when busy. Where rough grinders are employed some of the men work as low as $7, and from this up to $10. With the wandering grinders, whose shops are carried upon their backs, and whose advertisement is a bell, the wages are, as the old darky said about the white man, "mighty onsartin." Some days they may do what they call well, and earn $3 or $4, but, as a rule, they will not run above $12 a week on an average.

There has been no material change in the wages paid grinders for some years. Apprentices are taken on in some of the places to learn this trade, although there are no set rules to govern them. In some of the shops they serve three years, and in others four, and the wages while learning run from $2.50 to $6 a week. Child and convict labor are both unknown in this business.

CAUSE OF THE SUPERIORITY OF AMERICAN PLATE IRON.—Mr. Koch, in an address before the Society of Engineers of Western Pennsylvania, stated that he believed the reason why American plate was so much better than English was because it was rolled in both directions at the same heat, and as a consequence the tensile strength of a cross-section of our steel was almost the same as a longitudinal one, while the English plates showed a great difference that way, the cross-sections not being able to stand anything near so much as the longitudinal when put to the test.

FRACTURE AND CRYSTALLIZATION OF IRON.—Iron when fractured suddenly produces a crystalline fracture; but if gradually, a fibrous fracture. This accounts for the anomaly in the supposed change of iron from a fibrous to a crystalline character. Sudden shoulders which prevent a regular elongation of fiber cause a sudden snap.—*Ex.*

THE INVENTOR'S CONSENT to or allowance of the public use or sale of his invention is not requisite to invalidate a patent. The period of two years' public use or sale is to be reckoned from the date when the application is filed in the Patent Office, and not from the date of its execution.

LOCATING A NUMBER OF CLAIMS.—In view of the fact that in many localities the development of mines and other industries is retarded and paralyzed by the common custom of miners locating a large number of claims which they cannot improve or develop, but thus bar the way against those who might be able and willing to benefit the whole region by bringing to production some one of the many claims, and thus bring the camp into prominence and turn a tide of business into its borders, it might be well for the miners in each district to limit the number of claims one party or company should hold without security.—*Homer Mining Index.*

NEW MINING DISTRICT.—A dispatch from San Diego dated January 18th says: The *Sun* says this evening that a party of six will start overland this week provided with a camping outfit for the Black Metal mining district, 40 miles south and west of Needles. H. S. Hall, who has a ranch in the Poway Valley near this city, will lead the party. He has just returned from a prospecting trip there, where he staked out two claims in the Chimhuwa valley. It is a new district, and gives signs of being rich in silver ore. Hall thinks there will be a big rush for the region as soon as people hear of it.

SCIENTIFIC PROGRESS.

The Origin of Petroleum.

In a paper read before the New York Academy of Sciences, on November 26th, Professor J. S. Newberry gave his views as to the origin of petroleum as follows:

The origin of petroleum has been a vexed question, chemists holding one theory and geologists another. The eminent chemist, Mendeljeff, supposes it to be formed from inorganic elements by natural synthesis, but Mandeljeff had no personal acquaintance with our great American oil-fields. His theory is a theory only. In volcanic and metamorphic regions the inorganic elements exist abundantly and in juxtaposition, but oil is never found there, thus refuting the theory.

The geologist finds that oil is always associated with bituminous shales or limestones. Near the outcrop of the carbonaceous shales which underlie Western New York and Pennsylvania, oil and gas springs are found associated in position, and evidently so in origin. South of Cleveland, Ohio, oil and gas are found above such shales. They seem to originate in these shales, and are formed from organic matter, which goes on decaying. Coal, if left out in the open air, loses its volatile matter in the same way that these bituminous shales are doing. Thus spontaneous distillation is constantly going on, and petroleum and gas are issuing from decomposing organic matter. Petroleum, decomposing in its turn, throws off volatile gases, leaving tar, asphalt, ozocerite, albertite, grahamite (asphaltic coal), asphaltic anthracite, and as the last term of the series graphite, from which all volatile matter has escaped. The transition from oil to asphalt is very well seen in Canada, also in the Pitch Lake of Trinidad, which is fluid in the center and gradually solidifies toward the edges. At Canajoharie, petroleum oozing from the Utica black shales in ancient times has formed seams of anthracite from the thickness of a sheet of paper to those several inches thick. At a mine in Idaho eruptive rocks have formed dykes in carbonaceous (cambrian) shales, and fissures are filled with anthracite, also a residue from ancient petroleum. In the Laramie rocks of Northwestern Colorado are veins of albertite 10 to 20 feet thick, resulting from petroleum which came from the Colorado shales below.

All these examples indicate the methods of operation of natural agencies through secular periods. But similar processes are even now going on. We may see on a small scale the formation of oil in pools where vegetation is decaying. In such places, remote from the great oil-fields, a thin film of oil is formed on the surface of the water, and on poking up the mud with a stick, bubbles of marsh gas are set free from the bottom.

All these phenomena point clearly to vegetable tissue as the origin of the various hydrocarbons, whether gaseous, liquid or solid. Some small proportion may be of animal origin, as adipocere is not infrequently cast up by the sea, but the great deposits must be of vegetable origin. This is confirmed by microscopic examination of bituminous shales, which are found to be full of broken vegetable fibers. A possible source of oil and gas are the minute algæ, such as now in summer abound in some lakes to such an extent as to render the water green and opaque.

These considerations throw light on the question of permanence or failure of supply in gas and oil wells. If the theory of the speaker is correct, first, gas and oil springs and wells must be confined to strata overlying beds of organic matter, such as coal, carbonaceous shales and bituminous limestone; second, gas and oil will flow from such deposits as long as any organic matter is left; third, the daily flow of gas and oil will be small, and great accumulations of either can only take place where fissures or coarse, porous rocks serve as a reservoir, and impervious strata above prevent escape and cause the accumulation of hundreds of years of daily product. Hence gas and oil wells will continue to flow for ages, but when the stocks in reservoirs are exhausted, or the current production is divided among many wells, the product may be so reduced as to be of little or no value.

The oil wells of Mecca, Ohio, prove the continual formation of petroleum. These wells are bored in the Berea grit, a sandstone which overlies the Cleveland shale, a sheet of carbonaceous matter. When first opened the Berea grit was found saturated with oil, and several hundred wells were bored in close proximity. These soon drained away the accumulation of oil, and within three months every well was supposed to be exhausted and was abandoned. Now a small but remunerative industry is maintained there by pumping each well a few days in the year. The quantity taken from each, though small, is constant, proving a continued production. As no oil has been obtained there below the Cleveland shale, and gas and oil are seen escaping from that in a multitude of places, we must conclude that they come from the shale.

History confirms this view of permanency in supply. The Chinese have used petroleum for 2000 years and the Hindoos for many hundreds, and the spontaneous flow upon which they have depended has been constant. On the shores of the Caspian, enormous and apparently constant quantities of gas and petroleum have escaped from the ground from time immemorial. The Babylonian asphalt used as a mortar is a petroleum product furnished by the fountains of Hit, which are apparently flowing now as they did thousands of years ago. In all these localities the spontaneous outflow of oil (that is, the daily product of subterranean distillation) has been used, and such sources of supply are permanent, but the steam pump will certainly exhaust local reservoirs of oil, and numerous gas wells will exhaust a territory, however productive in the beginning.

In discussing the paper, Mr. Hidden took issue with the theory of the vegetable origin of petroleum, adducing the fact that carbon from meteorites has been distilled and oil obtained, and that quartz and granite are found sometimes heavily charged with carbonic acid, either gaseous or sometimes even in a liquid condition.

Prof. Newberry replied that the granites which contain carbonic acid and graphite are sedimentary rocks which have been metamorphosed by heat, and their organic hydrocarbons distilled. He had only attempted to explain the origin of the petroleum of this world; we do not know anything about the conditions of things in worlds other than our own, but analogy justifies the inference that similar causes produce similar effects elsewhere as here.

DANGEROUS EXPANSIONS OF ICE.—An interesting communication lately appeared in the *Engineering and Building Record* in regard to the expansion of ice by heat, which explains a good many phenomena that most people have observed without being able to account for them. According to the letter, a short railway was once built in the province of Ontario, which crossed a fresh-water pond known as Rice lake, by a bridge 2½ miles long. The bridge was mostly composed of trestle-work, very strongly built, with uprights driven to hard bottom and thoroughly braced. The middle portion, over the deepest part of the lake, was composed of trusses, 80 feet in span, supported by piers measuring 12 by 24 feet and filled with stones. Early in the first winter after the bridge was built, the lake froze over to a depth of about seven inches. Before snow came to protect the ice the weather moderated, the sun shone brightly, the ice expanded, and in a few minutes the bridge was in ruins nearly its whole length, the trestles being pushed over in the direction of the principal expansion. The destruction of the bridge caused the temporary abandonment of the railway, but years afterward, the trestles were repaired and filled in with an embankment of gravel, the top of which is eight feet above the level of the water; yet the expansion of the ice during the sunny days is so great that it frequently creeps up the embankment, and, by successive movements, is pushed upon the rails.

PURIFYING WATERS.—A valuable discovery of the efficacy of alum as a cleanser of noxious water was made by Professor Leeds in the course of an investigation of an outbreak of typhoid fever at Mount Holly, N. Y. He found the water supplied to the inhabitants of that place swarming with bacteria, and added half a grain of alum to a gallon of the dangerous fluid. The result was that all the dirt and coloring matter was precipitated and nearly all the bacteria destroyed. The bacteria that were left were all of large forms and were easily removed by filtering the water through two thicknesses of filtering paper. The simplicity of this means places it within the reach of every one, and it ought to be widely known.

HEREDITY OF FACIAL EXPRESSION.—It is considered an interesting fact that all the women of Cyprus, except the most decidedly ugly ones, have the same contour to the nose which has existed among the women of that island from the earliest historic times—600 to 1000 years before the Christian era. This form of the nose and general facial expression is impressed on the marble of the Venus Aphrodite found by Gen. Di Cesnola among the ruins of an ancient temple on that island.

A NEW GAS PROCESS BY A LADY.—T. G. Hall, D. H. Fletcher, and Miss Hattie Proctor of Chicago, were at Lima, Ohio, last week, experimenting with a machine, of which Miss Proctor is the inventor, for making illuminating gas out of crude oil. The process is a new one, and promises to change the fuel of the country entirely. It is claimed that by Miss Proctor's machine 10,000,000 cubic feet of gas can be made from one barrel of crude oil.

A CURIOUS SPRING.—Near the soda springs of Ashland, Ogn., there is a spring which emits gas so poisonous as to kill whatever may breathe it, and it is said that there is almost constantly a ring of birds, snakes, lizards, and small deer lying dead about it. The same deadliness is claimed for a spring somewhere in Idaho, and in both it is thought that a concentrated form of carbonic acid gas is the active agent of destruction.

AURORAL DISPLAYS.—Dr. de la Rue has reached the conclusion, after numerous experiments, that the most brilliant displays of the aurora borealis occur at an elevation of not more than 38 miles, while a pale glow may possibly be produced as high as 82 miles, but that no auroral discharge is possible at a hight of 124 miles.

STATIC ELECTRICITY, such as is produced by friction of belts, has a very injurious effect on incandescent lamps, placed near enough to the belts to be affected by the charge. The static effect ruins the vacuum.

GOOD HEALTH.

Cancer Quackery.

The following article from the pen of Joseph R. Buchanan, M. D., was recently written for the *American Spectator*, and has appeared in several other journals of repute. We reproduce it as fully confirmatory of the position we have taken in these columns in regard to the treatment and curability of cancer. The authorities introduced are of the highest standing in the allopathic school of medicine and practice. Dr. Buchanan himself is a well-known writer and medical practitioner in Boston. He is president of the College of Therapeutics of Boston; author of "A System of Anthropology;" "The New Education," etc., etc., and editor of the *Journal of Man*. The article, although somewhat lengthy, should be read by every one who takes any interest in the present general discussion in relation to the treatment of the one dread disease, which, above all others, baffles the skill of the regular faculty. We condense and curtail somewhat to bring it within the scope of our columns:

The Curability of Cancer.

It is a well-established fact, of which there are many living witnesses accessible to the public, that cancer can be, has been, and is being, cured without the use of the knife, by measures which the old allopathic colleges and their obedient graduates do not sanction and will not investigate. The witnesses have been called before legislative committees, the facts have been extensively published, and no honest inquirer who is not identified with medical monopoly can have any doubt of the curability of cancer after examining the evidences.

Although the allopathic party know they do not or cannot cure cancer, they spare no pains to shield their incompetence by overwhelming with odium all who do not join with them in saying the cancer patient is incurable, and especially all who have had the audacity to cure them without permission.

Notwithstanding the general theory of the allopathic party that cancer is incurable, there are not a few who persist in that desperate experiment on human life, which consists in applying the knife to cancers of the breast, and this is what we mean in speaking of *cancer quackery*.

Cancer Quackery.

What is quackery but an ostentatious pretension to do something which the party cannot do and which results in large fees to the operator, but anguish and death to his subject. Plunging the knife into the female breast is, in the great majority of cases, a heartless and *cruel quackery*, made doubly censurable by the fact that he who thus trifles with human life is, in the majority of cases, ready to denounce, with malignant energy, the physician who, *without using the knife*, restores the hopeless patient to health and prolonged life. There seems to be no greater crime in allopathic *medical ethics* than depriving an allopathic doctor of his fees by curing his patient.

These remarks are not, of course, applicable to all cancer surgeons, for some small cancers of the lip are sometimes successfully cut out; but they are especially applicable to those who fight against the medical cure of cancer, and who would prosecute or punish the *curer* of cancers as a criminal. Dr. Robert Morris, for example, writing in the *Popular Science Monthly*, calls cancer-curing an "illicit practice," but has nothing to say against cancer-*killing*, for which, in fact, he asked the protection of the law.

Allopaths Denouncing the Use of the Knife in Cancer.

To show that cancer-cutting on the female breast is the most cruel and daring quackery practiced at the present time, it will be sufficient to quote the testimony of the most eminent surgeons who have spoken out honestly on this subject.

There is no higher authority on this subject than Sir James Paget, the surgeon of St. Bartholomew's hospital, who said in 1870 that "in deciding for or against the removal of a cancerous breast in any single case, we may *dismiss all hope* that the operation will be a final remedy for the disease. I will not say such a thing is impossible, but it is so highly improbable that a hope of its occurring, in any single case, cannot be reasonably entertained."

There is other authority amply sufficient to place this statement beyond doubt. Surgeon John McFarlane of Glasgow in an able paper published fifty years ago, said of his own practice, in reference to cancer of the breast, "of thirty-two cases operated on by myself, in which the carcinomatous nature of the disease was distinctly ascertained, the *cure was not permanent in a single instance*." He also reported *eighty-six other cases* operated on by his friends, who extirpated the breast for cancer *without effecting a cure in a single case!*

Such has been the experience of prudent physicians alike in ancient and modern times. Hippocrates objected to operations for cancer. So did Alexander Monroe of Scotland, and so did the late Dr. Kearney Rodgers of New York, after he had had a terrible experience. It is said of him that "though he had removed a bushel basket of cancerous breasts, he had determined never to perform the operation again."

Dr. Mason Warren of Boston, after removing a cancerous breast, said to Dr. Wyman that he wished he never should hear anything more from it as long as he lived.

Dieffenbach, the celebrated German surgeon, was forced to the same conclusion, and said that the greater his experience became, the more he was disposed to renounce every operation for cancer of the breast. He further said that surgeons who for many years have operated on cancerous tumors, struck by their frequent recurrence, have at various periods completely abandoned the operation. These things he said in a letter to the distinguished French pathologist, Lebert, who expressed a similar opinion that the palliative "method of treating cancer of the breast ought to be the rule, and by operation the exception."

Dr. J. C. Warren of Boston stated in the Medical Society, November 12, 1888, that one year ago he operated for cancer in the breast, "on the theory that I might be able to remove all the disease, and when I got through the operation I felt satisfied that I had removed all visible disease, and yet that patient died with very extensive and malignant return in all parts of the body."

After alluding to one or two other cases similar to the above, the writer, after tendering thanks for this array of facts, asks these physicians why they cannot extend their candor and honesty a little further, and after admitting their own failures, look at some of the cases near by, cured without the knife, and tell the public the truth instead of sneering at those who are successful. The writer then continues:

If there are any cancer quacks in the field, the cancer surgeons who wield the knife belong to that class, even by their own confessions; for with all these disastrous failures before them, and the solemn verdict of experience against the operation, the champions of knife-quackery are advancing to a still more daring and dangerous policy—the policy of not only extirpating the cancerous breast, but cutting away all the glands under the arm on *suspicion of contamination*, and even portions of the muscles, thus making it one of those *bloody and terrible operations* which are frequently *fatal on the spot*. This theory of killing the patient outright for the *remote possibility*, against all science, of producing some ultimate benefit, is the most flagrant example of *bloody quackery* in the history of medicine. It is quackery, because it is unsuccessful. It is quackery because it is a fraud upon the patient, who is made to believe that his only hope is the knife, and that the cures are fictitious.

Patients Are Deceived.

There is so much credulity in the world, and so much ignorance on medical subjects, that it is not strange if even intelligent patients are deceived by the unanimous misstatements of the colleges and their graduates.

But why, we may ask, on what ground is this terrible operation proposed, and patients induced to submit to it? Frankly and plainly on the ground that the common extirpation of the breast *is a failure*, and therefore a still more terrible operation must be performed if anything is done. Here are two operations proposed—one dangerous and the other *more dangerous*, and the partisans of each say *the other is a failure*. Would any intelligent patient submit if the whole case were fairly stated? Would there ever be another of these bloody, unscientific operations, if all patients were duly informed of the success of cures effected without the knife? Certainly not—*the patient is always deceived.*

Cutting Does Not Prolong Life.

The very advocate of this most bloody practice, Mr. Banks, writing in the *British Medical Journal*, has the candor to say: "The popular idea that operating prolongs life is quite wrong. I believe it to be a *perfect delusion*. I believe that all these patients would have lived longer if they had never been touched. Yet you hear the operation being constantly advised on the ground that if it do not cure the patient, it will give her a little longer lease of life. On the contrary, the excitement that is set up by the operation makes everything that is left behind of a malignant character grow with double and triple speed, and I am inclined to think that the deaths after reappearance *are more painful* than when the cancer has been untouched. If a surgeon do not see his way to *a clean sweep*, I can only implore him to let things alone, for in few diseases does *meddlesome interference work more mischief than in this*." And he adds that any operation which does not thoroughly cure makes the patient "*decidedly worse*," which is sanctioned by the expressed belief of Dr. John Homans of Boston, that patients lived longer without the operation than with it.

Why then encounter the danger of this CLEAN SWEEP operation? Mr. Paget believes that it does not prolong life, and Leroy d'Etiolles has given statistics of 3974 cases of cancer of all kinds, of which 1192 were not operated on, and the conclusion from these statistics is that, upon the whole, if there was any difference as to the continuance of life it was in favor of those not operated upon. What reason, then, is there to undergo an operation which *may be fatal on the spot?* With all the best appliances of modern surgery, in the clinic of Esmarch, there were *twenty-one deaths from the operation* in 261 cases. In 41 cases reported by Mr. Banks (English surgeons are simply Mr.), *six were fatal* to the patient and none were cured. Of 141 cases reported by Mr. Butlin, *twelve were killed* by the operation on the breast.

In Mr. Moore's report on this subject, it appears that of 224 cases of cancer of the breast operated on by the knife, the average length of life after the operation was but 39 months. Taking these cases just mentioned, in 443 operations *forty-one* were killed by the act of the surgeon, and it may well be asked, has a physician any moral right to *kill one patient in eleven* by a bloody operation, when the best scientific authority says the operation is neither curative nor beneficial? The truth is, this knife quackery of the old colleges on the female breast is worse than their lancet quackery, which the increasing enlightenment of the age has abolished, and in the coming century, now very near, it will hold the same rank among the barbarisms of the healing art which New England witchcraft and witch murder hold among the barbarisms of religion.

Constitutional Treatment.

We believe that nearly, if not quite all, who advocate the use of the knife deny the possibility of curing by constitutional treatment, and yet we have in this very city of San Francisco scores of living evidences that constitutional treatment has cured patients which our best physicians have pronounced cancer. There are also many cases where the surgeons have removed the cancer once and twice, and when it has come again have again advised the knife, but which has been rejected and the patient subsequently cured by constitutional treatment. But not in a single instance, though repeatedly urged to do so, have they been willing to satisfy themselves by personal examination that such cure has been effected. Why? In regard to this phase of the question our author continues:

Sir James Paget said not long ago that he believed that if ever a cure for cancer of the breast was found, it would be found in constitutional treatment, for local treatment had been pursued for 500 years without success.

What excuse then can there be for persisting in this cruel operation? The only excuse is the positive assertion made by the surgeons and imposed upon their confiding patients (the surgeons having been deceived by the colleges in their education), that there are no cancer cures and that nothing but the knife has any power. Ought not the colleges to forfeit their charters for such a dereliction of duty? [and such falsification of well-known facts.—EDS. PRESS.]

Is not this cancer business a shameful imposition upon patients, who are always deceived? The patients who have been cured without the knife are living in good health in the neighborhood of some of the surgeons, but who ever heard of an allopathic surgeon investigating or even inquiring into one of these cures? It is enough for him to know that the physician who made the cure does not belong to his sect or his society, therefore he is an outside barbarian, to be treated as the ancient heathens treated barbarians of other tribes.

Our author discusses the subject at still further length, but we must close these extracts with this simple assertion, with which we fully coincide: "This is not so much a medical question, though it does concern the progress of the healing art, as it is *the people's question*," and we may add that the people of this State will probably take up the matter in the present Legislature and endeavor to secure a competent commission to investigate the same and report thereon to the people.

USEFUL INFORMATION.

TAMING A BIRD.—No creature is more jealous or sensitive than a bird, and we know of no better way to make a bird fearless and familiar than that described by Olive Thorne Miller in the *Homemaker:* There is an easy way to win the heart of almost any bird, and without starving him or making him think he has mastered you. Simply talk to him a good deal. Place his cage near you, on your desk or work-table, and retain his choicest dainty to give him with your own fingers. Let him know that he can never have that particular thing unless he take it from you, and he will soon learn, if you are patient and do not disconcert him by fixing your eyes upon him. After this he will more readily take it from your lips; and then, when you let him out of his cage after the first excitement is over, he will come to you, especially if you have a call you have accustomed him to, and accept the dainty from you while free. As soon as he becomes really convinced that you will not hurt him or try to catch him, or interfere in any way with his liberty, he will give way to his boundless curiosity about you; he will pull your hair, pick at your eyes, and give you as much of his company as you desire.

LIGHTING DOMESTIC FIRES BY ELECTRICITY Mr. Leigh S. Powell, in the columns of the *Electrical Review*, suggests a new use for electricity, *i. e.*, to light domestic fires. He proposes to make the bars of the grate one electrode, and an iron plate let into the back part of the grate the other. Cinders and coke being themselves conductors, when the grate is filled with these and the current turned on, heat is developed at the points of contact between the pieces of fuel, these localities being those of the highest resistance. With an experimental arrangement Mr. Powell found the cost of lighting a fire to be 1½d. or 2d.—a prohibitive price—but he thinks that with a greater E. M. F. than he had at command this cost would be much reduced. Dreams of being able to light a fire by pressing a button before you get out of bed on a cold winter morning are undoubtedly pleasant.

A NEW AUTOMATIC FIRE EXTINGUISHER.—A new article has been introduced in London, called the Draper Hetherington sprinkler, which appears to have features of superiority. It is described as being doubly automatic—that is, it discharges upon the fire on prescribed conditions, and when it has accomplished its object and extinguished the fire, the room cools the action of the sprinkler, and the further discharge of water is arrested. It is moved to action at 120° Fahrenheit, or 35° lower than that required by other sprinklers, and it is brought into operation by the expansion of a volatile fluid instead of the fusion of a metallic joint, and it is by the contraction of this fluid upon the cooling of the atmosphere that the discharge of water is stopped.

GOING ABROAD FOR CHICKENS.—It is one of the inexplicable matters in California industries that we should depend so much upon imported chickens and eggs. The railroad people themselves seem to be puzzled at the fact. W. H. Mills, one of the railroad officers, in a recent conversation with a reporter, said: "Don't you know it seems funny to me to see three or four carloads of chickens and eggs from Iowa come into our freight-yards every day. There is a lesson in the fact for our farmers. California should be able to supply herself with poultry and eggs, and the man who recognizes this fact and goes intelligently to work will realize a handsome income from the business. This importing of chickens and eggs appears to me very much like carrying coals to Newcastle."

EXPERIMENTS IN ELECTRIC FISHING.—A writer in the *Fishing Gazette* says: Experiments have been tried on the Welsh Coast with the electric light in connection with fishing with nets in the sea. I am told that two nets were let down at night, one being furnished with an Edison-Swan glow lamp. That net, when raised, was full of fish; but the other, to which no lamp was attached, was almost empty. The light was then shifted to the other net; both nets were tried without lamps, and both nets with lamps. The result in all these cases went to show that the electric light attracted the fish in a most wonderful manner.

FRENCH PERFORATED MONEY.—Our people have had their laugh over the curious Chinese perforated money; but it seems that the French are about to inaugurate a similar system in their small coins. An exchange says: The French Mint will soon replace the copper sous with nickels. Singularly enough the five and ten centime pieces will be perforated in the center, after the manner of Chinese coins. This enables them to be strung and counted or handled with great ease.

VULCANIZED FIBER FOR GEAR-WHEELS.—Vulcanized fiber for mechanical purposes has for some time attracted attention. As a material for cogs, in cases where the moist air would be an inconvenience and injury to ordinary gearing, it has, according to all accounts, given very satisfactory results. In one case gutta-percha cogs are known to have been used for 20 years. When the wheels became worn, the material was utilized for casting new ones.

GENERAL INAUGURATION OF THE EIGHT-HOUR LAW.—The 1st of May, 1890, has been fixed by the American Federation of Labor, in session at St. Louis, as the date for a general inauguration of the eight-hour rule in the United States. This is one of those doubtful industrial systems which can never be settled by verbal discussion, and the sooner it is put into general practical operation the earlier will its merits and defects be known and appreciated.

A CURIOUS PLACE FOR AN OAK TREE.—Twenty-seven years ago, an acorn lodged somehow in the mortar or between the stones of an Ohio courthouse spire, took root, and sent out an oak shoot. To-day a miniature oak grows on the spire, 80 feet from the ground. It draws life from the cement, the "skin of the rock," and the air, but principally from the air, as there is very little cement in the spire.

FRUIT EVAPORATION IN NEW YORK.—Within a radius of 40 miles of Rochester, N. Y., there are more than 1500 fruit evaporators, giving employment during the autumn and winter to about 30,000 hands. Last season the production of these evaporators was about 30,000,000 pounds, worth at first cost about $2,000,000. A large proportion of the product is exported.

A MUSICAL ROPE.—A novelty for children in the form of a skipping-rope which plays tunes while it is being used, has been introduced. There is a small musical box fixed at the end of one of the handles of the rope, and the turning of the rope puts it at once in action.

COLORADO is becoming an oil-producing State. In the Valley of the Arkansas, near Pueblo, there are a number of wells the yield of which is 1000 barrels per day.

MINING AND SCIENTIFIC PRESS.

A. T. DEWEY. W. B. EWER.

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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO
Saturday Morning, Jan. 26, 1889.

TABLE OF CONTENTS.

EDITORIALS.—A Practical Traction Engine; 53. Passing Events; Mining Stock Buyers and Brokers; Annual Mining Review; Effect of Foreign Patents on Life of American Patents; Electric Power at Big Bend; Artesian Wells, 56. Hauling Engines for Mines; Academy of Sciences, 57.
ILLUSTRATIONS.—The Roberts & Doan Direct-Acting Traction Engine; Geological Conditions Affecting the Flow of Artesian Wells, 53. Section of Coal Measure Cut by "Diamtless" Core Drill, 55. Hauling Engines for Mines, 57.
CORRESPONDENCE.—Montana Gold Mines, 54.
MISCELLANEOUS.—Southern Colorado Coal; Good Ore; Quicksilver in California; The Situation in Eureka District; Pine Grove; Dry Crushing and Concentrating, 54. Legislative Committees; Boring for Coal; Alaskan Placers; Waste Filling, 55.
MECHANICAL PROGRESS.—Iron Fiber—Bending and Breaking; Grinding and Polishing Edged Tools; Cause of the Superiority of American Plate Iron; Fracture and Crystallization of Iron, 58.
SCIENTIFIC PROGRESS.—The Origin of Petroleum; Dangerous Expansions of Ice; Purifying Waters; Heredity of Facial Expression; A New Gas Process by a Lady; A Curious Spring; Auroral Displays, 58.
GOOD HEALTH.—Cancer Quackery, 59.
USEFUL INFORMATION.—Taming a Bird; A New Automatic Fire Extinguisher; Lighting Domestic Fires by Electricity; Going Abroad for Chickens; Experiments in Electric Fishing; Vulcanized Fiber for Gear-Wheels; French Perforated Money; General Inauguration of the Eight-Hour Law; A Curious Place for an Oak Tree; Fruit-Evaporation in New York; A Musical Rope, 59.
MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 56–7.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 64.

Business Announcements.

[NEW THIS ISSUE.]

Delinquent Notice—Lord of Lorn G. & S. M. Co.
Air Compressors—Paymaster M. Co., Yuma, A. T.
Iron Planer—I. A. Heald.
Flax Packing—W. T. Y. Schenck.

See Advertising Columns.

Passing Events.

Another English company has gone into mining in Alpine county, this State. They have bought the Morning Star mine, near Monitor, and will put up a mill. Alpine has not been heard from as a bullion-producer for some time.

Some attention is again being paid to mines in Lower California, and ore is to be shipped to National City for reduction.

Conflicting reports continue to come from Harqua Hala. Some of those who have written from there speak well of the region, while others condemn it.

It is evident that there will be more development and prospecting in British Columbia during the coming season. Some of the quartz mines there make a good showing.

The English company which recently bought the Bear's Nest mine in Alaska, will send an 80-stamp mill to the mine by next steamer. Another 10-stamp mill is at work on Silver Bow basin, and an 80-stamp custom mill will be put up. A good many men will go to Alaska the coming season.

AT Spring Valley, Ill., about 2000 miners have gone out on a strike. The trouble is owing to a dispute in connection with the union.

Mining-Stock Buyers and Brokers.

On last Monday the United States Supreme Court rendered a decision of unusual importance to all dealers in stocks. The opinion, as telegraphed to this city, was rendered in the case of William G. Galigher, appellant, versus Thos. F. Jones, on appeal from the Supreme Court of Utah. The case turns upon the loss sustained by Galigher through the refusal or neglect of his broker, Jones, to follow his instructions in a stock transaction. The court holds that the broker is but an agent, and that he is bound to follow the directions of his principal or give prompt notice that he declines to continue the agency. It, therefore, decides that Jones is liable for damages for not notifying Galigher by telegraph that he would not convert certain stocks into other stocks, as he was ordered to do. The measure of damages which should be awarded where stock advances in value after an order to buy has been given, the court holds, should be the highest intermediate value which the stock attains between the time the order was given and a reasonable time after the notice of the failure to buy stock is given to the intending purchaser, in order that he may make a new order.

The decision in question has a much broader and deeper significance than is conveyed on the surface; or, at least, a number of leading stock operators in this city take that view of it. Their opinion, based on what they consider the purport of the decision, is that when a broker acting for another person buys stocks, he has no legal claim on or control of the stock further than the securing of himself against any loss for the necessary money advanced to make the purchase, and therefore he cannot jeopardize the stock either by loaning or otherwise handling it so as to risk its loss through a financial crash, unless there is a written agreement allowing the broker to hypothecate the security for the money advanced by him. It is also claimed that by this decision a broker cannot vote or allow to be voted the stock at any election held by the company that issued it, unless the consent in writing of the principal is first secured. If this latter opinion is held valid, then at all future elections of incorporated mining companies, officers cannot be elected except by the owners of the stock in person or by their agents, under a written agreement or instruction.

Annual Mining Review.

The MINING AND SCIENTIFIC PRESS for February 2d will contain a general review of the condition of mining affairs in the Pacific States and Territories, giving the product and statistics for the past year and of the features of the mining industry in 1888. The special article or review has been carefully prepared, and, while elaborate, has been so condensed as to comprise within a few pages the mining history of the year.

In order, however, to give our usual departments their full scope, the PRESS of next week will be enlarged by the addition of a number of pages and a double edition will be printed.

The MINING AND SCIENTIFIC PRESS is the oldest paper in the United States devoted to mining interests. Its annual reviews form a complete history of the mining industry for the year, useful for reference at any time, and furnish a basis for comparison not afforded in any other publication. Those interested in mining affairs can, with slight trouble, thus gain a good knowledge of the general condition of the business, and preserve the statistics for reference.

To advertisers this offers an excellent opportunity to reach special readers, since these papers are sent in all directions over a large field.

BISMUTH.—Rich deposits of bismuth have recently been discovered in North Queensland. Drs. Tarrant and Flatau of Sydney were shown some rich specimens of carbonate of this metal, which had been found at a place about 120 miles inland from Bowen. The ore, which is pure carbonate of bismuth, contains 50 to 85 per cent of metal.

THE contract for supplying 30 tons of flanged boiler-plates to the double-turreted monitor Monadnock, now at Mare island, has been awarded to the Union Iron Works, the contract price being $10,870.

Effect of Foreign Patents on Life of American Patents.

The United States patent law provides that in case an inventor takes out a foreign patent previous to the time when he takes out his U. S. patent, the latter will be limited in its term of life to the term of life of the foreign patent and will expire with that patent. Many serious questions arose out of this provision. The first was, whether, if the foreign patent lapsed before the expiration of its natural term, as would be the case upon the non-payment of annuities and taxes, the U. S. patent would expire simultaneously. This question has, however, been decided in the negative, that is to say, the U. S. patent will not expire simply because of the lapsing or unnatural expiration of the previous foreign patent, and this is now undoubtedly the law.

The next question arose out of the peculiarities of certain foreign patent laws, as, for instance, that of Canada, which, until recently, provided for a patent for five years with a privilege of extension to ten years, and another privilege of extension to 15 years. The question under such a law as this was, whether the previous foreign patent being taken out for five years, the U. S. patent would expire at the end of that term, notwithstanding that the foreign patent could be extended for a longer period. The Circuit Court of Massachusetts decided this question in the affirmative; that is, that the U. S. patent did expire at the end of the five years. This decision was appealed from to the Supreme Court of the U. S. in the case of the Bate Refrigerating Company vs. Geo. H. Hammond & Co.

The Supreme Court has now reversed the decision of the Circuit Court of Massachusetts, holding that the life of an American patent first taken out in a foreign country does not expire until the extreme limit of time for which an extension of the patent may be secured in the foreign country.

This would seem to settle the question conclusively, but in this particular case the foreign patent was, in fact, renewed. Now whether the same doctrine would apply if the patent were not in fact renewed, but the inventor simply had the privilege of so doing, is a point which has yet to be decided.

Electric-Power at Big Bend.

In the PRESS of December 22d last was an item to the effect that the electric-power plant had been removed from the Big Bend Tunnel Co.'s property, the inference being that it had proved unsatisfactory. We have since been shown a letter from the president of the Big Bend Tunnel & Mining Co., Dr. R. V. Pierce, in which he says it is incorrect to attribute the stoppage of work at Big Bend to any defect in the electric plant. "To be sure," he says, "we had a little trouble with the electric appliance at the start, but it was not so much the fault of anything in the plant as in the fact that no proper means of regulating the speed of our water-wheels had been provided. As to the plant itself, I believe it to be all that it was represented to be by the manufacturers. As soon as some regulation was applied to the water-wheels, and our men got a little familiar with the handling of the different machines, it worked most satisfactorily and furnished reliable and constant power, the motors developing considerably more power than they were rated at. The plant was taken out for the simple reason that obstacles were developed in our mining excavations which rendered it impossible for us to work the mines at a profit; therefore, we had no further use for the machinery and thought it best to take it out and dispose of it."

WHILE prospecting at Harqua Hala, the Fowler Brothers of Phœnix, A. T., are said to have found the long-lost Penhachapi gold mine. Lots of prospectors have been looking for this mine for years. The usual things connected with these re-finds are reported in this case, viz., an old shaft, tools, a skeleton of a white man, etc.

THE thirteen-weeks strike of the colliers of New South Wales involved a loss estimated at $2,500,000, mainly to shippers.

HARRY HANSON fell 82 feet in the shaft of a mine near Helena, M. T., last week, and then got up and walked off.

Artesian Wells.

The Requisite and Qualifying Conditions.

Drillers are now developing the sinking of artesian wells into a specialty, and through the aid of geological reports are mastering the stratigraphical elements of the problem in their several regions. Artesian wells form one source of pure water supply, but not always an unfailing one. This inconstant feature is an element which should lead to discussion, since they are a valuable resource in certain regions and under certain limitations, while in other regions they are only a lure to useless expenditure.

T. C. Chamberlain has contributed to the U. S. Geological Survey an article on the "Requisite and Qualifying Conditions of Artesian Wells," which is of great interest. He speaks of artesian wells as applied only to those that flow at the surface, condemning the use of the term as applied to denote deep wells not flowing. Artesian flow is but an expression of the common law of flowage made a little unusual by its special conditions. Any seeming strangeness springs from partial observation. Certain portions of the water of every stream are always "running uphill," though its average mass is moving down. The bottom layer flows up and down, according to the inequalities of the bed, while the top layer declines more uniformly with the surface slope. In the artesian stream we only see the rising column issuing from the earth and the brooklet that flows away. The more potent descending volume that forces the flow is concealed. No portion would rise if it were not forced up by a superior portion pressing down.

Fig. 1 of the cuts (see page 53) is a longitudinal section of a stream, illustrating in part its upward currents, subordinate to the general downward flowage.

To fashion a single idea of the common class of flowing wells, picture to the mind a pervious stratum through which water can readily pass. Below this let there be a water-tight bed, and let a similar one lie upon it, so that it is securely embraced between impervious layers. Suppose the edges of these layers to come to the surface or some elevated region (save that they may be covered with soil and loose surface material) while in the opposite direction they pitch down to considerable depths, and either come up to the surface again at some distance (Fig. 2) or else terminate in such a way (Fig. 3) or take on such a nature (Fig. 4) that water cannot escape in that direction. Now let rainfall and surface water penetrate the elevated edge of the porous bed and fill it to the brim. That such beds are so filled is evident by ordinary wells, which commonly find a constant supply at no great depth. Now it is manifest that if such a water-fat bed be tapped by boring at some point lower than its outcrop, the water will rise and flow to the surface, because of the higher head in the upper edge of the bed. If the surface water continually supplies the upper edge as fast as the water is drawn off below the flow will be constant.

Fig. 2 is an ideal section illustrating the chief requisite conditions of artesian wells. *A*, a porous stratum; *B* and *C*, impervious beds below and above *A*, acting as confining strata; *F*, the hight of the water level in the porous bed, *A*, or, in other words, the hight of the reservoir or fountain-head; *D* and *E*, flowing wells springing from the porous water-filled bed, *A*.

Fig. 3 is a section illustrating the thinning out of a porous water-bearing bed, *A*, inclosed between impervious beds, *B* and *C*, thus furnishing the necessary conditions for an artesian fountain, *D*.

Fig. 4 is a section illustrating the transition of a porous water-bearing bed, *A*, into a close-textured, impervious one. Being inclosed between the impervious beds, *B* and *C*, it furnishes the conditions for an artesian fountain, *D*.

Fig. 5 is a section illustrating the usual order in which the strata of a basin come to the surface; *A* and *B*, porous beds; *D* and *E*, impervious beds; *C*, a half impervious bed; *F* and *F*, the water levels of *A* and *B*, respectively.

Fig. 6 is a section illustrating the possible effect of erosion upon strata originally like those in Fig. 6; *A* and *B*, porous beds; *D* and *E*, impervious beds; *C*, a half pervious bed; *F* and *F*, the water levels of *A* and *B*, respectively. If the stratum *C* is not practically a confining layer, the water from *A* will pass through it

and escape at the edge of *B*, so that a flow cannot be obtained at a higher level than it, but may be had below the line *F*.

Fig. 7 is a section illustrating the failure of an artesian well because of defects in a confining bed below. *A* and *B*, porous beds; *D* and *I*, impervious beds; *C*, a defective confining bed; *E*, the water level of the stratum *B*. *G* and *H*, wells that do not flow. The bed *A* might give a flow at *G* and *H* but for the defect in *C*, which permits the water to descend into *B* and escape through its outcrop, which lies below the surface of *G* and *H*.

Fig. 8 is intended to illustrate the aid afforded by a high water surface between the fountain-head and the well. *A*, a porous bed; *B*, a confining bed below; *C*, a confining bed above. The dark line immediately below the surface represents the underground water surface. Its pressure downward is represented by the arrow *m*. The pressure upward, due to the elevation of the fountain-head, is represented by the arrow *n*. The line *F* represents the level of the fountain-head. There can be no leakage upward through the bed *C* except near the well *D*. There may be some penetration from the bed *C* into *A*, which would aid the flow.

Fig. 9 is a double section illustrating the effects of high and low water surface in the cover area. In this *A* represents the porous stratum inclosed between impervious beds, *B*, *C*. The source of supply is at *H*, and proposed well at *F*. Let *E* be supposed to represent surface of ground in one of two supposed cases, and *D* the surface in the other. The arrow springing from surface *E* represents upward tendency of water in porous bed, owing to pressure from fountain-head, while the arrow depending from line *D* represents downward pressure of ground water, whose surface is represented at *D*, and is, it will be observed, more than equivalent to the upward tendency due to pressure from the fountain-head. A flow at *F* could be very safely predicted if the surface were as represented by *D*, while it might be doubtful whether one could be secured if the surface were as represented by *E*.

Fig. 10, illustrates the possibility of a flow from a bed even when exposed at a lower level; *A*, a sandstone bed, thick and coarse at the right, its shore edge, and thinner and finer at the left. *B* and *C*, confining impervious beds. *F*, the water level in *A*. *D*, a well which may flow notwithstanding the lower exposure at *E*.

Fig. 11 shows the dependence of the collecting area on the thickness and slope of the porous beds. In the left-hand figure the porous bed *A* is thin, and, coming to the surface at a high angle, gives but a small section. In the right-hand figure the bed *A* is thick, and, coming to the surface at a low angle, its beveled edge is broad.

Fig. 12 illustrates a common effect of erosion upon the surface area of the porous stratum, and the contour of the resulting basin. The dotted lines show the original contours.

Fig. 13, section illustrating the advantages of low inclination. *A*, porous bed; *B* and *C*, impervious beds. *A'* and *A''* indicate porous beds of higher dip.

We shall continue this subject of artesian wells and give some facts relating to their proper distribution in certain regions.

MELBOURNE EXHIBITION.—Thomas B. Merry, one of the Commissioners to the Melbourne exhibition, who has returned, says that "while the exposition was a magnificent success as an exhibition, financially it has been a failure, being now behindhand between £200,000 and £300,000. They had a magnificent collection of exhibits from all parts of the world. America was excellently represented. England had a vast display. France and Germany each had large courts to themselves. In fact the earth was pretty well represented. On the 31st of this month the doors will be closed, as the falling off in the attendance will make it an impossibility to keep them open to June, as at first intended. The exhibition buildings are a magnificent pile and splendidly appointed."

THE Atlantic & Pacific railroad will have the first cantilever on this coast, when the new one across the Colorado near Needles is completed. It will be 820 feet long, the main span to be 660 feet.

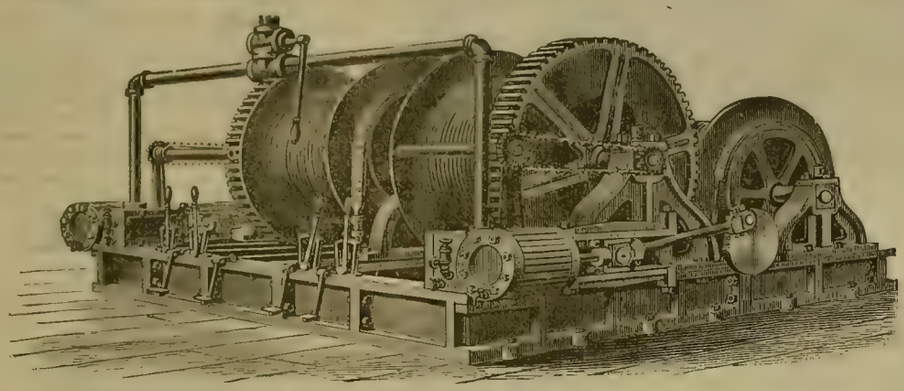
A FEW weeks ago the Harqua Hala gold ore averaged $5000 a ton; now the average has got down to $20. In California that would pay very handsomely.

Hauling Engines for Mines.

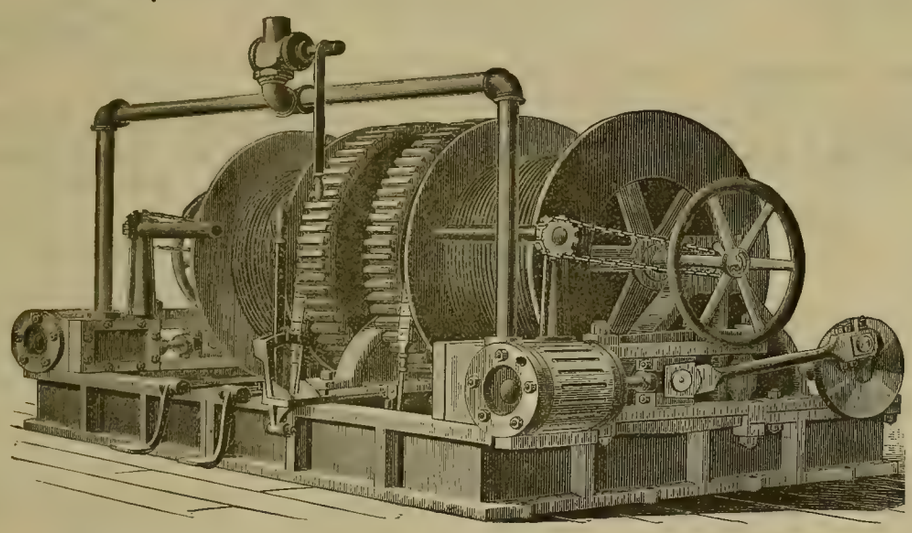
In using the "tail-rope" system in wire-rope haulage in mines, improved types of tail-rope hauling engines are made. The cuts on this page show types made by the Ottumwa Iron Works, Ottumwa, Iowa. They are described in a paper on "Wire-Rope Haulage and Its Application to Mining," read before the American Institute of Mining Engineers, by F. C. Roberts of Philadelphia. One illustrates a single two-drum engine. It consists of two engines with cranks at right angles, coupled to a common shaft carrying two pinions meshing in turn with two spur-wheels keyed to the drum shaft. There are two drums—one for the main and the other for the tail rope. This type of engine is adapted for location at either end of a haulage plant.

It is sometimes very desirable, owing to the relative position of the workings, to place the hauling engines in the center of the mine and to operate the rope-system in opposite direction from that point. To such conditions the engine illustrated in the other cut is admirably adapted. Four rope-drums are provided, enabling the operation of two separate and distinct tail-rope systems.

The motion of the drum in both the foregoing engines is controlled by an improved cone friction-device, the operation of which is simple and effective. These engines are also provided with automatic indicators, the purpose of which is to enable the operator to determine the position of the train at any moment, and consequently to govern all stoppages, and provide for variations in grade.



DOUBLE FOUR-DRUM HAULING ENGINE FOR CENTER OF A MINE.



TWO-DRUM REVERSIBLE HAULING ENGINE FOR MINING PURPOSES.

A CASE of minerals from Placer county, comprising 130 specimens of gold and silver quartz, building materials, fossils and agates, has been received at the rooms of the State Board of Trade.

THE miners at Gilman and McAllister, in the neighborhood of Seattle, are again on a strike. The trouble is caused by a dispute with the Knights of Labor.

THE longest mining tunnel in Montana has been begun at the Jay Gould mine in Lewis and Clarke county. It is to be 4300 feet long.

A Practical Traction Engine.

(*Continued from page 53.*)

down around short curves. They can also be backed readily on a curve, so they are practicable for switching.

Last season the engine hauled four and one-half million feet of lumber in 110 working days, and took two-thirds of it direct from the saw in a green, heavy condition, when it weighed five to six pounds per foot. The engine has worked two seasons without any breakage. The ordinary wear and tear consists mainly of the wheel tires, battering and hammering out the rivet-heads on the second or outside wearing tires. The machine makes 3½ miles per hour, with 15 revolutions of engines per minute.

There have been many experiments with geared machines, but there are many defects in that plan of construction. Plenty of power is developed with these direct-acting engines. The wrought-iron construction makes the machines quite flexible for road work and admits of their being mounted on springs.

These machines, though originally intended for valley work on level roads, have been found admirably adapted for work on mountain roads. In fact that is where they are most useful in acting as feeders for railroads, or hauling lumber where ordinary teaming is expensive. In going into the mountains for lumber with a 30 or 40 mile road these engines can haul out for one-fifth what ordinary teams can do. In running two engines alternately, one each way a day, on light grades not to exceed 100 feet to the mile coming out with the load, each engine could haul on a train of 15 wagons 60,000 feet of lumber at a trip at a cost not to exceed $1 per thousand for running expenses. This, we are told, is the expense where the man owns his own engines and wagons.

A special road with regular grade must be made. In some places more wagons can be hauled, according to grade. This engine can be run, of course, on grades where railroads could not be operated. In some places where freight is high, the whole plant could be paid for in a season. There are many places in the mountains where the road engine could be used with great effect in hauling mine timbers, etc.

The results of work given above are those of experience in the past two seasons in the Sierras.

Academy of Sciences.

Dr. Harkness presided at the meeting of the Academy of Sciences on Monday evening.

The following proposals for membership were made: L. Belding, ornithologist, Stockton; Waldemar Lindgren of the United States Geological Surveying Corps; James E. Mills, geologist, San Francisco; Volney Ratan, botanist, San Jose; T. S. Brandegis, botanist, Connecticut.

The following donations to the cabinet were acknowledged: A whistling swan (Oler columbianus), presented by Charles W. Kellogg; the secretary reporting that this species of fowl was more than usually plentiful in California this season; 40 skins of California birds, stuffed, including the grebe, a distinctly Arctic fowl; a blue heron from Santa Cruz, and a gull, the remainder being of all varieties, all presented by A. C. McGregor, together with 750 specimens of mounted insects, reptiles and fossils, including the boring mollusk.

E. J. Molera read a paper entitled "Notes on the Total Solar Eclipse of Jan. 1, 1889."

The following papers were read by title: "New Species of California Mammal," by C. M. Merriman; "Song Notes of Birds," by L. Belding; "Petrographical Notes on Lower California," by W. Lindgren; "Review of the Erythryna," by C. H. and R. S. Zigenmann; "Botanical Notes," by Mary K. Curran; "Reports Upon a Collection of Birds from Lower California," by Walter E. Bryant.

TRADEMARK INJUNCTION.—Judge Wallace has rendered judgment in favor of Buckingham & Hecht, enjoining and restraining Geo. K. Porter et al. from manufacturing or selling any shoes with the name of "Humphrey & Co., Boston," upon them, or from imitating said name.

IN the suit of James Landregan against Jos. Peppin to quiet title to the Morning Star and Trenton quartz mines, in Plumas Co., a decision has been rendered for the plaintiff.

EXTENSIVE GOLD MINE FOR SALE.

To be sold at public auction by the undersigned, at the Merchants' Exchange, in the City of Halifax, on Thursday the Fourteenth day of March next, at twelve o'clock noon, that extensive, valuable and well-equipped GOLD MINE known as the Dufferin GOLD MINE, situate on the Atlantic coast, about ninety miles east of said city. Daily mail from Halifax. Telegraph office at Salmon river, four miles from the works. Salmon river harbor never freezes, and is safe and easy of access. The mine embraces 342 areas, each 150x250 feet, all in one block. The entire area measures fifteen hundred feet in width across, and eight thousand five hundred and fifty feet along the lodes. The leases have nearly fourteen years to run, and can at any time be renewed for a period of twenty-one years, upon payment of two dollars per area Within this area is a belt of veins dipping on each side of an anticlinal. They have been found by tests made on the surface to extend upwards of 4,000 feet The ore has been partially removed to a depth of 200 feet over a distance of about 700 feet, and to a depth averaging about 70 feet over an additional 1,000 feet in length or thereabouts. The veins are of various width, the largest averaging about ten feet of solid quartz.

This mine was discovered in the Autumn of 1880, but was not worked to any extent until the Autumn of 1881. It has yielded up to the end of November, 31,012 ounces of gold from 64,508 tons of quartz, according to the sworn returns made to the Mines Office. The gold can be produced at a cost which will leave a very hand some margin of profit.

The mine is operated by machinery worked by water power, the power being transmitted by a line of wire rope running from the water wheel to the mine—a distance of about 4,750 feet—and lying parallel to the outcrop of said veins, at a distance therefrom of about fifty feet. The Salmon river crosses the property twice. It supplies the hoisting and pumping power, and the same water is afterwards used to drive the crusher. The latter has thirty-eight stamps, and there is ample water power to operate three times that number. Sixty stamps can be operated with present machinery Of the 120 horse-power existing for pumping and hoisting only about twenty-five is used. There are about 700 acres of well timbered and well watered land owned with the mine. This partly covers the areas, and where it does not immediately adjoins them. It is also provided with a steam plant to operate hoisting gear and pumps in case of accident to the transmission power, a sawmill, sufficient for the requirements of the property, a tramway from the mine to the crusher for carrying quartz, and stables, offices, and boarding-houses, sufficient to accommodate a large number of employees.

The mine is owned and has been operated by a partnership, and owing to the death of one of the principal owners it has to be sold to enable his estate to be settled. A good title will be given.

Terms, ten per cent cash, balance within thirty days from day of sale. The deposit to be forfeited in case the purchaser fails to complete the purchase within that time. Further particulars can be had on reference to N. H. MEAGHER, Q. C., Bedford Row, Halifax, or to JAMES DUGGAN & SONS, Auctioneers, Bedford Row.

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About 1500 pounds Drill Steel.
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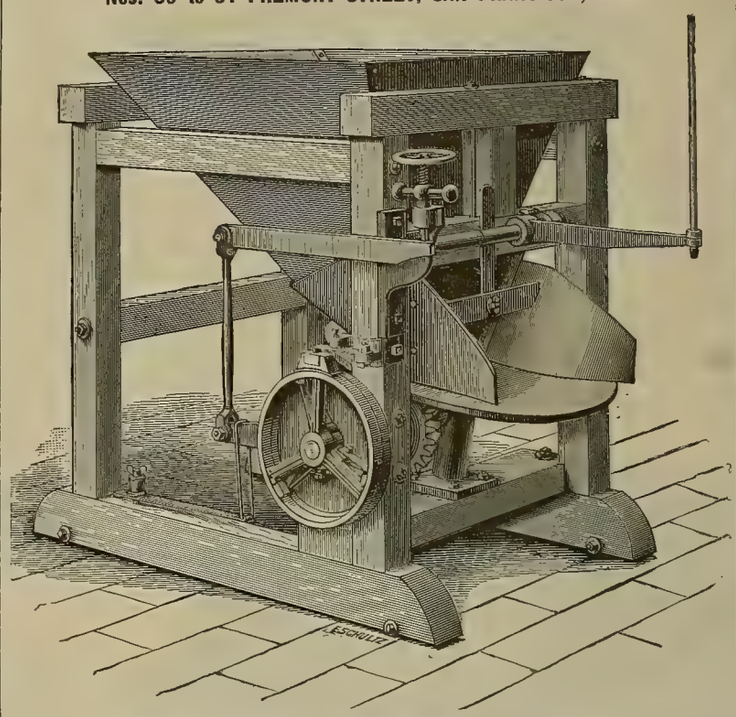

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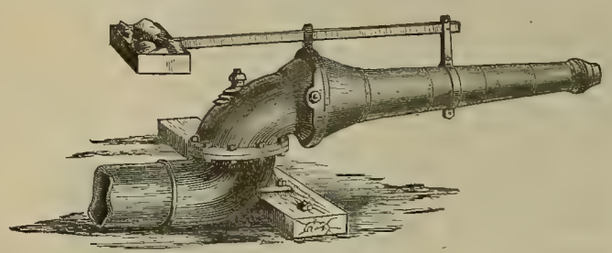

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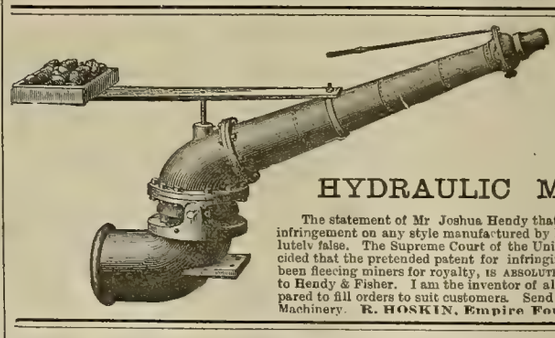

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The statement of Mr Joshua Hendy that ANY STYLE of machine is an infringement on any style manufactured by him, he knows to be absolutely false. The Supreme Court of the United States on March 19th decided that the pretended patent for infringing, which he has for years been fleecing miners for royalty, IS ABSOLUTELY VOID, with costs of suit to Hendy & Fisher. I am the inventor of all styles in use, and am prepared to fill orders to suit customers. Send for list of prices of Hydraulic Machinery. R. HOSKIN, Empire Foundry, Marysville, Cal.

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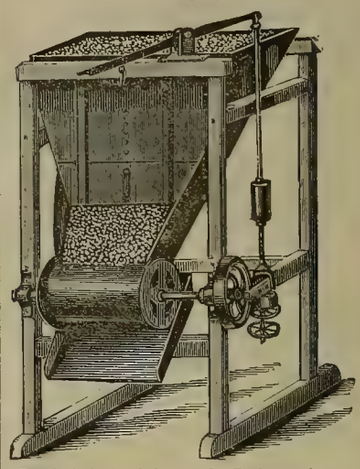
THE ROLLER ORE FEEDER

[Patented May 28, 1882.]



THIS is the best and cheapest Ore Feeder now in use.

It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

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List of U. S. Patents for Pacific Coast Inventors.

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From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING JAN. 15, 1889.

396,134.—VENTILATOR—P. Abrahamson, S. F.

396,251.—ROTARY SEED-SOWER—J. H. Adamson, North Melbourne, Australia.

396,142.—REVERSIBLE PLOW—Jas. A. Cole, Julian, Cal.

396,147.—CONVERTING MOTION—J. De Monnin, Corvallis, Ogn.

396,211.—BUGGY BOW SUPPORT—Kolb, Allen & St. Clair, Oceanside, Cal.

396,284.—AUTOMATIC AIR BRAKE—Geo. W. Marsh, Oakland, Cal.

396,111.—VETERINARY REMEDY—B. M. V. B. Price, Arroyo Grande, Cal.

396,250.—VEHICLE SEAT—J. A. West, San Rafael, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ROTARY SEED-SOWER.—James H. Adamson, North Melbourne, Victoria, Australia. No. 396,251. Dated Jan. 15, 1889. This improvement in rotary seed-sowers consists in making the distributer of the sower adjustable so as to equalize the area over which the seed is cast, while the machine is driven at varying speed. It also consists in the construction of a feed box so that it can be readily adjusted to sow different widths and secure a more uniform distribution of the seed over the land. When the team is driven very slowly, the centrifugal force becomes less and the outer ends of the spouts will rise, pointing slightly upward so as to be in a position to throw the grain to a greater distance with a slow rate of speed; but when the speed increases, and the grain is thrown out with greater velocity, the points of the spouts are automatically depressed by the increased speed, so that the grain will be thrown to about the same distance as when the machine is driven slowly, and they thus serve to regulate or equalize the discharge over the desired area.

AUTOMATIC AIR-BRAKE.—Geo. W. Marsh, Oakland. No. 396,284. Dated Jan. 15, 1889. This is an improvement on the Westinghouse "automatic" brake. The invention consists in connection with the piston valve and sliding valve carried thereby, of a spring arranged to throw the valves back when the pressure within the auxiliary reservoir equals that in front of the piston valve, and of an exhaust port, which is opened by the slide valve when thus thrown back, so that the brakes shall be relieved only after the auxiliary reservoir shall have been supplied. This improvement need only to be used on grades, as it is there only that the necessity arises for applying the brakes again before the auxiliary reservoir can be supplied.

REVERSIBLE PLOW.—James A. Cole, Julian, San Diego Co. No. 396,152. Dated Jan. 15, 1889. This is one of that class of plows in which a double bottom is arranged to be turned from side to side, whereby it may be used as a right or left-hand plow, these implements being specially adapted for use on sidehills, from which they are commonly called sidehill plows. The invention consists in the general construction and arrangement of parts and also in the locking device for the plow bottom, whereby it is held in position and may be readily released to turn to the other side. This plow may be used on level ground as well as on sidehills.

VENTILATOR.—Peter Abrahamson, S. F. No. 396,134. Dated Jan. 15, 1889. This is one of the class of ventilators for buildings, apartments, etc., in which a passage is formed or let into the wall, said passage having apertures at opposite sides and at different elevations, one aperture communicating with the interior and the other with the exterior; and it consists in a box or casing provided with a central partition dividing it into two independent passages, each of which has apertures communicating, the one with the interior and the other with the exterior, said apertures being on opposite sides and at different elevations, the apertures on the same level in the two passages being reversed with respect to the side with which they communicate. The object is to provide in a single box or case separate ventilating passages in which the communication with the interior and exterior is reversed in the two passages, whereby a current of pure air may enter and a current of impure air may make its exit without interfering.

RAISIN-STEMMER.—Chas. L. North, Fresno. No. 395,916. Dated Jan. 8, 1889. This machine is one of that class for stemming raisins in which the fruit is passed between opposing spaced surfaces formed of wire cloth, one or both of said surfaces being movable. In the machines now in use the wire-cloth surfaces are usually arranged so that one is entirely inclosed by the other, and some of the raisins, therefore, pass around the machines several times, while others are discharged in a short time, and all the raisins are not subjected, therefore, to the same amount of operation. In these machines there is a tendency to clog up. In Mr. North's apparatus the operating passage through which the raisins are directed is short and direct and each raisin passes through but once, all being subjected to the same amount of working; nor is there a tendency to clog or choke. In this machine the raisins are fed to the side of the cylinder and are carried direct by its revolution to the opposite side, where they are discharged.

POP SAFETY VALVE.—Frederick A. Miller, Oakland. No. 395,911. Dated Jan. 8, 1889. This is one of those safety pop valves in which the excess of steam is allowed to escape suddenly and the valve returns to its seat immediately. The object of this invention is to accurately and conveniently control the amount of steam which is allowed to escape, and also to prevent any improper adjustment. A perforated cap-plate is secured to the valve in such a way that the plate may be moved axially so as to bring its perforations into more or less perfect alignment with the perforations of the valve. By moving the cap plate so its perforations are in perfect alignment with those of the valve, the full capacity of the passage through these perforations is obtained and the excess of steam pressure below, upon raising the valve from its seat, will be at once relieved by escape through the fully opened perforations. The pressure is therefore instantly relieved, and the valve instantly returned to its seat by the pressure of the spring. By moving the cap plate so the perforations are not in alignment, a less amount of steam escapes; and having to pass around the rim of the valve, the pressure will hold the valve open longer and allow more steam to escape, thereby reducing the pressure to the required degree. There is also a lock, to prevent the engineer from screwing down the shell which prevents the valve from operating under the pressure primarily intended.

Legislative.

The following is a summary of bills introduced in both branches of the Legislature since the last issue of the PRESS:

One has been read appropriating money to improve the grounds around the Marshall statue at Coloma. The amount is $4000. There will probably be a legislative excursion on the occasion of the unveiling of the statue.

The Senate has passed Britt's bill providing for the proper sanitary condition of factories and workshops and the preservation of the health of employes, and also Moffitt's bill regulating the hours of labor and employment of minors and females.

Greeley has introduced a concurrent resolution asking Congress to appropriate $1,000,000 for the improvement of the Feather and Sacramento rivers.

An Act has been introduced making appropriation for the purchase of an electric plant, pump and pipe, sewer-pipe necessary for utilizing the water of the American river for power purposes, and the erection of a power building for the State prison at Folsom, and other expenses incidental and relating thereto.

It is proposed to have an elevator inspector in cities of 100,000 inhabitants.

It is proposed by enactment to prevent undue reduction of wages paid for labor by contractors for public work.

The Act compelling the owner of any mine, factory, workshop or mercantile establishment to answer questions of the Labor Commissioner, under a maximum penalty of $200, has been passed in the Senate; also the bill limiting labor to ten hours a day for minors.

The bill to license engineers has met with great opposition from members from the interior counties.

In the Senate has been submitted an Act to amend an Act entitled "An Act establishing an Industrial Home of Mechanical Trades for the Adult Blind of the State of California, creating a Board of Directors for the Government thereof, and appropriating the sum of $65,000 for the support of said home," approved March 17, 1887.

It is proposed to make the Commissioner of the Bureau of Labor Statistics Inspector of Elevators and Machinery.

Another bill has been read this session making an appropriation of $250,000 to purchase the Bancroft library for the State.

There is considerable opposition to increasing the salary of the Labor Commissioner.

The bill by Burwell of Butte creating a State debris commission, which we mentioned last week, has not yet been considered.

A letter has been received from the United States Geological Survey informing Governor Waterman that California need have no fear that she would be neglected. The necessary topographical surveys will be made as quickly as possible, and with proper Congressional aid the Governor's idea of the irrigation of the arid lands of California will be made practicable.

The committee from the Nevada Legislature has arrived from Carson. The Nevada lawmakers desire to have the assistance of the Californians in preventing the dumping of sawdust in the Truckee river, and also in obtaining the cession of most of Inyo, Mono, Modoc and Alpine counties to Nevada.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, Jan 24, 1889.

Trade the past week continued dull, although in some branches a general improvement is reported. The prevailing opinion is that the volume of business this spring will be very considerably larger than ever before. Among iron works the same confident feeling heretofore noted is still reported. All advices are confirmatory that more extensive building improvements requiring iron will be made this year than in 1888. Collections are reported to be fairly free for the year from the agricultural sections, but generally poor from other localities. The local money market is said to be working closer with the commercial banks, that is, the supply of available coin is light, while the savings banks report increased deposits. There is some inquiry for exchange on New York, necessitating in some instances the drawing against Liverpool wheat bills to accommodate patrons. It is claimed by some that large sums of money have been used by mining-stock manipulators in buying stocks from the outside public, which naturally affects the local money market. From the mining districts the news continues good. Well-informed parties look for quite an upward move in the stock market at an early day, based on the condition of the mines and the character of the work now going on in some, while in the others, very important work will be inaugurated soon. The first assertion has more special reference to Con. Virginia Savage, Hale and Norcross, Union, Ophir, Belcher, and also to one or two more. In Yellow Jacket, Seg. Belcher, and also in Belcher, crosscutting is to be started soon, and in favorable localities. The Crown Point drain-boxes are in place, and important work will be started soon in the mine. One of the dynamos for the Nevada mill was started up last week, and found to work well. Next week, it is said, both will be started up. From the Tuscarora, Bodies and Quijotoa districts, the news continues good.

The work in the Comstock mines is all to the west, toward the Red Lode.

SILVER—The local market the past week ruled dull, but then holders and consignees were firm in their views, owing to the high rate of exchange. The rate brings the price of silver up to fully 93 to 93⅛c here against 92⅝ to 92¾c in New York. The output of the mines on this coast continues to be light, barely enough for the export demand. This, judging from present advices from the Comstock and Tuscarora mines, warrants the assertion that a more decided increase will be in order in the near future.

QUICKSILVER—The market has ruled dull but firm at $42.50 throughout the week. The free call heretofore reported appears to have met the immediate requirements of the mines.

LEAD—The market is without essential change. There is slightly more inquiry, but the principal deliveries are being made on the contract sales negotiated last fall. The fruit canners are contracting for supplies for future delivery, at prices heretofore quoted.

COPPER—The market is reported unchanged, although the tone is weaker. The demand is of an offish character.

TIN—Some deliveries are being made on contracts negotiated last fall. It is claimed that Columbia-river canners will take less this year, while Alaska canners will require more. For spot and near-by tin the market is steady, but for just shipped and for prompt shipment, buyers can obtain slight concessions.

IRON—Business continues slack. The volume of pig iron going out on orders is disappointingly small, but as heretofore stated, a large consumption is looked for this year, which will create freer buying. The output of the coast furnaces is said to be fully up to former years. A new and large deposit of iron ore is reported to have been recently discovered in Nevada.

COAL—The market is gradually drifting to lower levels despite the strenuous efforts being made to sustain values. The output of the coast collieries is not curtailed. Rocky Mountain coals, unless lower freight rates are given, will soon be out of the market owing to their relatively high cost. The shipments of Australian coals to this port, will, it is claimed, soon be upon an enlarged scale. Distant cargoes and prompt shipments are weak at the quoted decline; even near-by cargoes can be had cheaper.

Eastern Metal Markets.

By Telegraph

NEW YORK, Jan. 24, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42⅝	93	$17 25	$3 85	$21 70
Friday	42 11-16	93½	17 25	3 85	21 70
Saturday	42 11-16	93½	17 25	3 85	21 65
Monday	42½	92⅞	17 25	3 82½	21 55
Tuesday	42⅜	92⅛	17 25	3 82	21 55
Wednesday	42⅜	92⅛	17 30	3 80	21 65

Borax is firm. Quicksilver is unchanged. Tin is in better demand, with an upward tendency; Straits, $21.55. Petroleum is dull. Refined barrels, 7c; plain, cases, 9c. Lake copper is almost nominal for spot or future. Best, 17¾@16c—casting brands. The stock of Pig lead is large, and the market steady.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, ——@——; Billiton Tin, $24.50@——; Banca Tin, $24.25@24.50; Baltimore Copper, ——@——; Orford Copper, $16.00@16.25; P. S. C. Copper, ——@——; Foreign Lead, $4.75@5.00; Foreign Spelter, $5.90@6.00; Antimony, Hallett's, $10.75@11.00; Cookson's, $12.50@13.50.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Jan. 10, 1889

ANTIMONY—French Star	13½@c	14
BORAX—Refined	7½@c	7½
Powdered	7@c	7½
Concentrated	6½@c	7½
COPPER—		
Bolt	26 @	27
Sheathing	26 @	
Ingot	16 50 @	18 00
Fire Box Sheets	— @	25
IRON—Glengarnock ton	— @	—
Eglinton, ton	— @	—
American Soft, No. 1, ton	— @	32 50
Oregon Pig, ton	— @	30 00
Clay Lane White	— @	24 50
Shotts, No. 1	— @	29 00
Bar Iron (base price) ₰ lb	2½@	3
Chrome iron ore, ₰ ton	8 00 @	10 00
LEAD—Pig	4½@	—
Bar	5 @	—
Sheet	8 @	—
Pipe	7 @	—
Shot, discount 10 on 500 bags Drop, ₰ bag	1 55 @	—
Buck, ₰ bag	1 75 @	—
Chilled, do	1 95 @	—
STEEL—English, lb	18 @	20
Canton tool	9@c	—
Black Diamond tool	10 @	16
Pick and Hammer	8 @	10
Machinery	4 @	5
Toe Calk	4½ @	—
TINPLATE—Coke, prompt shipment	4 75 @	4 85
Coke on spot	5 10 @	5 15
Charcoal, 14x20	6 75 @	7 25
do roofing, 14x20	5 50 @	5 62
Pig tin, ₰ lb	23 @	—
QUICKSILVER—By the flask	@42	50
Flasks, new	1 05 @	—
Flasks old	85 @	—
COKE—English, ton	20 00 @	—

PRICES OF COAL "TO ARRIVE."

	Per Ton.		Per Ton.
Australian	$10 00 @11 00	Cardiff	10 50@11 00
Liverpool Steam	11 00 @11 50	Lehigh Lump	20 00@ —
West Hartley	11 50 @12 50	Cumberland bk	18 00@18 50
Scotch Splint	11 00 @12 00	Egg, hard	16 50@17 00

Taylor's Iron Mountain.

Taylor's "Iron Mountain" is situated about 11 miles from Grass Valley, Nevada county. The mine lies in the foothills seven miles from the plains and 22 miles from the Sacramento river.

The ore is composed of red and brown hematite. There is a tunnel which runs into the mountain for about 100 feet, cutting three distinct ledges separately 60 feet, 44 feet and 32 feet thick. The tunnel level is 130 feet from the surface. In running the tunnel they cut through some very fine bodies of fire-clay suitable for fire-brick pottery and chinaware. The ore crops out on the above mountain in large benches, extending for a mile or more, enough being in sight to run a 25 ton furnace for many years.

About two years ago Mr. M. C. Taylor, the owner, went to England, and a company to work the mine was formed, but as yet nothing much has been done. We are informed that the plan of procedure determined upon was as follows: The company agreed to erect one 25-ton furnace in the city of San Francisco and one 5 ton Bessemer steel plant; also a narrow-gauge railroad from the mine to the most available point on the Sacramento river. This was to connect with a steamboat with four barges, which the company was also to furnish. With this through line of conveyances from the mine to San Francisco, it was calculated that there would be enough business on the route from the start to pay running expenses, receipts increasing with each year, and would finally make the investment a profitable one. The completion of the railroad would enable the company to deliver their ore in San Francisco practically free of cost.

The next calculation was to smelt the ore with coke, which would cost $10 per ton of iron produced; labor of furnace, $3; wear and tear of furnace, $2; loading ore on cars at the mine, $1; lime, $1; total estimated cost of one ton of iron, $17.

This cost of liquid iron in San Francisco at $17 a ton would enable the company to make all kinds of castings direct from the furnace. It is estimated that the addition of $6 would convert the liquid iron into steel ready to make into all kinds of castings.

CON. CAL. AND VA.—The official returns of the December ore and bullion yield of the Con. Cal. and Va. mine show that during that month a total of 11,195 tons of ore were crushed at the Eureka and Morgan mills, producing bullion of the gross assay value of $260,320 56, of which $132 766.73 was gold and $127,648 33 was silver. From a cleanup of the local assay office $5921.37 was realized, aggregating a total of $267,631 37. The average yield of the ore in bullion per ton was $23 25, of which $11 85 was in gold and $11 39 was in silver. The average assay value of the battery samples was $29 53 per ton.

GUTENBERGER'S ROLLER ORE CRUSHER.—Several improvements have recently been made on the roller ore crusher invented and manufactured by Wm. Gutenberger of Sacramento. There are now oscillating-boxes and ball joints for the bearings. This relieves all strain and friction from the main shaft. By the last steamer three of these crushers were shipped to Mexico for mines there.

ADAMS & CARTER, agents of the Frue Vanning Co. on this coast, have removed from 109 California to 132 Market street, in this city, where they have more pleasant offices than formerly, and in a central location.

THREE of the smelting companies at Pueblo, Colo., have given a silver brick each for the benefit of the sufferers by the cyclone at Reading, Pa.

E. E. EYRE, President. JAS. H. GRAHAM, Vice-Pres. & Manager. G. M. PINCKARD, Sec'y.

VULCAN IRON WORKS,

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135 to 145 Fremont Street, - - San Francisco, Cal

MINING MACHINERY,

Stamp Batteries, Pans, Settlers, Etc. "Dodge" Rock Breakers, Pulverizers, Concentrators.

SAWMILL MACHINERY,

Refrigerating and Ice Machinery,

STEAM ENGINES,

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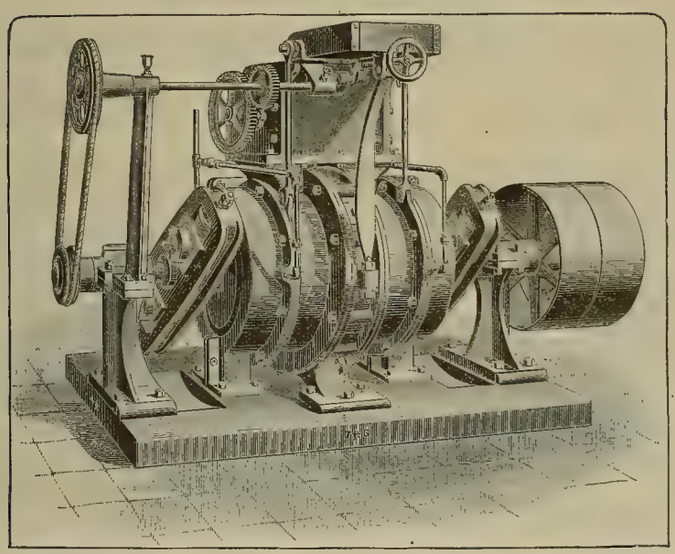
Shafting, Pulleys, Hanger and Boxes, Etc.

Special machinery of all kinds. We have a large list of Standard Patterns, Gears, Pulleys, Boxes, etc. REPAIR WORK SOLICITED.

FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; is in successful operation and we guarantee its work as represented.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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GIDEON FRISBEE, Manager, - - - 461 Howard St., San Francisco.

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AND AIR COMPRESSORS.

THE HIGHEST AMERICAN TUNNELING RECORD.

Of the Machine-Mined Mineral in the U. S., in 1887, three-quarters of the Iron Ore and two-thirds of the Copper Ore were mined with Rand Drills.

THE STANDARD

American Rock Drilling Machinery

For Mines, Tunnels, Quarries, Sewers, Grading, etc.

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MASSEY'S STEAM HAMMERS.
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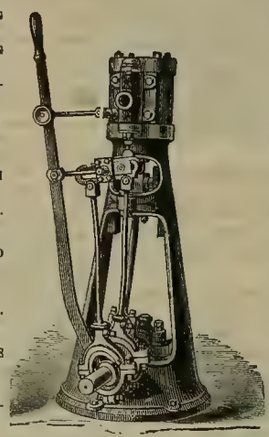

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JUDSON ENGINE GOVERNORS.
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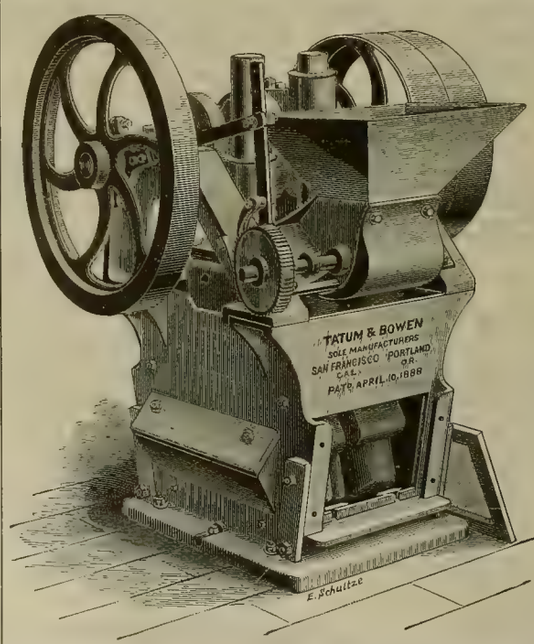

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PERFECTED DOUBLE Economic Quartz Mill.

Attached to each Mill is an effective

Automatic Ore Feeder.

THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

IMPROVED ROCK BREAKER.

Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address:

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SMELTING and LEAD CO.,
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GOLD AND SILVER REFINERY
And Assay Office.

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BLUESTONE,
LEAD PIPE,
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Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

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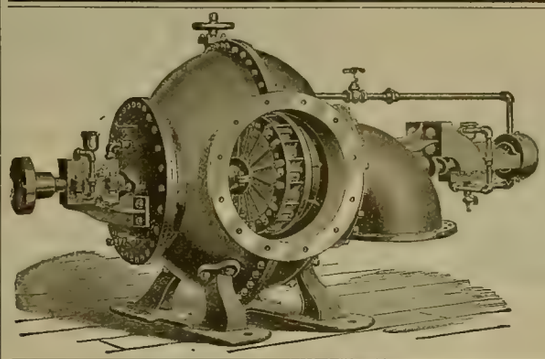

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

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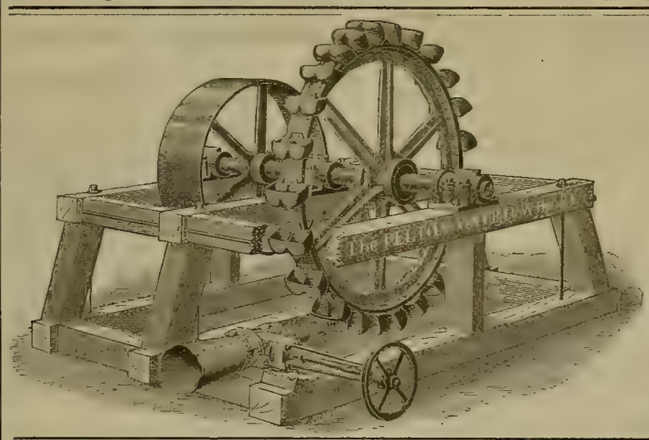

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ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Best & Belcher M Co	Nevada..	42..	25	Jan 10	Feb 15	Mar 7	L Osborn	309 Montgomery St
Big Canyon G M Co	California..	1..	20	Dec 20	Jan 22	Feb 7	T W Nolin	230 Montgomery St
Commonwealth Con M Co	Nevada..	7..	50	Nov 24	Jan 4	Jan 31	H Deas	309 Montgomery St
Concordia M C	Nevada..	2..	50	Nov 12	Jan 24	Feb 12	G C Higgins	121 Montgomery St
California Slate Co	California	3..	30	Dec 13	Jan 19	Feb 18	J O Hansome	10 California St
Gould & Curry M Co	Nevada..	61..	30	Jan 10	Feb 14	Mar 7	A K Durbrow	309 Montgomery St
Gt Western Quicksilver M Co	Cal..	3..	10	Nov 28	Jan 7	Jan 28	A Halsey	328 Montgomery St
Gover M Co	California..	1..	15	Nov 28	Jan 5	Jan 29	L G Harvey	13 Fremont St
Horseshoe Bar Con M Co	California..	2..	10	Dec 7	Jan 14	Feb 4	D M Kent	330 Pine St
Mayflower M Co	California	44..	50	Jan 14	Feb 18	Mar 11	J Morizio	328 Montgomery St
Montrose M Co	Colorado..	1..	1½	Oct 3	Dec 24	Jan 28	F E Luty	330 Pine St
North Guild & Curry M Co	Nevada..	10..	20	Dec 18	Jan 18	Feb 4	C H Mason	331 Montgomery St
Nevada Quicksilver M Co	Nevada..	8..	50	Dec 21	Jan 28	Feb 25	H Deas	309 Montgomery St
North Belle Isle M Co	Nevada..	16..	50	Jan 3	Feb 6	Feb 27	J W Pew	310 Pine St
Overman M Co	Nevada..	59..	25	Jan 15	Feb 19	Mar 12	G D Edwards	414 California St
Occidental Con M Co	Nevada..	3..	25	Dec 27	Jan 31	Feb 25	A K Durbrow	309 Montgomery St
Puget Sound Iron Co	Wash Ter.	13..	1.00	Dec 29	Feb 2	Feb 25	A Halsey	328 Montgomery St
Russell Reduction & M Co	California..	6..	05	Dec 15	Jan 21	Feb 13	J Morizio	328 Montgomery St
Seg Belcher & Mides Con M Co	Nev..	2..	25	Dec 3	Jan 7	Jan 28	E B Holmes	309 Montgomery St
Savage M Co	Nevada..	72..	50	Jan 7	Feb 11	Mar 4	E B Holmes	309 Montgomery St
Superior M Co	Nevada..	24..	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
S F Natural Gas & Oil Co	California..	1..	25	Jan 3	Feb 4	Feb 28	J Scoville	309 Montgomery St
St Louis M Co	Nevada..	1..	50	Jan 14	Feb 18	Mar 16	W E Dean	309 Montgomery St
Scorpion M Co	Nevada..	21..	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
Union Con M Co	Nevada..	37..	25	Jan 4	Feb 8	Mar 1	J M Buffington	303 California St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Alabama, Humboldt & Bailey M Co		W H Watson	302 Montgomery St	Annual	Feb 11
Belcher S M Co	Nevada	J Crockett	327 Pine St	Annual	Jan 29
Cibolo Creek M & M Co		L Osborn	309 Montgomery St	Annual	Feb 4
Lucky Hill Con M Co		F D Buck	Baldwin Hotel	Annual	Feb 14
Spring Valley G M Co	California	H Pichoir	320 Sansome St	Special	Feb 26
Utah Con M Co	Nevada	A H Fish	309 Montgomery St	Annual	Jan 30

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada..	A W Havens	309 Montgomery St	50	Jan 10
Caledonia M C	Nevada..	A S Cheminant	328 Montgomery St	05	Nov 26
Candelaria Con M Co	Mexico	C T Givens	221 Market St	50	Nov 12
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Idaho M Co	California		Grass Valley	50	Oct 11
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Dec 10

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 3.		WEEK ENDING Jan. 10.		WEEK ENDING Jan. 17.		WEEK ENDING Jan. 24.	
Alpha	2.55	3.15	2.40	2.80	2.25	2.65	2.15	2.50
Alta	2.65	2.90	2.60	2.80	2.65	2.80	2.45	2.80
Andes	1.00	1.30	1.05	1.15	1.05	1.20	1.00	1.15
Argenta	....	.10	....	.10	....	.10	.10	.15
Belcher	5.75	7⅜	5.00	6.00	4.80	5⅝	4.00	5.25
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	7⅛	7.50	5.50	7.50	5.25	6.60	5⅛	6.75
Bullion	1.30	1.45	1.20	1.40	1.25	1.55	1.15	1.45
Baltimore	.35	.40	.35	.40	....	....	.35	.40
Belle Isle	.40	.45	.35	.45	.40	.45	....	.45
Bodie Con	1.35	2.80	1.60	2.15	1.50	1.75	....	....
Benton	2.65	3.00	2.75	3.00	3.25	6⅛	4.00	6.25
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.50	.75	.60	.65	....	.55	....	.55
Con. Va. & Cal	9⅝	10⅜	8⅜	10	8⅜	9⅜	8.50	9.00
Challenge	5.00	6⅜	4.60	5⅛	4.50	6.25	4.50	4.90
Champion	....	....	....	....	....	....	....	....
Chollar	3.10	3.50	2.85	3.50	2.70	4.10	3.10	3.80
Confidence	15	16⅜	13⅜	15	13⅛	14⅜	13	13⅜
Con. Imperial	.70	.90	.70	.90	.75	.95	.75	.85
Caledonia	....	.95	....	.45	.40	.45	....	.40
Con. Pacific	....	....	....	.15	....	....	....	....
Crown Point	6.50	7.75	5⅞	7.00	5.25	6⅛	5⅜	6.00
Crocker	.80	.90	.80	1.05	.80	.95	.95	1.05
Central	....	....	....	....	....	....	....	....
Dudley	....	....	....	....	....	....	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	....	....	....	....	....	....	2.50
Exchequer	1.15	1.25	1.10	1.25	1.00	1.35	1.05	1.20
Grand Prize	.65	.75	.70	.90	.75	1.05	.95	1.10
Gould & Curry	2.85	4.30	3.05	3.90	2.75	3.15	2.75	3.30
Hale & Norcross	5.25	5.75	4.90	5.50	4.85	5⅝	5.00	5.25
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	.50
Iowa	....	....	....	....	....	....	.35	.40
Julia	....	.35	.25	.35	.35	.40	....	.35
Justice	1.70	2.45	2.10	2.45	2.10	2.45	1.95	2.30
Kentuck	2.75	2.85	2.20	2.25	2.25	2.80	2.05	2.10
Lady Wash	.50	.55	.50	.55	.55	.65	....	.55
Martin White	....	....	....	....	....	....	....	....
Mono	1.05	1.70	1.25	1.55	1.10	1.25	1.10	1.15
Mexican	3.70	4.65	3.40	4.00	3.25	3.90	3.35	4.00
Mt. Diablo	....	....	....	2.75	2.50	2.60	....	2.75
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.75	1.80	1.60	1.70	1.45	1.70	1.50	1.65
North Belle Isle	2.60	2.90	2.25	2.50	2.45	2.70	2.50	2.60
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.55	2.55	2.60	2.90	2.75	3.20	2.95	3.15
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.60	2.00	1.50	1.75	1.50	1.60	1.50	1.65
Ophir	6.25	7.50	5.25	6.50	5⅛	6⅛	5⅜	6⅛
Overman	1.55	1.85	1.55	1.70	1.55	1.70	1.25	1.55
Potosi	2.50	2.65	2.00	2.60	2.25	3.20	2.25	2.90
Peerless	1.20	1.45	1.20	1.40	1.10	1.35	1.35	1.45
Peer	.40	.45	.40	.60	.35	.40	.35	.40
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	3.25	3.95	3.00	3.40	2.70	3.20	2.75	3.20
S. B. & M	2.75	3.90	3.00	2.50	3.15	3.45	2.90	3.30
Sierra Nevada	3.10	3.45	3.00	3.30	3.00	3.35	3.05	3.50
Silver Hill	.75	.95	.85	1.00	.85	.95	.75	.90
Silver King	....	....	....	1.50	1.25	1.40	1.25	1.40
Scorpion	.50	.55	.45	.50	.50	.55	.45	.55
Syndicate	.10	.15	....	.15	....	.10	....	....
Union Con	2.90	3.60	2.75	3.10	2.70	3.20	2.75	3.15
Utah	1.20	1.45	1.25	1.35	1.20	1.30	1.25	1.40
Yellow Jacket	4.75	5⅜	4.60	5⅛	4.40	5⅛	4.50	5.00

Sales at San Francisco Stock Exchange.

THURSDAY, Jan. 24.

200	Alpha	220	Hale & Nor
100	Argenta	400	Justice
400	Belcher	50	Kentuck
570	B. & Belcher	200	Mono
805	Bodie	200	Nev. Queen
700	Bulwer	50	N. Belle Is
100	Bullion	150	Navajo
100	Caledonia	100	Ophir
400	Chollar	200	Overman
110	Con Va & Cal	100	Potosi
100	Con. Imperial	830	Savage
280	Crown Point	140	Sierra Nevada
21	Commonwealth	50	S. B. & M
500	Con. Pacific	100	Silver Hill
300	Del Monte	100	Utah
500	Exchequer	100	Union
750	Grand Prize	300	W Comstock
375	Gould & Curry	50	Yellow Jacket

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, *or beyond the time he intends to pay for it*, let him not fail to write us *direct* to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER

GOVERNOR ZULICK of Arizona says that the building designed for a school of mines at the University is far advanced.

ONLY 506 Indians, out of a total of 20,000, attend school in British Columbia.

Mining Share Market.

The stock market has been rather active this week, though prices do not show any material advance. The Hale and Norcross and Savage companies have suspended ore shipments, and a number of miners employed in the ore stopes were drafted. A scarcity of water through the freezing of the Carson river flow, curtailing the crushing capacity of the Mexican and Rock Point mills, operated by that stream, is given as the reason of the suspension of ore shipments. The ore resources in both mines are officially stated to be by no means exhausted.

If the power test of the Nevada mill electric motors, to be made in a few days, should prove satisfactory, there will be 30 stamps in the mill available for crushing Hale and Norcross ore. The Con. California and Virginia Company continues to ship above 200 tons of ore daily to the Eureka mill, the motive-power of which has not been seriously curtailed so far by the ice in the river.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

MERRIMAC M. Co., Jan. 19. Capital stock, $1,000,000. Directors—J. P. Couch, Chas. W. Keeney, J. Christian, A. M. Ellsworth and R. W. Heath.

PACIFIC COAL AND COMMERCIAL CO., Jan. 19. Object, to erect coal bunkers in various places in California, and to charter vessels. Capital stock, $3,000,000. Directors—Wm. H. H. Hart, James Campbell, Jas. Speirs, Chas. B. Richards, A. Brunson, W. H. Martin and John Ballard.

CHILKAT PACKING CO., Jan. 19. Object, to cure and can fish. Capital stock, $20,000. Directors—John P. and E. M. Burnham, Frank H. and Theodore Poindexter.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Mt. Diablo, Jan. 23, $8136; Chollar, 23, $16,735; Confidence, 22, $16,733; Navajo, 21, $19,000; Savage, $8500; Con. Virginia, $56,295; Hanauer, $2100; Blue Bird, 19, $15,280; Lexington, $26,656; 19, Hanauer, $2300; Alice, $34,000; Butte and Boston, $23,856; 17, Hale and Norcross, $4981; Mt. Diablo, $5871; Chollar, $42,593; Challenge, $11,542; Confidence, $15,963; Hanauer, $2425; Hanauer, 16, $2525; Hanauer, 14, $5400; Lexington, 11, $2800.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. P.) from week to week and year to year.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

MORE than 1200 miners have rushed to the new diggings at Chloride City and Weber in the Coeur d'Alene.

THERE are now 22 vessels on the way from Australia, bringing coal to California.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

A. F. JEWETT—Tulare Co.
F. B. LOGAN—Southern California.
H. G. PARSONS—Southern California.
GEO WILSON—Sacramento Co.
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JOHN L. DOYLE—Napa Co.
J. C. HOAG—San Francisco.
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Practical Hydraulics.

A Book for Civil Engineers, Miners, Millmen, Hydraulicians, Mining Engineers, and Irrigators.

BY P. M. RANDALL.

This new work is by one of the most experienced hydraulicians of the country. It abounds with useful tables for ready reference, in which the results of abstruse calculations are all placed in a form so that one can find what he wants in a moment. For the engineer the principles, formulæ, coefficients, etc., are given; and for those not familiar with higher mathematics, examples, rules, and tables are prepared. Thus the needs of the scientist and the practical miner or millman are each met. It is the most complete work on the subject yet published, and is specially applicable to the Pacific Coast.

Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated:

General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulæ Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated and Expressed in Formulæ and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water Over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow Through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water Through Short Tubes and Compound Tubes; Flow of Water Through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend—Cicular and Angular; Flow Through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

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The works are situated on A. & P. R. R., Calico Mining District, Daggett, Cal., and contain a first-class Engine and Boiler with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPY & CHILDS, 123 California street, San Francisco.

STOCKHOLDERS' MEETING.

OFFICE OF

The Superior Mill and Mining Company.

A SPECIAL MEETING of the stockholders of the Superior Mill and Mining Company will be held at the office of the company, Room 11, 303 California Street, San Francisco, California, on Wednesday, February 20, 1889, at 1 o'clock P. M., for the purpose of taking into consideration the increasing of the capital stock of said company from ten million (10,000,000) dollars, divided into one hundred thousand (100,000) shares of the par value of one hundred (100) dollars per share, to fifteen million (15,000,000) dollars, divided into one hundred and fifty thousand (150,000) shares of the par value of one hundred (100) dollars each. Transfer books will close on Monday, February 18, 1889, at 3 o'clock P. M. By order of the Board of Directors.

J. M BUFFINGTON, Secretary.

OFFICE—Room 11, No. 303 California Street, San Francisco, California.

DIVIDEND NOTICE.

The German Savings and Loan Society,

526 California Street.

For the half-year ending December 31, 1888, a dividend has been declared at the rate of five and one-tenth (5 1-10) per cent per annum on Term Deposits, and four and one-fourth (4¼) per cent per annum on Ordinary Deposits. Payable on and after Wednesday, January 2, 1889.

GEO. TOURNY, Secretary.

Practical Treatise on Hydraulic Mining.

BY AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, $5, post-paid. For sale by DEWEY & Co., Publishers, 220 Market St., San Francisco.

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DELINQUENT NOTICE.

Lord of Lorn Gold and Silver Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Gold Hill Mining District, Nevada.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment (No. 4) levied on the 19th day of December, 1888, the several amounts set opposite the names of the respective Shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Am't.
Jas. T. McDougall, Tr	72	80	$8 00
Jas. T. McDougall, Tr	194	15	1 50
Jas. T. McDougall, Tr	208	10	1 00
John Wright, Tr	50	150	15 00
John Wright, Tr	74	200	20 00
John Wright, Tr	83	100	10 00
John Wright, Tr	84	100	10 00
John Wright, Tr	85	100	10 00
John Wright, Tr	86	100	10 00
John Wright, Tr	130	150	15 00
John Wright, Tr	132	50	5 00
John Wright, Tr	134	100	10 00
John Wright, Tr	145	50	5 00
John Wright, Tr	151	50	5 00
John Wright, Tr	153	50	5 00
John Wright, Tr	154	250	25 00
John Wright, Tr	160	50	5 00
John Wright, Tr	163	250	25 00
John Wright, Tr	169	100	10 00
John Wright, Tr	170	100	10 00
John Wright, Tr	172	25	2 50
John Wright, Tr	175	50	5 00
John Wright, Tr	176	50	5 00
John Wright, Tr	177	100	10 00
John Wright, Tr	178	100	10 00
John Wright, Tr	179	100	10 00
John Wright, Tr	180	100	10 00
John Wright, Tr	181	100	10 00
John Wright, Tr	182	100	10 00
John Wright, Tr	183	100	10 00
John Wright, Tr	184	100	10 00
John Wright, Tr	188	100	10 00
John Wright, Tr	189	100	10 00
John Wright, Tr	190	100	10 00
John Wright, Tr	191	100	10 00
John Wright, Tr	192	100	10 00
John Wright, Tr	196	200	20 00
John Wright, Tr	199	25	2 50
John Wright, Tr	200	100	10 00
John Wright, Tr	201	100	10 00
John Wright, Tr	202	100	10 00
John Wright, Tr	203	100	10 00
John Wright, Tr	204	50	5 00
John Wright, Tr	209	100	10 00
John Wright, Tr	210	100	10 00
John Wright, Tr	211	100	10 00
John Wright, Tr	212	100	10 00
John Wright, Tr	213	100	10 00
John Wright, Tr	216	100	10 00
John Wright, Tr	217	100	10 00
J hn Wright, Tr	218	50	5 00
John Wright, Tr	219	100	10 00
John Wright, Tr	220	50	5 00
John Wright, Tr	221	50	5 00
John Wright, Tr	225	100	10 00
John Wright, Tr	228	50	5 00
John Wright, Tr	235	40	4 00
John Wright, Tr	236	20	2 00
John Wright, Tr	237	20	2 00
John Wright, Tr	238	8	80
John Wright, Tr	269	25	2 50
Thomas Nelson, Tr	20	50	5 00
Thomas Nelson, Tr	21	50	5 00
Thomas Nelson, Tr	24	50	5 00
Thomas Nelson, Tr	25	50	5 00
Thomas Nelson, Tr	26	50	5 00
Thomas Nelson, Tr	37	50	5 00
Thomas Nelson, Tr	39	50	5 00
Thomas Nelson, Tr	40	50	5 00
Thomas Nelson, Tr	52	150	15 00
Thomas Nelson, Tr	57	35	3 50
Thomas Nelson, Tr	61	200	20 00
Thomas Nelson, Tr	65	40	4 00
Thomas Nelson, Tr	69	40	4 00
Thomas Nelson, Tr	95	200	20 00
Thomas Nelson, Tr	117	2 0	20 00
Thomas Nelson, Tr	119	200	20 00
Thomas Nelson, Tr	122	100	10 00
Thomas Nelson, Tr	123	50	5 00
Thomas Nelson, Tr	124	50	5 00
Thomas Nelson, Tr	1 5	50	5 00
Thomas Nelson, Tr	126	50	5 00
Thomas Nelson, Tr	166	50	5 00
Thomas Nelson	246	1000	100 00
Thomas Nelson	247	250	25 00
Thomas Nelson	248	250	25 00
Thomas Nelson	249	100	10 00
Thomas Nelson	250	100	10 00
Thomas Nelson	251	100	10 00
H. B Atkins	42	100	10 00
Elizabeth Nelson	51	50	5 00
E B. Hamlin	138	50	5 00
E. A. Learned	146	100	10 00
E. A. Learned	252	50	5 00
E. A. Learned	276	50	5 00
E. A. Learned	278	107	10 70
E A. Learned	296	150	15 00
E. A. Learned	297	203	20 30
Asa Fisk	193	200	20 00
F. A. Webb, Tr	263	25	2 50
F. A. Webb, Tr	264	75	7 50
F. A. Webb Tr	281	90	9 00
F. A. Webb, Tr	283	45	4 50
Wm. Drury	258	10	1 00
Wm. Drury	265	25	2 50
Wm. Drury	268	25	2 50
Wm. Drury	294	5	50
Wm. Drury	295	5	50
Jos. Battersby	167	25	2 50
Eben. Jordan	262	20	2 00
Mrs. E. E. Van Brunt	303	186	16 60
Martin White, Tr	313	3332	333 20
Irving Lawton, Tr	310	3995	399 50

And in accordance with law, and an order of the Board of Directors, made on the 19th day of December, 1888, so many shares of each parcel of such stock as may be necessary, will be sold at public Auction at the office of the Lord of Lorn Gold and Silver Mining Company, 313 California street, San Francisco, California, on Monday, the 11th day of February, 1889, at the hour of twelve o'clock M., of said day, to pay Delinquent Assessments thereon, together with costs of advertising and expenses of the sale.

L. G. HARVEY, Secretary.

OFFICE—313 California street, San Francisco, Cal.

THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Leiber, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Antou Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No. 1, 32 ft; No. 2, 9½ ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

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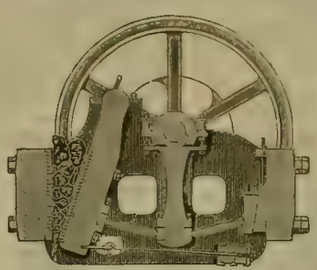

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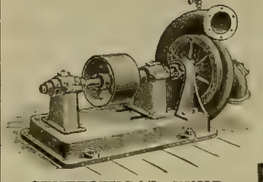

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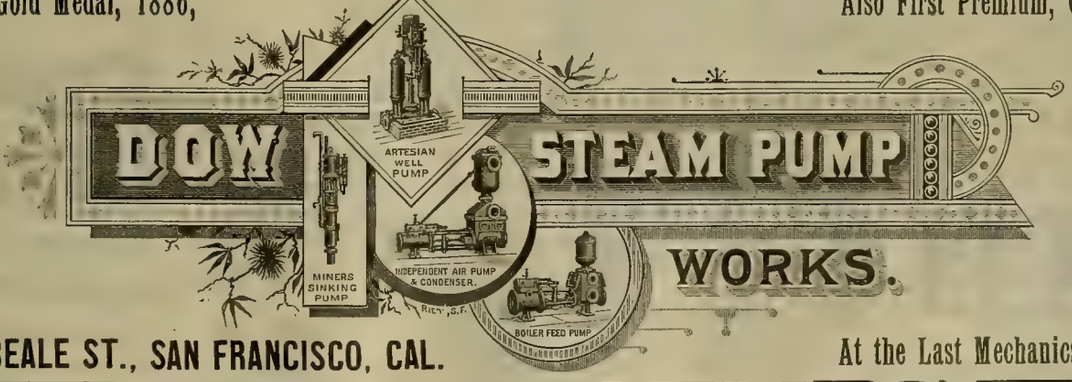

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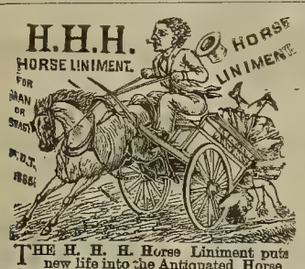

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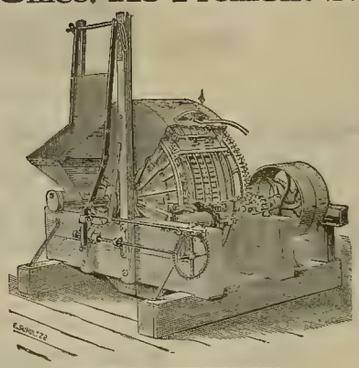

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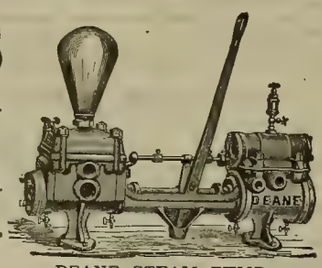

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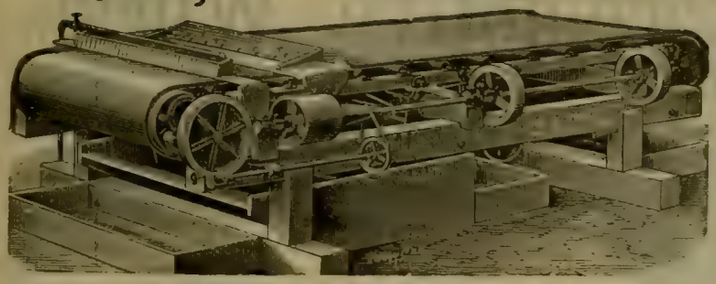

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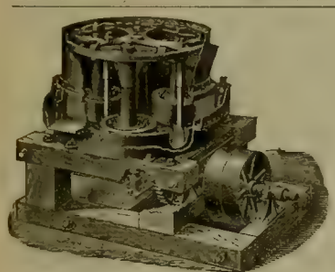

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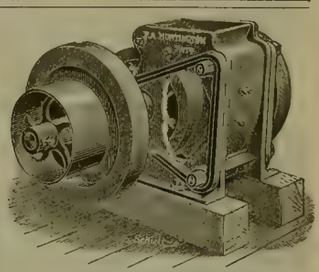

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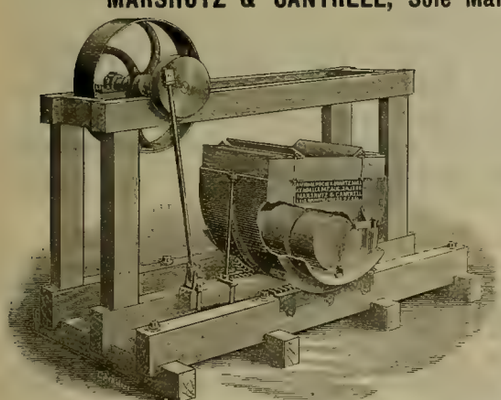

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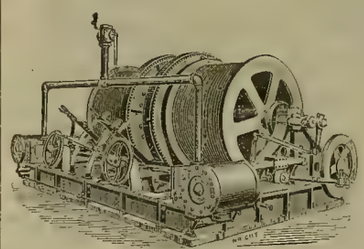

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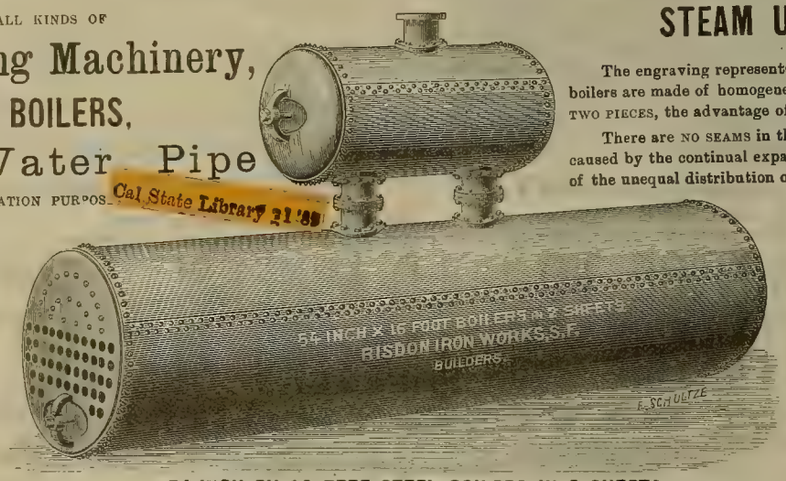

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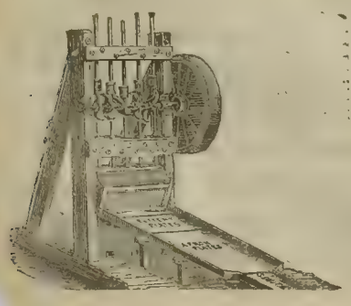

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

ANNUAL MINING REVIEW—TWENTY-PAGES.

BY DEWEY & CO. Publishers.

SAN FRANCISCO, SATURDAY, FEBRUARY 2, 1889.

VOLUME LVII. Number 5.

A 40-Inch Telescope.

We had a conversation on Thursday with Alvan G. Clark, the famous astronomical telescope-maker who has just returned from Los Angeles, where he went to confer with the authorities of the University of Southern California about making a 40-inch lens for a proposed telescope on Wilson's Peak. Mr. Clark says that they will go ahead and complete that telescope. He says: "I could not say that we have an order for it, but perhaps that we have a preliminary order for it. They appointed me an agent to secure prices, etc. It is to be a 40-inch telescope. The University of California is a Methodist institution which has already had a great deal of money, and they are raising money all the time.

"Their selection looks very promising. I had a good telescope and looked at many test objects. They intend to equip a complete observatory in Southern California, and they are talking of making a 24-inch photographic as well as a 40-inch glass. I do not think they intend to go into physical work to the same degree as the Lick Observatory, but in astronomical work they intend to do better if they can. The peak where the instrument is to be placed is very nearly 6000 feet high.

"I have a statement authorizing me as an agent for the trustees of the Southern California University and signed by them. Mr. Spence told me to go ahead with it and it would be all right. I am rather more favorably impressed with the southern country than when here before. It has now settled down to solid work, while before they were all busy selling land. The peak they intend to place the telescope on is back of the Sierra Madre Villa.

"This big glass will be cast in Paris. Edmund Fiel is here in this country. He is probably the best glass-worker in the world. He made the field glass for the Lick Observatory. If I grind and finish the big lens, I shall do it here in California. I have had two or three different persons ask me to do it in Los Angeles on the grounds, and they will put up buildings, etc., if I would do it here. I rather think I should work it here. It will cost them just about as much as for the big Lick telescope."

Underground Photographs.

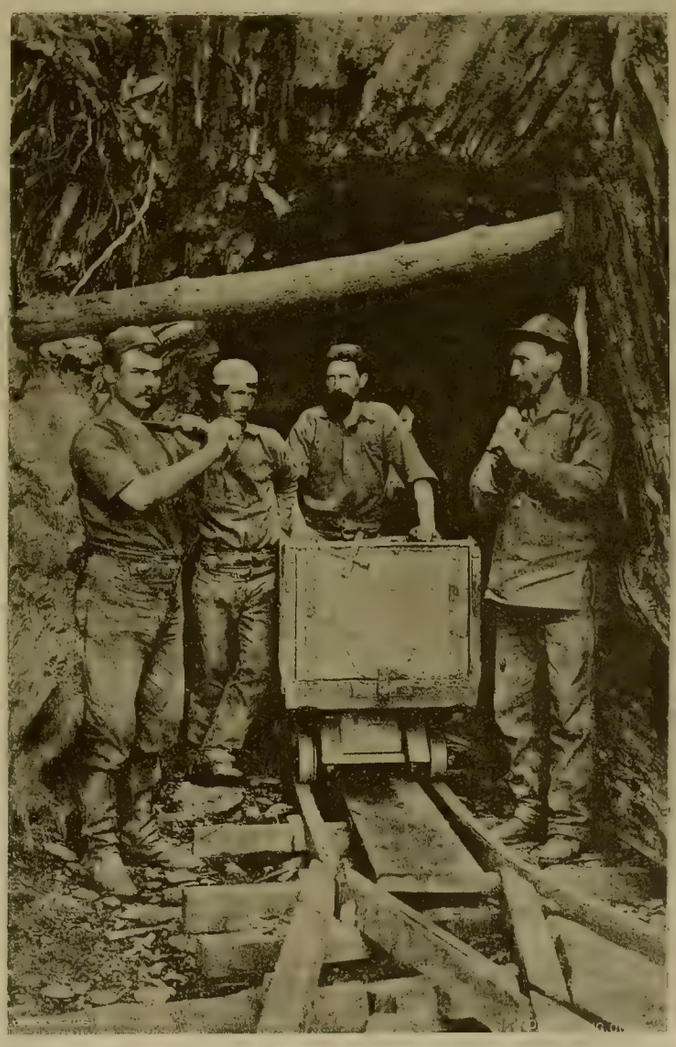
We give on this page two photo-facsimiles of views at the Dorer mine, Placer county, made from photographs taken by Geo. W. Dornin. These pictures are made direct from photographs, without any handwork or engraving of any kind. One of the views was taken in the open air at the mouth of the upper tunnel, and the other at the face of a side drift a couple of hundred feet inside the tunnel. There is little difference in the appearance of the two photographs, both of which were made instantaneously.

The main interest in giving these cuts is to show how little difference there is in obtaining good photographs, whether inside or outside a mine. The underground picture was made with the same camera and lens as the other one, and a "flash light" was used for illumination. This flash light is simply magnesium powder, which, on being ignited, makes an intense light for an instant. A reflector is placed behind the powder so as to concentrate the light at the point to be photographed.

It will be seen that the figures of the men drilling and striking are as clear as those in the sunlight at the mouth of the tunnel. This flash-light powder is much better than magnesium wire for photographic purposes, less time of exposure being required, and it being more easily ignited. By its means underground views are much more simple than formerly.

The Dorer mine, where these pictures were made, is on the divide about 3300 feet above the South Fork of the North Fork of the American river. The ore is brought down a tramway to the mill, which is of 10 stamps, driven by water-power. The water is taken from the old Sailor Bar dam (rebuilt), about two-thirds of a mile up the river from the mill.

DRILLING AT THE FACE OF THE DRIFT.



AT THE MOUTH OF THE TUNNEL.

CORRESPONDENCE.

We admit unindorsed, opinions of correspondents.—EDS

Value of Montana's Product.

EDITORS PRESS:—The press East and West, in commenting on last year's contribution to the wealth of the world by Montana, are certainly in some instances not governed by that sterling virtue, common sense. One popular journal in its New Year's issue, publishes a general write-up of our Territory, and its reporter made an assertion, based on his observation (a very correct one, I think), that the gross product of the Territory would reach $35,000,000 in money. This was followed by an editorial note stating that it would be about $14,000,000. Now either one or the other was superlatively wrong. On investigating the amount of gold and silver bullion and the copper matte shipped, with a fair estimate of the amount of silver and gold the latter contained, also the amount of ore shipped from here to other reduction works, with the values all placed to Montana's credit, the result will show the editor's estimate so far below the amount that the question will naturally arise as to whether he knew anything about the subject he was treating. He might as well have expressed an opinion on the mineral product of Spain as to have estimated the value of Montana's product at the sum of $14,000 000. Silver Bow county's product alone will foot up over $20,000,000 on a conservative estimate. The truth of this will easily be seen by an observing and intelligent news-gatherer when he learns the number of large companies operating here and the magnitude of their operations. The following is a list of the most extensive companies and the approximate of the number of men in their regular employ:

Companies.	Men.
The Anaconda and St. Lawrence	500
Chambers Syndicate	500
Boston & Montana	700
Butte & Boston	300
Parrot Silver and Copper Co	300
Colorado Mining and Smelting Co	200
Lexington	200
Alice Mining Co	225
Moulton Mining Co	200
Blue Bird Mining Co	350
W. A. Clark's properti s	200
Anaconda Smelter	1800

Numerous smaller mines with from 10 to 30 employes are not mentioned. This makes a grand total of nearly 6000 men employed directly, and those who are furnished with a livelihood through the operating of the mines of Silver Bow county will number as many more. Woodmen, teamsters, freight-handlers, etc., are all indirectly in the service of the companies through contractors, as a small army is necessary to run sawmills.

The Anaconda mine alone consumes a million feet of square timbers per month to replace the enormous amount of ore displaced by them, now averaging 2500 tons per day, and all of the other mines spoken of here are operated just as regularly as the Anaconda properties, and disburse an equal amount of money pro rata.

Taking this multitude of toilers at an average of $3 per day (and that is half a dollar less than miners' wag s here), we find the total disbursements of these Butte mines for labor to be nearly thirteen millions per annum.

Now let our seeker after information go still further, and by inquiry at the proper points learn something of the expense that is entailed in working a mine outside of the labor element, and the effect of the old maxim "that figures won't mis epresent the state of facts" when honestly and capably employed, and he will find that he has misrepresented the product of this country to a large extent. In this communication nothing has been said of the properties that have the largest dividends to their credit. For instance, the Granite Mountain, which, besides the enormous expense of building a 90-stamp silver-mill, three miles of tramway and all the regular operating expenses, has $1,800,000 to its credit for the year. The Drumlummon, although they have been working all the past year on the poorest part of their ore body, has over a half-million dollars dividend to its credit.

Then comes the Jay Gould, with only a 10-st mp mill (free gold) with nearly $200 000 to its credit. The old Hecla Consolidated is to the front again $180,000 more. While your correspondent is not inclined to boom Montana, for her own sterling worth will force her to a place in the front ranks, he takes the position that fair play is a jewel, and if our people put a product of thirty or forty million dollars worth in circulation during the past 12 months, we are entitled to the credit of it. Not only that, but we have resources for further and greater production that certainly are unequaled on the American continent. Our coal-fields are just now being opened. We have many new districts, that are in an embryotic state yet, but their mineral wealth is well known and they only lack the facilities of cheap transportation to make them producers and dividend-payers.

Our farming interests are rapidly increasing in volume and importance. The stock and grazing interests are virtually without a parallel at present, and when Uncle Sam takes the remnants of the aborigines under his protecting care, and throws open the immense Indian reservations to settlement, our Territory will stand without a peer in the united constellation of States, either in product of minerals or the production of the soil. Official statements will show us to be ten million dollars in the lead of any of the mineral producers in the Union, which will be satisfaction enough for us, and will also serve to show the manufacturers both East and West that they are neglecting their opportunities when they do not compete for the trade of this growing Territory.

Whether it is due to railroad discrimination or not, the West Coast people are shut out of this market except on fruits at certain seasons of the year. Possibly it may be that they have so much trade at home they do not reach out for this trade with the vim the Chicago merchants do. In the early years the Union Iron Works did a considerable trade here, but now Frazer & Chalmers of Chicago have almost a monopoly in their line.

I am sorry to have taken so much of your space to air my grievance over the reports of our products, but these things only occur once a year, and you and your readers can bear it for the cause of truth. H.

White Oaks, New Mexico.

What the Miners There are Doing.

EDITORS PRESS:—For a considerable time there has been nothing of especial interest to report from this region of New Mexico. Our mines have been engaged in steady development; no "strikes" of remarkable value have been made or looked for. In other words, we have reached the "business" period of mining.

At this point, the South Homestake, the property of the Homestake Gold Mining Co. of St. Louis, has reached a depth of 350 feet in the south workings, and 400 feet in the Wilson shaft. This last is now in process of sinking to 600 feet. They are also sinking on the north line of the property from the 250 level. They have a very large body of low-grade ore in the south workings, and seams and streaks of better ore. In the north workings they have a pay chute in the vein 80 feet long of very high grade.

This property has been equipped with steam hoisters at both ends, and otherwise prepared to handle ores cheaply. The company's 20-stamp mill resumed working this morning for a long season, apparently, of profitable operations. The bins and the levels are full of ore, certainly, and apparently a very large amount in sight.

The North Homestake, the property of Jas. M. Sigafus and J. E. Bird of Tarrytown, N. Y., and Congressman Hunter of Kentucky, has two five-foot Huntington centrifugal crushers at work night and day. The north or "Solitaire" shaft is well equipped with Clayton compressor, hoister, etc. Burleigh drills are used. The vein at the surface was 3½ inches wide. On the ninth and tenth levels it has been stoped out to a width of 26 feet. On No. 14, richer ore than ever is being broken out. It maintains its great width and extends to the side line of the property, going northerly.

In the south shaft a very large amount of ore of high grade was extracted in 1887 and early in 1888. That seems to have been derived from the upper part of the ore-chute, which has now (by its southerly pitch in the crevice) been carried entirely over into the South Homestake ground. The owners do not appear to be doing much at the south end at present. They have only 270 feet of depth at that point. Doubtless they have good ore below them. At the Solitaire shaft they are down 450 feet.

The Lady Godiva, owned by John W. Harrison of St. Louis and B. H. Dye of White Oaks, has recently been equipped with shaft-house, steam hoist, etc. The No. 3 shaft has a depth of 150 feet, and has s arted down under orders not to stop for anything short of 400 feet. This fine property has several parallel fissure veins. The one being chiefly developed is a beautifully defined fissure filled with quartz quite distinct from anything in the region of the Homestakes and of very profitable grade.

There are in this district two distinct systems of veins. Those having a strike of from 9° to 14° west of north are mainly porphyritic in character, have walls not very well defined, and have been chiefly developed on Baxter mountain. Here they lie in a grayish bastard granite. To them belong the South Homestake, Miners' Cabin, and the south workings of the North Homestake.

The system having a strike of from 12° to 22° east of north, partly intersects the other on Baxter Mountain, but crosses the gulch and appears in East Baxter unenhanced by such intersections. The gangue is here a quartz, black, white and amethystine, with iron; walls are well defined, and ores of higher grade. To this class belongs the Lady Godiva. A fine mill will be built for that property this summer.

The improvements made in this town the past year, in the way of new buildings, etc., have cost a large sum, and have largely added to its attractiveness as a place of residence and business. The population has nearly doubled in the last twelve months, and the volume of business done has increased in a much greater ratio.

The building of the Chicago, El Paso & Mexican railway, and its completion to this point during the year 1889, are now assured facts. Work is actually begun, and ten miles of track laid. The Rock Island has already begun the construction of its line from Liberal, Kansas, to El Paso via White Oaks; so that before we write 1890 we shall be upon at least one great transcontinental line of track.

The Parsons mine on Tanbark gulch in the Bonito district has been sold to a Chicago & Santa Fe corporation, which has taken charge. The new owners will equip the property with a 60-stamp mill in the spring. Their ore body is known to be 450 feet in width and 700 feet in length, and is believed to be much longer. Your correspondent knows all that great mass (which rises in the center to the hight of 65 feet above the general surface) to prospect satisfactorily. While the mine was run by the discoverer, he ran 2564 tons through the small mill now on the property, with average cleanups of $5.36 per ton. With his small capital and plant he mined and milled for $1.60 per ton. The company now owning the property can work cheaper than he did and also get better results.

The other mine-owners of Bonito district are getting their properties rapidly in shape. The sale of the Parsons mine has been a great stimulus to all that part of Lincoln county.

The coal mines near White Oaks are doing a good local business. The Wells-Parker coal mine has been equipped with steam hoist and steel tracks, and is in shape to do a large business.

There is a better and more hopeful feeling among miners all over New Mexico than for many years. There is every indication of capital seeking mining investments, and seeking them intelligently. Investigators and intending investors are at present seeking the aid of mining men and experts, old residents of the localities in which they wish to operate. Your correspondent is receiving more inquiries for and in reference to mining property and investments than at any time since 1881. The year 1889 will be a prosperous one for New Mexico.

White Oaks

* * * * *

Mines and Mills Near Kernville.

EDITORS PRESS:—Although all the large mills in this vicinity are idle, still some gold is being extracted. The Glenn Olive mill, 12 miles south of Kernville, consists of two arastras driven by steam. They crush about five tons per day, and employment is given to about 12 men. The mill is supposed to turn out about $75 per day. Mr. Packard and Judge Sumner have small stamp-mills on Kern river, below the old town of Keysville, that employ on an average eight or ten men. Judge Sumner also has two water-power arastras two miles farther up the river, at which he, like Mr. Packard, crushes custom rock. The Robinson Bros. have a small water-power arastra above Kernville, and occasionally crush a few tons from an eight-inch ledge, known as the Bob Lee, which so far has yielded an average of $115 per ton. Butterbread & Co. have two small water-power arastras on Kelsey canyon, near the site of the old town of Sageland, which are generally run when there is water.

In addition to these, in passing through the hills it is no uncommon thing to find a camp of two or three men with a horse and a few bales of hay, engaged in extracting gold by a process supposed to have been discarded for a third of a century. There are hundreds of small leads here which would pay a good profit over mining wages if the means were at hand to crush the rock at moderate expense. But, as a rule, these small ledges will not pay for the erection of a costly mill. Near where the old town of Keysville once stood, the workings show the ledges to average not more than 100 yards apart, and excepting the Mammoth, averaging not more than one foot in width. A number of men find employment here in extracting rock for the custom mills, and they seldom select anything of a lower grade than from $20 to $40 per ton.

Some development work is being done. The Bright Star Co. has recently made an important find in their mine, on Pinto mountain. Barton & Simpson are exposing a body of ore in the Old Key near Keysville, from which $500,000 is said to have been taken between the years 1854 and 1858 inclusive.

There are some thin ledges in this vicinity, either of which is capable of affording a constant supply of paying rock to a first-class mill for years; and but for the most deplorable mismanagement (not to use a much harsher term) they would now have been giving employment to hundreds of men.

There are two or three notable instances here in which the plant was not warranted by the size of the ledge. A first-class mill should never be erected on a 14-inch vein.

STEPHEN BARTON.

Kernville, Kern Co., Cal.

WHERE THE MONEY GOES.—Without endeavoring to explain where all of the money paid miners for wages on the Comstock goes, we can state with considerable reliability that the wage-earners of the Comstock have on deposit in bank something like $250,000. The Hibernia bank of San Francisco has a large percentage of this amount, and also Wells, Fargo & Co. have a big pile. The average sum paid miners and mill hands for wages on the Comstock is $224,000.—*Virginia Enterprise.*

APPRECIATIVE.—The San Francisco MINING AND SCIENTIFIC PRESS has closed Volume 56. We have "exchanged" with it for about 20 years and never opened an uninteresting number. May it last forever.—*Prescott Courier.*

That Lake of Volcanic Glass.

Relics of Extinct Civilization.

EDITORS PRESS:—I noticed in a recent issue a reprint of an article originating in an Eastern paper, relative to the great lake of volcanic glass in the neighborhood of this place, and referring also to the ruins of Gran Quivera. The author of that article has an imagination fertile and vivid enough to suggest rivalry with Rider Haggard.

The prosaic facts are, that at a point 15½ miles W. N. W. of this place is the center of the north end of the famous

Lava Beds of Lincoln County.

Measured upon a line drawn along their center, they are 45¾ miles long. For ten miles from the north end, they have an average breadth of 3½ miles. The general course so far has been at first a little east of south and then south. Here they bend to a N. S. W. course, and for six miles more have an average breadth of 2½ miles. Thence for 12 miles further the course is S. W.; extreme breadth, 1½ miles, but where crossed by the Carthage stage-road they are less than a mile in width, and where crossed by the Military and Telegraph road they are scarce half a mile. At this last point they bend to the south, widen rapidly, until ten miles below, they attain their extreme breadth of 5½ miles. Here they deflect to the S. W. again and maintain an average width of 4½ miles until they abruptly end at the head of the salt marshes in Socorro county.

They are composed of a black iron lava of in part, at least, recent origin.

The Center of Activity

Was at the north end, near the center of which and about one mile from the extreme northern point is the ancient crater now not elevated more than 200 feet above the general level. The origin of the flow was at a distance from its outburst here. It occupies in part the bed of an ancient river of generous proportions, and is underlaid by the subcarboniferous limestone. In many places it is possible to penetrate through crevices to the underlying limestone strata. Eight distinct flows can be counted, some of which were so separated by time that sand, gravel, and traces of arboreal vegetation remain between them. The last st flow was at no very distant geological period. Very slight accumulations of sand, soil or vegetation as yet appear; vast stretches are as black, bare and forbidding as when first cooled. No signs of disintegration appear anywhere, except where older lavas, partially calcareous in their composition, have been brought to the surface. This occurred during the last flow. That in many parts came on behind and beneath the older lavas like a gigantic and resistless plow, and piled the broken-up ancient lavas in vast heaps and windrows, like the front and flanks of a Canadian-river ice-gorge.

There are much larger lava beds even in New Mexico, but for savage grandeur, or for the clearness of their testimony to the resistlessness of the force employed, they have no equal within my experience of lavas, and that has extended from Vesuvius to Mauna Loa.

The Soil Surrounding These Lava Beds

Is usually a red argillaceous and calcareous deposit or wash, permeated in all directions with streaks and threads of gypsum. So far from being surrounded by extensive "beds of white ashes," they are surrounded by some of the finest grazing lands in New Mexico, and, so far as the east side is concerned, among the best watered.

They lie along the center of the superb natural valley, bounded on the east by the Congo mountains and the magnificent White Range, the loftiest in New Mexico. To the west the valley is shut in by the Chupedero Mesa and the Oscura mountains. The valley has a natural descent of 27.5 feet to the mile. Near the eastern border of the lava beds is the surveyed grade of the Kansas City, El Paso & Mexican railway.

A Former Mining Period.

The ruins of the Gran Quivera lie 40½ miles northwest from this place. Considerable remains are to be found, such as would suggest a place of considerable importance and population, and a population well advanced in arts and industries of civilization.

The irrigating ditches on which its existence depended are readily to be traced, though the bold and necessarily rapid stream from which they drew their supplies has ceased to be.

That the inhabitants were extensively interested in the reduction of auriferous and argentiferous ores is demonstrated by the buried heaps of slag still to be found. That their appliances were rude and imperfect is demonstrated by the amount of lead and silver and sometimes gold, remaining in the slags. Whence they drew their ores remains a mystery. Neither the scanty nodular copper ores of the Manzana mountains on the north nor the copper carbonates and sulphides of the Gallinas on the east account for them. Scarce traces of copper are found in their slags, and no trace remains in the neighborhood of the pyritous ores and argentiferous galenas, which were the foundations of their industry.

Another Champollion or another Moira may at some time unlock the riddle of the Cibolla. Read the pictured traces of an extinct people and civilization and give a new history and a new romance to the human race; till then, we

can only gaze and ponder and speculate upon the loves and fears, ambitions, hopes, conquests and arts of a people who have left us not even a name. D J. M. A. JEWETT.

White Oaks, New Mexico.

Washington Territory Mines.

EDITORS PRESS:—In your issue of Nov. 24th is a letter dated at Spokane Falls, and published under the caption, "Washington Territory Mines," which is calculated, if relied upon, to mislead your readers and to do injustice to Washington Territory as well as to persons who are endeavoring to do something toward the development of the mineral resources of that country.

In the letter referred to the author alludes to the "mines near Ruby City." I have personal knowledge of all the matters referred to, and there is no truth in that part of the letter.

The Arlington mine on the surface at the point of discovery fairly averaged 151 ounces of silver and $4.75 in gold. The ledge was fully six feet in width. At the time Professor Clayton reported upon the mine the ledge had been uncovered and found in place on the surface throughout the entire length of the claim, 1500 feet, and a shaft had been sunk on the ledge to a depth of 80 feet. Samples of the ore taken from the dump, with a view of getting a fair average, assayed 81 ounces of silver. A tunnel has been run which cut the ledge 210 feet below the surface. An upraise has been made on the ledge to the surface and drifts run each way from the tunnel a considerable distance. The ores from the mine have been carefully assayed, and working tests have been made by the most reliable firms in San Francisco and New York, and work on the mine is being pushed under the direction of a superintendent of many years' experience in that class of work. The mine is not for sale and the stock of the company is not on the market.

The company is satisfied with its prospects and is endeavoring to develop a mine and carry on a legitimate mining enterprise. It does not care to advertise its mine or its business, and only asks that if correspondents do meddle in the matter at all, they simply tell the truth.

What is said concerning the First Thought, Fourth of July, Idaho and War Eagle, is as incorrect as the other statements in the letter referred to. They have not had as much work done upon them as the Arlington, but what has been done shows each of these claims to be very promising, and their owners are fully satisfied with them.

If you will be kind enough to give this space in your valuable paper, it may prevent some one from forming an erroneous conclusion concerning "the mines near Ruby City."

Portland, Oregon. C. A. ALISKY.

Suspension Hoists in Mining.

It frequently occurs that the character of route renders the construction of surface planes a matter of great difficulty and expense. To such cases the application of aerial planes has peculiar advantages. These planes consist of wire ropes extending between the points of desired communication. Upon these cables the carrying vehicles or carriages travel, the ropes serving as tracks. This system, as in the case of surface inclines, admits of single or double planes and may be operated by engine-power or gravity, according to the conditions and requirements of the case.

Aerial inclines find frequent application in mountainous regions and in the hoisting of material from large open-cut mines or quarries.

Fig. 1 shows a serviceable application of the single-rope system. This system is especially adapted to quarry-work, where the loading-point is continually shifting. Fig. 2 shows the general arrangement of the double cable suspension hoist for large open-cut workings and quarries. Where the grades are excessively steep, and large output is required, the double rope system is found very serviceable. The governing principles are similar to those of surface inclines, the two ropes serving instead of the surface track. This system is applied to the diamond mines of South Africa. The cuts are from a paper of F. C. Roberts, read before the Am. Inst. M. E.

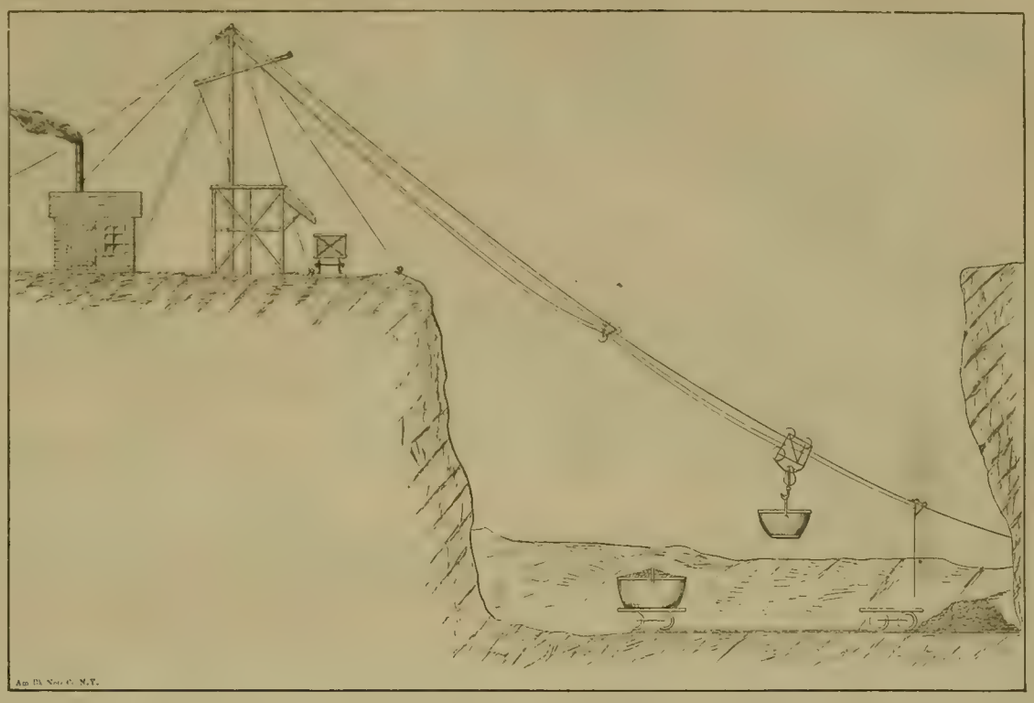


Fig. 1.—SUSPENSION HOIST FOR QUARRIES.

THE WATER-WALKER—HOW HE DOES IT.—C. W. Oldreive lately accomplished the task of walking on the water of the Hudson river from Albany to New York; distance about 150 miles; wager, $500. His average progress was 24 miles a day. He always went with the tide. The shoes he wore are made of cedar, lined with brass. They are five feet long and a foot wide. Each is air-tight, with a space in the center for the foot. On the bottom are three fins so arranged that when the shoe moves forward they are pressed up against the bottom, and when the shoe is at rest they hang downward like paddle-wheel buckets.

MONKEYS AS COIN-TESTERS.—The Siamese ape is said to be in great request among Siamese merchants, says London *Tid Bits*, as a cashier in their counting-houses. Vast quantities of base coin obtain circulation in Siam, and the faculty of discrimination between good money and bad would appear to be possessed by these gifted monkeys in such an extraordinary degree of development that no human being, however carefully trained, can compete with them. The cashier ape meditatively puts into his mouth each coin presented to him in business payments, and tests it with grave deliberation. His method of testing is regarded in commercial circles as infallible; and, as a matter of fact, his decision is uniformly accepted by all parties interested in the transaction.

WHY TINWARE IS CHEAP.—People often express great surprise at the cheapness of tinware, says an exchange. Not long ago a lady told me that for $1.20 she purchased a wash boiler and enough smaller articles of tinware to entirely fill the boiler. If they could see how quickly these articles are made they would no longer wonder at their cheapness. A piece of cheap coke tin can be made into a stewpan almost in the wink of an eye, I might say. There is a general impression that because such tinware is cheap it will not give good service, but this is not generally the case. The greatest imperfection is caused by careless soldering, but this applies only to the most inferior grades. The better grades of the so-called cheap goods have double pressed seams, which are practically everlasting. Tinware is cheap only because it is made by rapid machinery. Should this country ever produce tin in quantities large enough for home consumption, tinware will likely be cheaper than ever.

Fig. 2.—GENERAL ARRANGEMENT OF DOUBLE CABLE SUSPENSION HOIST FOR LARGE OPEN-CUT WORKINGS.

Reducing Ores on the Comstock.

Bullion-producers of the Comstock, says the Virginia *Enterprise*, can be made as numerous as there are mines on the lode. There is scarcely a mine here worthy of being called such that cannot produce ore containing more or less of the precious metals. But there are very few that can make the business remunerative to their stockholders under the present conditions and general expense of reduction. In the Black Hill country dividends are paid from ores assaying 100 per cent less than ores for the running of which we pay assessments.

The means being in existence for the reduction of low-grade Comstock ores at a big profit, their ultimate introduction upon the lode must be considered inevitable. It is simply a matter of time and the exhaustion of the conditions now existing which make their introduction undesirable.

But there are already men of perseverance and knowledge in the field figuring upon the introduction of a Russell plant for the reduction of ores by lixiviation. A 120-ton capacity plant lately erected at Park City, Utah, cost but $20,000. In testimony of the success of the process and its ability to extract a very high percentage of precious metals contained in it, the companies operating Russell plants buy ore outright, paying 85 per cent of its assay value, which is higher than is extracted from Comstock ores on the average by the amalgamating process. In other words, we have to take out the cost of reduction from the 85 per cent obtained from the ore, and the Russell people must get their cost and profit from what they can get out of the ore over and above 85 per cent of its assay value.

With the introduction of such reduction works, doing that which they represent, nearly every mine on the lode would become a bullion-producer, and there would be no excuse to run long drifts through bodies of low-grade quartz in search of fat little kidneys.

As things now exist, the bullion-producers of the Comstock are: Con. Cal. and Virginia, Hale and Norcross, Savage, Confidence, Challenge, Crown Point, Yellow Jacket, Belcher, Chollar, Potosi, Alta, Occidental, Gould and Curry, Justice and Overman—15, all told. Of the above, Con. Cal. and Virginia, Hale and Norcross, Confidence, Challenge, Savage, Alta, Justice and Overman are probably the only paying mines.

The Con. Cal. and Va. is the only dividend-payer at present. Hopes are entertained that Hale and Norcross and Confidence will resume the payment of dividends before long. Savage and Alta may also become dividend-payers this year.

BUTTE, Montana, has many smelting furnaces. Now the residents are making a fuss about the smoke. Mr. Clark says, however, that if the smelters were to shut down and stop making smoke, there would be a still bigger "kick."

THE President has approved the Act increasing the appropriation for the San Francisco postoffice site to $800,000. This is the final act of the long legislative process of securing this appropriation. The next step will be the selection of a site.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CLEVELAND CLAIM.—*Dispatch*, Jan. 26: The tunnel being run in on this property is now in 125 feet. The company expects to strike pay gravel when in about 200 feet more. The mine is at Volcano, and is owned by Messrs. Cleveland and Stolcken, who have it bonded to foreign capitalists.

GOVER.—The mill started up from the new water supply Sunday, which is a great saving for the company. Heretofore they used 130 inches; now they use only 40 inches, which is quite a saving every month to the company. The mine turns out the usual quantity of good ore from the 300 and 500 foot levels. The Plymouth Con. mines are going right ahead; the water is all out and new timbers are being put in where it is found necessary; more men are being employed every day in the mine so that it will not be long before as large a force of miners as were working in the mine before the fire will be at work again. The New London is working the usual force of men and have started a crosscut at the 300-foot level. The company have quite a force of men doing assessment work on their outside locations. It is understood that a mill will be erected on the New London about the first of May which will give employment to a lot more men.

COSMOPOLITAN.—The east crosscut is in 162 feet; its face is soft slate and stringers of quartz. The west crosscut is in 58 feet with face in hard slate. They started a drift south on the ledge Monday and will also start a drift north on the ledge in about another week. The ore shows free gold and prospects well. The company will erect a mill in the spring if the outlook is as favorable then as at present. The ore body is 34½ feet wide and they will need a large mill. They can get 600 feet fall of water from the Quartz mountain reservoir for motive-power to run mill and hoisting works. Ere long the Cosmopolitan will be a bullion-producer.

ALPI.—A few men have been put on at the Alpi. The shaft has been started and the first set of timbers put in. It is proposed to erect a mill at once, which policy is questioned by some who think the better plan to be to run through a couple of hundred tons of rock in some mill near Jackson, so as to give the large body of rock in sight a test before going to too much expense. The undertaking is a local enterprise.

NORTH GOVER.—Mr. John A. Eagon, one of the principal stockholders in this property, says the owners are about to form a corporation and issue stock on the North Star plan for the purpose of working the mine.

NORTH CALIFORNIA.—This company have started the Potosi mill on their ore and will run until the water fails in August. The plates are looking very well so far.

ZEILE.—They are making a station at the 1030-foot level. A level will also be run between the 800-foot station and the bottom of the shaft.

KEYSTONE.—They are now sinking from the 1400-foot level at this grand old mine. The mill runs regularly on good paying ore.

Butte.

RICH RIVER MINES.—Oroville *Register*, Jan. 24: We visited the Golden Gate mine on Feather river this week and were surprised to see the vast amount of labor required to construct a flume for carrying the water of the stream. It is no wonder that in the early mining days, when lumber, powder, tools and labor were all expensive, this mammoth task was not undertaken. The great width of the flume necessitates a wide cutting on the high rocky points along the river, but this work has been nearly all completed, there remaining only 200 or 300 out of the 3200 feet that needed grading. The lumber for the mammoth flume has been hauled to convenient localities and other preparatory work has been done. This will greatly facilitate operations in the spring when the water is low enough to put in the head-dam. Of the richness of this stretch of river-bed, there can be no doubt. Near it were two of the richest river-bed mines ever worked in Feather river, the Greek and the Old Cape claim. The banks and bars of the river in the vicinity of Long's Bar, Adam's Bar, Morris Ravine and Thompson's Flat were all fabulously rich. There are many old miners living in this region who well remember the great amount of gold taken from the mines in and near Feather river and who are confident that the Golden Gate will verily prove a golden one to its owners. One needs to go upon the ground, note the immense labor required to drain the channel, and mark the great volume of water to form any idea of the great task undertaken. It is safe to assert that all the gold ever deposited in the channel of the Feather during an almost countless number of years remains there to-day and will remain until this great flume is completed and the channel laid dry. Some of the statements made by the miners and others who worked in the river-bed show that no part of California is richer in the precious metals than the channel of Feather river just above Oroville. Mr. John P. Leonard and H. B. Lathrop took out in one panful of earth $2200 in gold dust. Day after day the miners at work in the Cape claim took out from $10,000 to $25,000 a day. The mine was only free from water 57 days, yet during that period there was taken out $1,000,000 worth of gold dust or an average of $17,500 a day. Thomas H. Williams in 1857 took out from the Union Cape $150,000 in 21 days, yet his dams were leaky and he could not work to advantage. We have no doubt that the Golden Gate mine and the Greek mine will prove equally as rich as did the Cape and the Union Cape when the river-bed is once laid dry and an opportunity is given to work the channel of the stream.

Calaveras.

ANGELS.—*Mountain Echo*, Jan. 23: Everything is running in full blast night and day at the Nevills mine in this town. The ore body in the north stope of the 400-foot level is immense, as well as being a higher grade than any heretofore extracted from this mine. The mill is kept in constant motion and the plates present a very healthy appearance. It is quite evident that this mine will fall into the hands of a London company in a few weeks. The work of building and fitting up, preparatory to opening developments on a large scale, is going on actively at the Utica mine. The new 60-stamp mill is about in readiness for operations, and, we are informed, will be started up some time during the coming week. Everything is being put in readiness as rapidly as possible for the spring and summer campaign. This is one of the largest mining properties in the southern mines. Operations are progressing steadily at the Angels mine. The ore now being mined is said to be of a very good grade, and best of all, there are thousands of tons in sight. The mill is kept in constant operation. Work is going on continually at the Lane & Tulloch mine, situated in the southwestern part of this town. The owners are well pleased with the flattering prospects of the mine, and are sanguine that they have a valuable mining property. The mill is kept in constant motion and the ore is being crushed as rapidly as it is taken out of the mine.

PURCHASE.—Mr. J. F. Curtis of Stockton has recently purchased from E. A. Foster a quartz mine known as the Evening Star, situated on Smith's Flat, about two miles northwest of Angels, adjoining the celebrated Gold Hill mine owned by Geo. Osborn. Mr. Curtis is brimful of energy, and has had considerable mining experience. He says the claim is a good one, but will require a considerable outlay to thoroughly develop it.

STRIKE.—It is currently reported in this section that a body of ore 40 feet wide has been struck in the Calaveras mine near Robinson's Ferry. It is also said that assays of the ore have been made which yielded about $75 per ton.

Mariposa.

RED CLOUD.—Mariposa *News*, Jan. 26: Matters at the Red Cloud mine are in a demoralized state. Much of the property has been destroyed. Attachments have been levied on all the available machinery by employes. The Red Cloud is certainly a very rich pocket mine.

Nevada.

AT GRASS VALLEY.—*Tidings*, Jan. 26: The North Star Mining Company has contracted with the Risdon Iron Works for a new hoisting plant, to be erected upon the company's shaft in the Grass Valley mining district. Mr. Cutter of the Risdon Works is now in the city to carry out the contract. Of the hoisting plant now in use the reels are too small to permit of expeditious hoisting from the depth attained, to say nothing of the depth projected. The new plant will be larger and equal to all exigencies. For its accommodation the hoisting works building will be extended 40 feet. The old plant will not be removed, there existing provisions for operating it by steam in case of an emergency. "Everything is running along well, and we're doing well," was the reply made by Supt Mainhart when interrogated as to the outlook at the Omaha & Lone Jack Consolidated. At this mine there are 65 men employed at day's pay and 15 contractors and tributers. The 20-stamp mill is running night and day on good ore, and the superintendent wishes the mill were of greater capacity, for the time being at least. As yet all operations are confined to the Omaha ground, but the workings are in the direction of the Lone Jack. Developments of the last few months leave no doubt but that the enterprise is a success. Sinking constitutes the only work being done at the New Eureka. The nine contractors, working in eight-hour shifts, are making sufficient progress to guarantee that the contract price of $21 a foot will give them wages. The shaft is vertical, 8x10 in dimensions, and is now down 340 feet. At a depth of about 500 feet it is expected to cut the ledge struck by crosscutting from the 300-foot level several months ago. In sinking, several gold-bearing stringers have been cut, while the country rock is highly mineralized and bears other favorable indications. The skip put in at this mine a few weeks ago works to a charm. Two years ago, perhaps less, the *Tidings* related the prospects of the Metropolitan mine of the Moore's Flat neighborhood, as told by its owner, Geo. Abrahams. Nevertheless, Abrahams was unable to obtain capital and had to go it alone again, for mining men regarded his ledge as too big to be worth anything. Recently Happy George, as Abrahams is termed, because of his optimistic tendencies, made a strike, which, if it is to be judged by samples of the ore exhibited on the street to-day by son-in-law Reynolds, will net him the rich reward due all persevering, plucky prospectors. The quartz has a lively appearance, and carries free gold and other minerals. A mill is now wanted on the property.

COPPER.—Cor. Grass Valley *Tidings*, Jan 29: The mining interest of the western part of Nevada county should not be overlooked. Around and in the immediate vicinity of Spenceville some prospecting for copper has been done with very encouraging results, while it is well known that gold-bearing ledges or lodes exist in several localities. There has been no systematic development of any of these claims or mines outside of the Spenceville copper mine, and that one is paying large dividends to the stockholders, and what that mine is now doing can be done with several others in the neighborhood if their owners had the capital to develop them. To those who are interested in mining, no better locality can be found for profitable investments.

Placer.

SPRING GARDEN.—Placer *Argus*, Jan. 26; The Gray Eagle mine, which is the principal point of attraction, will soon be ready to start up again. I say it is the point of attraction from the fact that mine-owners for miles on each side above and below are waiting to see what the Gray Eagle are going to strike before they will undertake to locate the exact position or the depth of the channel. That the main channel comes down the divide through the Gray Eagle Co's. ground, all concede. That they have a mine none here doubt. But those above and below them do not like to "face the music" to the tune of the thousands required to prospect a deep channel mine. The Gray Eagle Co. being the pioneers in this section deserve great credit for their energy and enterprise, for undoubtedly they will be the means of bringing thousands of dollars to this point. From the present outlook at the Gray Eagle works, that company is determined to know what is on their ground. They are putting in one of the largest and finest pumping plants in the county, which, when completed, will be able to handle an enormous body of water. F. Chappellett is doing some work on his Owl creek property. The Mountain Tunnel Co. have been doing assessment work on their claim. Mr. Garber has made a rich strike in the McKinstry claim. Good reports come up from the divide. A Napa company, under the management of Mr. Gardner, are prospecting a quartz ledge near the U. S. Ranch, and show some fine specimens. Times are lively and all anticipate a large output of gold for 1889. There has been some valuable mining ground taken up as agricultural ground in this district, but the miners are determined to dispute every foot of ground with the agriculturists.

FOREST HILL.—Placer *Argus*, Jan. 26: This place is one of the liveliest in the county. The Mayflower mine has a large force of about 100 men at work and their large stamp-mill is running continually. Good paydrift is being taken out. The Breece & Wheeler mine at Bath has struck some of the richest pay ever taken out of the mine.

Plumas.

BULLION SHIPPED.—Plumas *National*, Jan. 26: Below we give the amount of bullion shipped from Spanish Ranch Express office in 1884 and 1888. The figures are kindly furnished by our young friend, W. H. Thompson, and show the effect of the injunctions on our hydraulic mines. In 1884 the shipments amounted to $79,523.21 and have gradually decreased every year until in 1888 the amount shipped was $42,122.67, being a decrease of $37,400.84.

Shasta.

FRENCH GULCH.—Redding *Free Press*, Jan. 26: From Charley Plumb, who was in Redding yesterday, the first time in a year, we learn the following French Gulch and Deadwood news: Cummings, Osborne & Morrell, on Klein gulch, have put in a rotary 12-stamp mill, which was started up on Monday on $50 rock from a large, well-defined ledge. They expect to make a cleanup in about two weeks, and big results are expected. Frank Wheeler's mine, in the same locality, is idle awaiting repairs to the battery. The Niagara is running 75 men. The mill is running constantly, making two cleanups each month, averaging $9000 each time. The Brown Bear is running about 50 men, and the McDonald mine 30. Both companies are close mouthed about their shipments, but that they are making money is well understood. Tom Green's mine, under the management of Bob Skinner, has begun to pay again, developing ore of a high grade.

POCKET.—Shasta *Courier*, Jan. 26: A lively excitement was occasioned here Thursday by the discovery of a pocket mine on Rock creek, a mile or so from town, in the neighborhood where other pockets have been found. The discoverers keep "whist" about the matter, but they shove up coin in a manner that indicates that somebody's pocket is plethoric.

NOTE THE FACT.—Jack Conant had a splendid group of claims; they were fine and desirable property; capital, big and strong, looked on with longing eye to purchase and possess; but they said give us a Government title and patent, and here is the coin. Jack saw the point; complied; is now the possessor of $150,000. The lesson is plain. Secure Government patents to your land and claims, mineral or agricultural; anything you own or claim in the land line.

Sierra.

NOTES.—Sierra *Tribune*, Jan. 26: The Kentucky mine has started up again. Jake Mess has the management of the mine. Four men are at work there. The San Luis company are receiving bids for a contract to run 200 feet in their drift. The snow in Sierra City has almost disappeared. The Sacred Mount Co. let a contract last week to Messrs. Langton, Thompson and Sharkey, to run their tunnel ahead 200 feet further.

Siskiyou.

RIVER MINING.—Yreka *Journal*, Jan. 30: More snow and rain, with warmer weather, is greatly needed for our miners to start a boom in taking out gold dust. We anticipate extensive operations in both placer and quartz mining as the days get longer and the weather moderates to prevent freezing each night. From the numerous prospectors in our mountains the past summer and fall, we anticipate the opening of several new claims the coming spring, both placer and quartz as soon as water becomes plenty for washing, and the roads are in better condition for taking quartz to mills for testing. The present indications promise a very light winter in the way of rain and snow, which will permit early operations in river mining the coming spring, while late spring rains are so customary when the winter is dry or sets in late, that placer miners may yet receive the benefit of a good supply of water.

San Bernardino.

THE NEEDLES.—Arizona *Journal-Miner*, Jan. 23: The Needles, since the recent discovery near there, in San Bernardino county, is dividing honors with Yuma, in this Territory, with her Harqua Hala strike, as the Mecca for miners, prospectors and capitalists. A project is on foot for the erection of a smelter at The Needles, since the recent discoveries near there.

Trinity.

RIDGEWAY.—Humboldt *Mail*, Jan. 26: The Ridgeway company now has a working capital of $25,000. With this amount for immediate use, Major Toms is very sanguine as to the future of the mines. The Ridgeway shaft is now down 240 feet, where the ore vein is five feet wide and the ore of high grade. Major Toms, who is superintendent of the company, will begin at once a tunnel of about 700 feet, to tap the ledge 5000 feet below the surface. This he expects to complete by the first of July. It will serve both for drainage and for tramway purposes, and will lead to the vicinity of the new ten-stamp mill, to be erected in the fall—probably in September. Meanwhile work will go on in the shaft, and the small mill kept running. Three eight-hour shifts will be put on, and the work will be pushed with all the energy that money can put into it.

Tuolumne.

STRIKE IN THE MARY ELLEN MINE.—Cor. Tuolumne *Independent*, Jan. 26: The sensation of the season over here is the rich find in the Mary Ellen mine. The vein in the upper level shows five to six feet of rich rock carrying heavy gold, and the value of the rock can be reckoned by the pound, and not by the ton. The tunnel has been driven about 17 feet since this bonanza was discovered, and the vein looks now as if it would increase in width. Groveland has long felt the need of a boom, and we hope the Mary Ellen will be one of the solid foundations on which it will rest. The river-hills near the Mary Ellen are full of location notices, and we hear of a number of prospectors who are to try their luck in the same belt of slate. This mine is now the property of A. B. Cruickshank, and he intends to erect a stamp-mill on it as soon as the season will permit, as he has plenty of rock in sight in his two tunnels to keep a mill going for a long time.

MILL RUNNING.—Cor. Tuolumne *Independent*, Jan. 26: The Black Oak mine is running its mill to full capacity. The vein is eight feet in width, and the output of ore has so crowded the mill that it was found necessary to discharge 11 miners, to maintain an economical balance of supply and demand. The rock is first-class, and the prospects were never better.

Tulare.

KEYS.—Tulare *Times* Jan. 24: The Keys mine, which is owned by J. J. Bowen of San Francisco, has redeemed its former reputation as being the richest mine in Tulare county. Al Harris & Co., the lessees, have struck immensely rich ore, which is paying about $2000 per ton. This mine it will be remembered was thought to be entirely worked out, and could have been bought for a song; but has by digging a short distance past the old works, turned out richer than ever. There are other old mines here, now lying vacant, which might by going down on them, turn out as well as the Keys.

Yuba.

REPORTED RICH FIND.—Nevada *Transcript*, Jan. 24: Jos. Miller, an old pioneer of this county, who has for many years been searching for a lost ledge near the Oregon House, is said to have found the object of his search recently, and will as soon as spring has opened take steps toward its development. The ledge is said to be four feet in thickness, carrying free gold and sulphurets. Mr. Miller claims that fragments crushed in a mortar in 1853, when the ledge was first discovered, yielded at the rate of nine cents per pound. There are many quartz ledges in that vicinity, and the attention of miners will doubtless be turned that way soon if this reported rich find proves to be a fact.

NEVADA.

Washoe District.

SAVAGE.—Virginia *Enterprise*, Jan. 26: On the 400 level the face of the southwest crosscut No. 2 is showing stringers of ore. On the 500 level the south drift from west crosscut No. 2 is in ore that averages $30 a ton. From No. 1 east crosscut on this level, in the south drift, ore is being extracted; also Nos. 2 and 3, east crosscut, 600 level. During the week have hoisted 447 tons of ore; have shipped to the Rock Point mill 339 tons; average battery assays, $21. Bullion on hand and previously shipped amounts to $18,104.

HALE & NORCROSS.—On the 550 level the north drift continues in ore of a good milling grade. The winze below this level is also in good ore. All the ore-producing sections between the 500 and 700 levels are looking and yielding well. The usual amount of ore has been shipped to the Carson river, but the usual amount was not reduced, as at the mills there was trouble for two or three days with floating ice, which, getting into the turbine wheels, caused delays. The average assays are nearly $20 a ton.

CON. CAL. & VA.—The stopes on the several levels from the 1400 down to the 1950 are looking well. On the 1650 level ore is being extracted from several floors. About the usual amount of ore has been extracted and shipped to the mills on the river, the battery samples of which will average about the same as last week.

ANDES.—The surface machinery has been overhauled, and underground work was resumed last Monday. This work is on the 175 level, the old drifts and crosscuts on which are being cleaned out and repaired with a view to their further extension. A new hoisting cable was yesterday placed on the reel.

CONFIDENCE.—The south drift on the 1300 level is still in a mixture of quartz and porphyry. The face of the joint Challenge and Confidence drift on the 300 level is still in quartz. The weekly shipments to the Brunswick mill amount to about 450 tons of ore of the average assay of over $28.

BELCHER.—Good headway is making in the drift on the 200 level since setting up the blower at that point. Are making good progress in the work of cleaning out the north drift on the 1100 level. There are no changes in the ground passed into at any point that are worthy of note.

BENTON.—The Benton Con. management is negotiating for the purchase of the hoist plant and building at the Ward shaft, owned by the Bullion Mining Co. The plant is one of the finest on the lode and is in first-class order.

CROWN POINT.—The new east crosscut (No. 2) on the 800 level continues in a vein material composed principally of quartz and porphyry. The work of cleaning out the south drift on the 1100 level continues.

YELLOW JACKET.—The usual shipments of ore are being made, and there is much good milling ore in sight at several points. Some prospecting work is still being done.

OVERMAN.—The usual amount of ore is being extracted and sent to the Vivian mill, Carson river. A good deal of milling ore is still in sight in the mine.

BALTIMORE.—The usual work is being done in the exploring drifts on the 350 level. The ore extracted is stowed away in the openings on the level.

CHOLLAR.—The usual amount of good milling ore is being extracted from the ore-producing sections, and the Nevada mill is running steadily.

ALTA.—The producing sections are yielding the usual quantity and quality of ore, and the mill is kept running to its full capacity.

SEG. BELCHER.—The usual progress is making in the joint south drift on the 1100 level. No change of material worthy of note.

CON. IMPERIAL.—On the 1100 (Yellow Jacket) level, east crosscut No. 2 continues in a mixture of clay, quartz and porphyry.

POTOSI.—A considerable amount of exploration work is being done on several levels, and a large amount of ore is in sight.

CHALLENGE CON.—On the 300 level the north drift, joint with Confidence, is being advanced at the rate of 30 feet per week in a material of favorable

appearance. Are shipping about 150 tons of ore a week to the Brunswick mill, the average of which is over $28 a ton.

GOULD & CURRY.—The exploring drifts on the 200 and 450 levels are passing into material carrying some metal.

JUSTICE.—The ore-producing sections continue to look well. The mill is able to reduce 40 tons of ore per day.

OPHIR.—The material in the south drift on the 1465 level continues in a mixture of clay, quartz and porphyry.

OCCIDENTAL.—About the usual quantity of ore is being extracted from the stopes on the 300 and 550 levels.

UNION CON. & MEXICAN.—Good headway is making in the main joint north drift on the 1405 level.

NORTH OCCIDENTAL.—The 250 and 400 levels are still yielding a considerable amount of milling ore.

SILVER HILL.—Preparations are being made for a resumption of operations in the old upper levels.

BEST & BELCHER.—East crosscut No. 2, 50 feet below the 300 level, continues in good ore.

UTAH.—The north and south drifts are still in vein matter of a promising appearance.

SCORPION.—The usual progress is being made in the west crosscut on the 400 level.

Belmont District.

BULLION.—Belmont *Courier*, Jan. 26: Lessee J. E. Severance shipped this week 12,254 ounces of silver bullion. This is very encouraging for Nye county. The Monitor Belmont mill has produced many large silver bricks this winter. The Barcelona mine at Spanish Belt continues to yield good ore and the work of development is pushed with energy.

Eureka District.

MISCARRIED.—Eureka *Sentinel*, Jan. 26: It seems that the project to start up the Eureka Con. furnaces under lease to Messrs. Donnelly and Davis has miscarried. They had secured the furnaces, arranged for the Dunderberg spice dump and were in readiness to come up and begin operations, when it was discovered that the Eureka Con. could not make such a bargain under its contract with the Richmond Co. without the consent of the latter. This, Mr. Probert refused to give; so at latest advices the whole scheme was considered to have fallen through. There will be no starting of the Eureka Con. furnaces by the gentlemen named unless some new arrangement is entered into. It is hard for the camp.

CONTRACT.—Another contract for 50 feet of the Ruby hill tunnel has just been let. Manual and Hooper are the contractors. The trustees of the company feel confident that not more than one or two contracts will be necessary to carry the tunnel into the ore belt.

Moss District.

MONTREAL.—Esmeralda *News*, Jan. 26: The Montreal mine is again coming to the front. Recent developments made tend to show that it will soon be yielding large quantities of the precious metal. Quite a lot of work has been done in the mine, and there is a ledge therein about 30 feet wide, carrying ore which assays all the way from $15 to $500 a ton in gold. The owners of the Montreal, in addition to their former working force, sent four men out to work on the mine last Thursday, and intend to thoroughly prospect it.

Pioche District.

RAYMOND.—Pioche *Record*, Jan. 25: One hundred and eighty-five feet of the Raymond shaft is timbered from the 200-foot level to within 15 feet of the surface, which will be reached in a few days. This covers a part of the shaft which always gave more or less trouble even when first used, as it was slightly out of alignment. This defect is now remedied and the shaft at this part is said to be in better condition than ever before.

Tuscarora District.

NAVAJO.—*Times-Review*, Jan. 26: Crosscut from west vein, 350-foot level, has been extended 23 feet. Upraise south of the stopes has been carried up 20 feet. The stopes on the different levels continue about the same.

COMMONWEALTH.—100-foot level: No. 2 east crosscut from south drift has been advanced 21 feet through vein formation. Intermediate drift from No. 4 chute has been extended seven feet, still developing good ore. 225-foot level: No. 1 west crosscut has been advanced 11 feet, being very close to the winze from the 150-foot level. Line crosscut has been advanced 16 feet in vein matter giving low assays. 300-foot level: No. 1 west crosscut has been advanced 18 feet through very favorable looking porphyry. Gangway has been advanced 11 feet; rock is hard blasting.

NEVADA QUEEN.—North drift, 450-foot level, has been advanced 20 feet; it is looking more favorable and assays better than for some distance back. The stopes continue about the same as last reported. East crosscut from west gangway has been extended 13 feet, showing a little mineral. Line crosscut 225-foot level of Commonwealth has been advanced 16 feet. The concentrating works have been kept running steadily and doing good work.

NORTH COMMONWEALTH AND DEL MONTE COMBINATION SHAFT.—The shaft has been sunk and timbered 11 feet the past week; total depth, 110 feet. A station is being cut out at 100 feet below the collar of the shaft and will be completed in a few days, when sinking will then be resumed. At 95 feet the shaft passed into and through about 10 feet of vein material, highly mineralized, a portion of it showing very high-grade ore.

BELLE ISLE.—Drift south from east crosscut, 250-foot level, has been extended eight feet. The vein shows an average width of over two feet. The assays average low grade. The general appearance of the vein is very encouraging. This vein has not been cut at any other point in the mine.

GRAND PRIZE.—East and south drifts on the 400-foot level are being cleaned out, and concentrating ore which has caved in hoisted and piled on the dump, assays from which show $35 per ton.

NORTH BELLE ISLE.—The working force has been doubled and greater progress will be made. There is no material change to report in any of the workings.

Wild Rose District.

A RICH STRIKE IN THE WILD GOOSE.—*Silver State*, Jan. 23: The mining news from Spring City is of an exciting character, and unless reports are exaggerated that camp will soon be booming. The most reliable information is to the effect that a four-foot vein of black sulphuret ore has been cut at a considerable depth in the Wild Goose, one of the Paradise Valley Co.'s mines. For some time past this mine has been producing a good grade of milling ore, and hoisting works were erected for the purpose of sinking a shaft to a depth of several hundred feet. In this shaft the vein of sulphuret ore was discovered, and it is said to be so rich that it will not pay to concentrate it for shipment. This new find has elated the people of Paradise as well as of Spring City, as lively times in the mines benefit the farmers, who can then find a market for all their products at home.

RICH ORE.—*Silver State*, Jan. 26: The ore body recently developed in the Wild Goose mine, owned by the Paradise Valley Co., averages four feet wide and $200 per ton. The extent of the ore body along the vein is not yet known, but it continues as far as the ground has been prospected.

ARIZONA.

THE HARQUA HALA MINES.—San Diego *Sun*, Jan. 23: Wyatt Earp and William Bryson have just returned from Harqua Hala mining region, about which there is considerable excitement just now, and Earp was seen by a *Sun* reporter this morning. "Bryson and I left here two weeks ago last Sunday," said Earp, in answer to questions. "We went by the Southern Pacific to a point in Arizona called Sentinel, 70 miles east of Yuma. At Sentinel we got rigs and an outfit and started for the camp, which is 65 miles due north. When we arrived there we found there was a camp of from 200 to 250 people, most of them living in tents. Anybody can see that the whole region is rich in minerals. I have visited a good many mining camps, and I do not know of any that showed better prospects than are to be seen there. The particular mine that has attracted attention is only a hole about six feet deep and six feet across. It is located on the side of a hill or knoll. It appears from what they say there that for years the Indians and Mexicans, and some white men, have been running over that ground prospecting. But they always hunted in the gullies and canyons, and never thought to prospect the hill. One day about two months ago a couple of miners were crossing the hill and sat down to rest. In some way they got to breaking the loose rocks, when free gold rolled out in chunks bigger than they ever saw before. Then they dug some and they claim they took out free gold in pieces a foot long. Those specimens were sent away before we got there, but I myself saw pieces as large as half of my head. Just before we came away Bryson was talking with one of the proprietors of the big mine, and told him he didn't want to take back simply a report, but would like something to show folks. The miner just jumped down in the hole and knocked off a piece of rock that showed the gold sticking out all through it. After these men had dug down six feet they stopped and put a price of $200,000 on the claim. They have been waiting for a buyer, but just as we were going away they had about concluded to go on with the mine themselves. They tell us that within six weeks or two months there have been taken out between $30,000 and $40,000 from that region, and I am willing to believe the story is not much exaggerated. In the Mojave Indian language Harqua Hala—I think it should be spelled Jarqua Jala—means flowing river, and an old Indian that comes into camp there says when he was a boy a river used to flow all the time at the foot of the hill. It is dry now, however, but by sinking a well a few feet plenty of water can be found. All the mining that has been done has been by the dry wash or placer mining, but there will be no trouble to get water for pan washing or hydraulic works."

BRITISH COLUMBIA.

ORE SHIPMENTS.—Donald *Truth*, Jan. 15: The Monarch mine at Field, up to Friday night, had shipped 325 tons of ore to the company's smelter at Vancouver. Supt. Davis has 30 men employed about the mine, and is pushing along as fast as possible outside work that will prevent delays during the winter from a too great depth of snow. The mine is looking well for the amount of development work done. While the value of the ore is not exactly known, it is safe to reckon it at $50 a ton, which would give a total value of $16 250 for the three weeks' output. The company's smelter is expected to start up early in January.

WORK TO BE RESUMED AT ANTHRACITE.—No better news for this section of country could be announced than that work is to be immediately resumed on a large scale at the Anthracite coal mines. It not only gives fair-pay work to many men who are now much in need of it, but establishes a base from which miners and prospectors can operate into the northern portion of Kootenay district. A great part of the coal goes to the sugar refineries at San Francisco.

JUBILEE MOUNTAIN.—Latest advices from the Jones & Wells camp are that they have over 200 tons of ore on the dump ready for hauling to the steamboat landing on the Columbia, distant six miles. They expect to haul 10 tons a day all winter. Capt. Armstrong's boats will have down-trip loads, as well as up-trip ones, as soon as navigation opens in the spring.

COLORADO.

LEADVILLE.—*Journal*, Jan. 24: The Haytrosser shaft, situated on the Big Pittsburg property and leased by Hewitt & Danforth for a period of five years, is now 360 feet in depth where the leasers are drifting in iron. They still intend sinking farther, where they soon expect to strike a large body of high-grade carbonates. The Maid of Erin mine is now working a force of 150 men—100 underground and 50 on top—shipping from 200 to 250 tons of ore per day. The Brookland shaft is working at present a force of 30 men, who are taking out and shipping about 15 tons of ore daily. The shaft has a depth of 640 feet. The company contemplates starting up its concentrating-mill about the first of the coming week and will employ a force of about 25 or 30 extra men to run it. The capacity of the mill is 100 tons every 24 hours. The Wolftone shaft of the Agassiz Con. M. Co. is being worked at present by 15 men. The company intends, however, putting on a large force of men as soon as the machinery can be put in place in the concentrating-mill. The mill requires about 100 men to run it to its full capacity. Shaft No. 6 of the Robert E. Lee, which is under lease to Mr. Robert O'Neil, is shipping from 15 to 20 tons of ore every day. The lessee is now running a drift expecting shortly to cut a fine body of ore.

DAKOTA.

LEACHING.—Deadwood *Pioneer*, Jan. 24: Leaching ore already roasted will begin at the reduction works to-day. The Golden Reward company is working a force of 18 men. Ore is being extracted from different places and daily forwarded to the reduction works. Returns from a carload of ore recently shipped to Omaha were received by the Double Standard Co. yesterday. Check accompanying shows the ore averaged $32 per ton. The company will continue shipments. An intelligent estimate of ore actually in sight in what is known as the Ruby Basin and Bald Mountain districts places the value thereof at $30,000,000. From the mouth of Fantail gulch to the base of Terry's Peak, 500 tons of ore can be mined daily. This is reliable and was obtained from an intelligent miner, who knows every foot of the ground. This ore will go from $20 to $100 per ton.

IDAHO.

NEARLY COMPLETED.—Idaho *Avalanche*, Jan. 26: The addition to the De Damar mill at this place is rapidly approaching completion, and will soon be ready to receive the machinery now at the mill. When ready to start up in the spring, the capacity of the mill will be about 30 tons per day. It is expected that a mill will be built at Wagontown this year, with a capacity of at least 100 tons a day, especially for ores from the Wilson mine. The Nellie Stoddard quartz mine is looking better than ever. The work now being done has developed the fact that what appears to be country rock turns out about $50 per ton in gold. There is no telling how extensive the mine is, and it is probably unlike anything ever found in the Territory. As depth is attained the ore gets richer. The width cannot now be determined. The pay chute has been traced on the surface for about 600 feet.

YREKA DISTRICT.—Wardner *News*, Jan. 19: Work on the Sierra Nevada is progressing with its accustomed vigor in tunnels A, B and C, the principal operations being confined to tunnel A. In this a large amount of stoping is being done and the ore procured is of so high a grade it needs no concentrating. Tunnel A has reached a distance of 450 feet and work on its further extension progresses daily. Tunnel B has been run 375 feet and tunnel C 360 feet. The hand jigs are no longer found necessary, the crusher being the only piece of machinery utilized in the mill, as all the ore now extracted is sent in a crude state to Wickes, Montana. The mine is looking better than ever; 40 men are kept constantly employed, and a shipment of 20 tons of ore is daily made.

PLACER CENTER DISTRICT.—The Granite Co. has found it expedient to close down its mill on Canyon creek, near Wallace, for the same reason given for the suspension of other concentrators, but work will be continued on the mine on Nine Mile on which the principal operations will be confined to the lower tunnel. This will be made the main working tunnel and will be driven to cut the ledge. The mine is looking splendidly and by the course now adopted work will progress to better advantage.

LA LANDE DISTRICT.—Supt. P. Clark of the Poorman mine, at Burke, found it necessary to suspend operations at the company's mill in consequence of the vast accumulation of concentrates and the lack of transportation facilities. A few men will be kept at work, but to increase the 500 tons of concentrates already on hand is deemed imprudent, until some means for their speedy shipment is made apparent.

BEAVER DISTRICT.—The Fay Templeton Co., at Delta, suspended work temporarily in its mill last Saturday, and will not resume until after the arrival of some new concentrating machinery. A small force of men will be kept employed developing the mine.

TIGER.—The Tiger mill and mine are still being worked, and with the exception of 10 or 12 men on the night shift, operations are progressing with wonted regularity.

MONTANA.

WHITLATCH UNION.—Montana *Mining Review*, Jan. 26: It is rumored on the street that a big deal is on, if indeed it is not already consummated, which has for a basis the world-famed Whitlatch Union mine, at Unionville, and other properties contiguous thereto. The purchasers are said to be a syndicate of Butte men, and some flying rumors connect some names of well-known St. Paul men with the transaction. This deal if conducted to a successful issue will infuse new life into this long-abandoned camp and revivify one of the richest suburbs of Helena. Last Friday the 60-stamp silver mill of the Alice company at Butte again commenced at its fullest capacity crushing ore from the Alice mine, after having undergone a period of partial idleness for the past several months. It is thought that the other 20 stamps of the company will also be in full operation within a month.

A COPPER DEAL.—Butte *Inter-Mountain*, Jan. 24: A new enterprise has been put on foot in this country which may result in adding another heavy copper producer to the long list of big mining enterprises here. For some time past Hon. John R. Toole of Anaconda, who is in the employ of the Anaconda smelting company, has been buying and bonding mines in the Camp Creek district, and it was supposed that he was acting in the interest of the Anaconda company. The mines bonded by Mr. Toole are, as stated, in the Camp Creek district, about twelve miles east of Melrose. They are called the Banner, Clipper, Columbia, Cecil, Clipper Fraction and Ben Lomond, and are owned by the Moffett Bros. and Messrs. Traynor, Ingram and Roberts. The mines have some of them been bought, and others bonded by the company in question, between $50,000 and $60,000 having already been expended. When the bonds are taken up, as Mr. Toole is confident they will be, the group will have cost the company in the immediate neighborhood of $100,000. In this enterprise Mr. Toole is acting for New York capitalists, and not for the Anaconda company as has been supposed. Mr. Toole is also financially interested, and will superintend the operations of the new company. The mines mentioned all carry copper ore running from 25 to 30 per cent. The principal amount of development done so far is on the Clipper and Banner, which are located on the same lead. Shafts have been sunk on these properties to a depth of about 100 feet, and the lead at the bottom is fourteen feet in width. A force of twelve men is now engaged in these two shafts.

SAN FRANCISCO.—Phillipsburg *Mail*, Jan. 24: In our last issue we mentioned the recent report of a strike in the San Francisco as being true and which has been predicted by so many. The main strike was on the 550-foot level. They had to run 18 feet to the vein. This placed them under the ore displacement where they have over two feet of good ore, one streak of this being exceedingly rich, averaging 350 odd ounces to the ton, heavily laden with ruby. The balance of the ore chute averages about 150 ounces, the latter carrying considerable antimony and galena. The vein is large, strong and compact. Little work has been done as yet on this strike. Mr. Smith went to Helena this week to purchase a new pump. A shipment of 21 tons of ore was made this week through Austin's sampler to the Omaha smelting and reduction works.

HELENA DISTRICT.—*Mining Review*, Jan. 26: Like many another, the Helena district has taken advantage of the favorable mood of the weather, and as a result much development work has been accomplished in that locality, some of which has added not a little to the material worth of the district.

ONLY DEPTH NEEDED.—From the developments of the past year it would seem that depth only is needed to assure the future of Helena district, and it would seem as if the prediction of a Colorado expert who visited this section last summer, that great depth would cause the different lodes of the district to concentrate into one vast body of ore, is destined to be verified.

THE HARD CASH.—During the latter part of the past week, at a depth of about 52 feet, the shaft on the Hard Cash lode encountered a fine body of carbonate ore, there being at the depth mentioned about 3½ feet of vein matter with ore on both the foot and hanging walls. Since the strike referred to the vein has been showing rapid improvement.

NEW MEXICO.

ORE.—Lordsburg *Liberal*, Jan. 26: A carload of ore will be shipped from the Bachelor mine to-morrow. A carload of high-grade copper ore was shipped this week from the Carlos mine to Belleville, by Vanhall & Greaves. The Mexico Mining and Milling Co., formerly the Viola Co., is steadily at work on its property at Pyramid. The work is under the management of O. E. Colby, who has a force of six men at work. The assessment work has been done on the Viola and the men are at work on the Penelope, extending the drifts on the 40 level. A carload of ore was shipped from the Penelope to the El Paso smelter last week.

OREGON.

THE MONUMENTAL.—Bedrock *Democrat*, Jan. 21: Mr. J. R. Bowick of the Monumental mine is in the city for a short stay. To the reporter he stated that the company's operations were progressing nicely, with one exception, that experienced miners are scarce and on this account they were experiencing no little difficulty. The company would increase their working force at once if miners were to be had. The mill is in fine working order and it is expected to commence crushing on ore from the Monumental the coming week. It is the intention, also, to do custom work and thus greatly benefit the numerous mine-owners in the vicinity.

SPARTA.—Mr. C. Cooper is one of the owners of the Little Pittsburg mine upon which a contract was let some time since for development work. The latest reports from the mine are very encouraging to the owners, and Mr. Cooper's visit there is to formulate arrangements for the erection of a mill on the property in the early spring.

UTAH.

THE FIVE-TWENTY AT OPHIR.—Salt Lake *Tribune*, Jan. 27: W. H. Hennefer returned yesterday from a trip to Ophir, where he has been inspecting the Five-Twenty mine. He says a five-foot vein of rich ore has just been struck, and thinks the property will develop into a big thing.

THE MINERS RESPOND.—The miners at the Brooklyn mine, Bingham, were the first to respond to the call of the Ore-Producers' Association for money to secure legislation to stop the importation of Mexican lead ores. R. G. Legg, superintendent of the Brooklyn, and each miner contributed one day's pay for this cause, and the result was shown in a check for $115.50 sent to the association. The promptness with which these men responded to the call shows that they understand fully what competition of peon labor means for American miners and mining interests. The association needs money to secure the desired legislation.

EUREKA MINE.—The Eureka mine has commenced the shipment of ores again after a stoppage of a short time on account of bad roads. The Centennial-Eureka is still holding its ores because of bad roads. This mine has considerable ore ready for shipping, but the company is not in a hurry about sending it out.

NEW LAST CHANCE.—The new Last Chance Co., Bingham, have their mill running steadily during the daytime, putting through 25 tons of ore per day. The concentrates being shipped bring from $50 to $60 per ton. Only enough miners are employed to keep the mill running during the daytime during the winter.

THE SMELTERS.—The Mingo smelter is running its stacks, while its receipts of ore are equal to keeping the smelter running at this rate. The Hanauer smelters are making their regular output of bullion, and find no trouble in getting a supply of ore.

MECHANICAL PROGRESS.

A Good Mechanical Suggestion.

The *Metal Worker* of a late date says:

Builders of special machinery may be excused for not informing their clients how to order duplicate parts. Those who make standard machines, however, would confer a very great favor on their patrons if they would, in addition to cuts of machines, publish in their catalogues sectional or skeleton views with the different parts numbered. Then, when a machine breaks down, the operator can order by telegraph, if necessary, giving the number of the part broken. Hardly any two machines from different shops will agree upon the technical name of an inferior or subordinate part of a machine, although they may always correctly designate the main working parts. Shop phrases and special terms are current in one establishment which are a totally unknown language when used in speaking to a workman employed in another shop. The language is still more mystical to the operator on the machine, who may not be a practical machinist, but in every other respect a trained workman, thoroughly competent and perfectly equipped to perform his task on it. Take, for instance, a steam hammer. The hammerman may be an expert in the use of the tool, but knows very few of the technical names of the parts. If his hammer breaks down he is at a loss how to describe the portion broken unless it is one of the main parts or he has been so long in his position that he has somehow picked up the terms employed. In his ignorance of the names used he would probably have to make a sketch of the broken part and send that by mail, or forward the pieces by express or freight and lose a great deal of very valuable time, which would be saved if he could order by number by telegraph. This is assuming that builders of machinery issue catalogues. All of them do not, however, it being a remarkable fact that some very important engineering establishments in this country consider a catalogue superfluous. When written to for a list of their standard machines they can only furnish photographs of a few, and make their customers work in the dark if they desire to order other sizes or patterns. The catalogue is an essential in a systematic dispatch of business, and next come the sectional views with numbered parts as an important chapter in the table of contents.

AN EMBROIDERY MACHINE.—A London paper says: Experts have long sought to devise a process whereby the delicate arts of the embroiderer could be added to the necessary requirements to which the sewing machine has been made to minister. Not a few times has the sewing-machine trade been aroused into eager expectation by the claims which oversanguine workers in this field have put forward for the latest product of their inventive fancies, but it would seem that an invention designed to meet this want has at length been cast in a more practical mold, and as no special skill is required in its manipulation, an embroidery apparatus may now be set up in every household. It is stated that the apparatus, which is of German origin, may be attached to sewing machines of almost every kind. It consists of a system of conducting-rods, with which the embroidering-frame is connected, and with which is combined the pantograph. By the aid of the pantograph the design is transferred on a reduced scale, the otherwise necessary tedious tracing on the cloth to be embroidered is no longer requisite, and with a single pattern the design may be embroidered *ad infinitum*. But in order to rightly appreciate the work which the new machine is capable of performing, it is necessary to have seen in operation a sewing machine fitted with it, for only by so doing can one fairly realize the wide extent of work, ranging from simple darning to the most complicated patterns in embroidery, which the machine is capable of performing. It need only be added that in order to secure a wide application for the new machine, an arrangement has been made with one of the largest sewing-machine companies to push its sale, and as the price is such as to induce every possessor of a sewing machine to make the slight outlay involved in the addition of the embroiderer, it is not unnaturally assumed that among the owners of the 5,000,000 sewing machines calculated to be in use in the United Kingdom, this new adjunct should find a ready sale.

TRANSMISSION OF POWER BY CABLE.—The transmission of power by cable, much in the same manner as a cable is applied in the transmission of cars, was recently put to practical test in Chicago, for the first time in America. In this case, however, instead of passing along from one building to another, the cable was conducted to widely separated parts of one large building on Market street, Chicago, and with the most satisfactory results. The cable used was a manilla rope seven-eighths of an inch thick and 750 feet long. The rope went round the driving-wheel and winding sheaves three times, and then was carried 150 feet north on 12-inch pulleys of the same pattern as with the North Side street-car cable. There it furnished power to a moving incline, and then was carried 200 feet south and thence eastward 75 feet, where it drove a barrel-lift. Eighty feet northward it furnished power to another barrel-lift, and then returned to the driving-wheel, where it moved a second incline. The slack in the rope was taken up by a sliding-wheel on the same principle as in the street-car cable. The driving-wheels had V-shaped grooves in which the rope was pinched and prevented from slipping. The cable was tested running at the rate of 1600 feet a minute. It was found that about five-horse power was taken up in driving the machinery when not loaded. The engine is 40-horse power.

Another Reported English Discovery.

It is well known that the great Bessemer process for converting iron was first discovered by an American ironworker of Pittsburg, Pa. We gave in these columns, a few weeks ago, the full particulars of the American invention and the manner in which, by his want of means, and the lack of confidence in his discovery by American capitalists to whom he applied for assistance, the poor inventor was compelled to part with his invention to the English inventor.

And now comes to notice another important discovery in working iron, to which we alluded a week or two since as having been made known by an English inventor. Under the head of "A Belated Discovery" the *American Manufacturer* says:

In our English letter published in the issue of December 14th, the correspondent gives an account of a discovery said to have been made recently by Mr. Chas. Wood, president of the Cleveland, England, Institution of Engineers This discovery, which Mr. Wood announced but a short time ago, is that it is possible by the addition of about 1½ per cent of silicon, white iron can be converted into gray, and that by regulating the proportion results similar to those effected in the aluminium and other alloys now so largely used in foundry work can be obtained.

In this Mr. Wood seems to have discovered a principle long known to American founders. It has been practiced in Pittsburg for at least ten years. High silicon iron has been made in Ohio for over 20 years, and Western founders used it in place of Scotch iron. For at least ten years the Licking furnace, at Newport, Kentucky, has made this iron from mill cinder, and in 1879 the managers of the furnace mentioned called attention to the chemical change which took place when the iron was used with old car-wheels and other hard iron. This fact was embodied in a circular sent to consumers generally at the time. The advantage of using a certain percentage of silicon to work up burnt scrap has been made the basis of numerous alleged discoveries, which enterprising men years ago, and even within the last few months, have attempted to foist upon Pittsburg founders. Hence it is certain that Mr. Wood's discovery is new only to himself, and in announcing it to the world he shows himself to be sadly behind American metallurgists.

A NEW PADLOCK.—Among the novelties put on the English market is a new padlock called the swivel, the object of which is to simplify the operation of locking. The swivel is reversible, so that the shackle can be opened from either side. A further advantage in the new lock is that, owing to there being no open space by the shackle, moisture is effectually excluded. Another English manufacturer is putting up sash cord in boxes, which have an opening in front, through which the end of the cord passes. This system is referred to as largely adopted by other English manufacturers, and is said to be far preferable to the old method of doing up the goods in hanks.

A GREAT INVENTION.—The slot device for ensnaring pennies, nickels, quarters and dimes originated in England, and was imported to this country by the ever-enterprising Erastus Wiman, who, it is said, owns the American rights of the invention. The patent is an extremely broad one, covering every possible application of the principle involved. The new automatic opera-glass attachment in theaters puts a royalty in Mr. Wiman's capacious pocket, just as the weighing-machines, lung-testers, etc., do.—*N. Y. Tribune.*

THE PRODUCTION OF IRON AND STEEL in France shows a steady decrease from year to year. The output in 1883 reached 3,570 000 tons, and dropped to 2,712,000 tons in 1887. The almost complete cessation of railway enterprise is accountable for the decrease in the demand for steel, and while six years ago the iron and steel works consumed over 6,000,000 tons of coal, they did not consume more than 4,000,000 tons last year.

A NEW PISTON has been patented by P. W. Williams for single-acting vertical engines, having as its object the ready removal of the fluid which condenses in the cylinders. The top of the piston is made with an inclined surface, so that the parts at the exhaust port are lowest, and the fluid collecting on the top of the piston is carried downward and blown out when the exhaust port opens.

A NEW TOOTHED WHEEL.—John T. Redington of Ambler, Pa., has invented a toothed wheel, which is so constructed and arranged that a tooth or teeth may be easily and readily removed in case they become injured or broken and new ones substituted. It is a very simple arrangement, but will undoubtedly prove of great advantage.

SCIENTIFIC PROGRESS.

THE REASON WHY.—Leguminous plants enrich the soil, according to Prof. Breal; but the nitrogenous principles which enter so abundantly into the constitution of plant-tissues are derived neither from the soil nor from the manure; while by their dead leaves and roots they enrich the soil by their reserves of nitrogenous matter. The knots or nodes on the roots are full of bacteria, and the latter are the intermediary agents by which the plant obtains its supply of atmospheric nitrogen. For example: if a soil be totally deprived of nitrogen, while containing the other elements of plant food, and some of these bacteria be sown therein, leguminous plants, lucern, peas, lupine, etc., will thrive, while plants not belonging to the same order will perish. However, in the case of cruciferæ, cabbage for example, the roots are often full of these nodosities too. Prof. Breal does not tell us if bacteria here play a parallel part. Perhaps the animalcule is not the same, just as in the case of hydrophobia, fever, cholera, etc., where each disease has its distinct disease-germ or microbe. When a few knots from the roots of lucern were crushed and then thrown in a medium devoted to peas, the roots of the latter became speedily covered with knots, and it was found that the percentage of nitrogen in the seeds had been augmented. Similar results followed with lupine. Now, when the latter was grown upon the same soil, but deprived of the artificially added bacteria, the lupine plants died off. Profs. Soxhlet and Weiske draw attention to the fact that when milk "turns" in a dairy where cattle are fed on grains or acid fodders, the cause is not to be sought for in the food, as the organic acids of the rations are burned and utilized in the animal's system, but in the microbes or germs produced by the fermentation of the food, and that they find their way into the milkpail.

SOUND, LIGHT, ETC.—Sound is the sensation produced on us when the vibrations of the air strike on the drum of our ear. When they are few, the sound is deep; as they increase in number, it becomes shriller and shriller; but (says a writer in the *Popular Science Monthly*) when they reach forty thousand in a second they cease to be audible. Light is the effect produced on us when waves of light strike on the eye. When four hundred millions of millions of vibrations of ether strike the retina in a second, they produce red, and as the number increases the color passes into orange, then yellow, then green, blue, and violet. But between forty thousand vibrations in a second and four hundred millions of millions we have no sense capable of receiving the impression. Yet between these limits any number of sensations may exist. We have five senses, and sometimes fancy that no others are possible. But it is obvious that we cannot measure the infinite by our narrow limitations. Moreover, looking at the question from the other side, we find in animals complex organs of sense, richly supplied with nerves, but the function of which we are as yet powerless to explain. There may be 50 other senses as different from ours as sound is from sight; and, even within the boundaries of our own senses, there may be endless sounds which we cannot hear, and colors as different as red from green, of which we have no conception. The familiar world which surrounds us may be a totally different place to other animals. To them it may be full of music which we cannot hear, of colors which we cannot see, of sensations which we cannot conceive.

FISH GILLS—THEIR COLOR, ETC.—Lift up the gill covers and under them will be seen a soft, dark-red mass, not unlike a slice of raw liver. This is part of the gills. Leave them for the present and open the mouth. To all appearances it is rather a small mouth in proportion to the size of the fish. Nothing worthy of notice will be seen at first, the only objects within the mouth being the tongue, which is quite small and hard, and a number of pink projections arranged in successive rows and looking like long and very slender teeth. By this time the water will have become much discolored and must be changed, a slight, dark-red stream continually oozing from beneath the gill covers. Before placing the fish in fresh water, take it to a tap and allow a stream of water to flow into its mouth and out at the gill covers. How is this? The scarlet hue of the head is rapidly paling, and in a few minutes disappears altogether. It does not belong to the living fish, although most persons assume that the scarlet hue is the normal color of the herring's head. The living fish is of a pure silvery white, as I have often had the opportunity of seeing. The red hue only shows itself after the fish has been removed from the water, and is due to the extravasated blood. Again look under the gill covers. The gills are there, but so altered as scarcely to be recognized as the dark-red masses which were seen before. They have lost all their color, the water having washed the blood out of them, and are now pale gray. Moreover, they are evidently not solid masses, but are composed of several layers, each layer being formed of a vast number of delicate plates, leaflets or laminæ.—*Longman's Magazine.*

SACCHARINE AS A SUBSTITUTE FOR SUGAR.—A commission of Paris doctors was recently appointed by the Minister of Commerce to examine into the properties and effects of saccharine as a food. The commission condemned its use. It is not only not a food, but its antiseptic properties render unalterable and indigestive whatever food it is mixed with. Hence it checks or retards the physiological actions which produce the change into sugar of the starchy food which may be taken into the stomach. Hence the decision that saccharine should not be used as food and cannot replace sugar—its use seriously disturbs the digestive functions and induces dyspepsia. As an offset Dr. Fahlberg, its discoverer, pronounces the report as cowardly and unfair.

PHOTOGRAPHING RIFLE BALLS.—The interesting process of photographing rifle bullets in motion, by means of the electric light, presents some remarkable phenomena, judging from the experiments made by Mach, the Austrian chemist. In this operation his plan is to illumine the bullet by letting it break an electric current formed, but the velocity of the bullet must exceed that of sound, in order that the conditions of the air before and behind the projectile can be shown. After various experiments he succeeded in his efforts to photograph projectiles fired by Wernal and Jurde guns, having respectively an initial velocity of 438 and 530 meters per second. The photographs obtained in this manner showed an air formation in front of the bullet, having the form of a hyperbole, while behind it almost a vacuum was formed, in which, when the initial velocity was very great, there were some curious spiral motions. From the description given, there appeared from these photographs to be a great similarity between the motion of a body through the water and that of a projectile through the air.

USE OF THE BEAVER'S TAIL.—It is a common belief that the beaver uses its tail as a trowel to plaster the mud on the walls of its house and dam. Capt. Hardy studied the habits of the animal in Nova Scotia some time ago, and came to the conclusion that this opinion was not well founded. The vulgar opinion that the broad tail of the beaver was used to plaster down the mud in its work has long since been pronounced erroneous. Its real use is evidently to counterpoise, by an action against the water in an upward direction, the tendency to sink, head foremost, when propelling itself through the water by its powerful and webbed hind feet, and at the same time supporting the load of mud or stones in its forepaws under the chin. Our Indians laughed at the idea of the trowel story. That and the assertion that the tail is likewise used as a vehicle for materials may be considered as exploded notions.—*Youth's Companion.*

STILL ANOTHER ALLEGED IMPROVEMENT IN TELEGRAPHY.—There has lately been invented a new system of synchronism which, it is claimed, will make it cheaper to telegraph messages than to mail them. Dr. J. Harris Rogers of Washington, D. C., is the inventor, and he claims that the world will be almost revolutionized by his discovery. The new system, Mr. Rogers says, reduces the English alphabet to ten elementary characters. The messages are prepared by means of a machine resembling a typewriter and manipulated in the same manner, and by the use of ten keys, one for each character, any desirable message can be written. A test of the new apparatus was lately held at New York, and a message of 76 words was sent in 25 seconds, and printed on a tape in plain Roman characters. The inventor says that he can by this system make one wire do the work that ten do now by the system in vogue.

BIRDS AS VENTRILOQUISTS.—At a recent meeting of the American Ornithologists' Union, Mr. Ernest E. Thompson of Canada said that some birds, especially sparrows, have ventriloquial powers. Birds, when surprised in the act of singing, will be silent for a moment, and then give forth a faint song that seems to come from a distance, though the singer be not farther than ten feet away. Thrushes and robins, the lecturer said, also have this power.

EARLY FOOD USE OF OYSTERS.—In cleaning out the lower levels of the caves at Dordogne, in France, there were found a great many oyster shells piled in such a manner as to show that the Neanderthal man used the bivalve as a common article of food. The oyster is thus demonstrated to be the oldest domesticated delicacy known to man.

ANOTHER COMET DISCOVERED.—A telegraphic dispatch received by the Director of the Lick Observatory states that a faint comet was discovered by Wm. R. Brooks at Geneva, N. Y., on Jan. 15th, at 14 minutes past 11 o'clock in the evening. Its position was right ascension 18h. 4m. and declination 21° 2'. Its motion was rapid westerly.

EXPLORING CENTRAL CHINA.—M. Martin, a French Siberian explorer, will soon start on an expedition to Central China and the unexplored regions of Eastern Thibet. He will have a small escort and will carry with him a complete outfit of astronomical and topographical appliances. He will be gone three years.

A LUSCIOUS SPRING.—It is said that a spring of natural cologne has broken forth in the southern part of Algiers The liquid has not been analyzed, but its odor is very similar to that of patchouli.

USEFUL INFORMATION.

Why Pianos Get Out of Tune—A Growing Plant a Remedy.

"This is the time of year when we are driven nearly crazy with work," said a tired-looking piano-tuner to a New York *Sun* reporter. "Everybody wants his piano tuned for Christmas, and most of them forget about it till the last moment. And besides being the busiest season, we have been having the most trying weather. These cold, dry days throw pianos out of tune every time, and besides that the sounding-boards are beginning to split. It always surprises me what poor care most people take of their pianos. Let a man buy an expensive watch, and he'll treat it as though it were a live thing, but people don't seem to realize what a delicate piece of mechanism a good piano is. Pianos are not affected so much by heat or cold as they are by dryness and dampness. Of course, if you stick one end of a piano up against a stove, or a heater, or a register, and let the other end come near a cold, leaky window, it'll raise Ned with it, but most people are on to that. The trouble is, the piano is too dry.

"You know the sounding-board—the life of a piano—is forced into the case when it's made so tightly that it bulges up in the center, or has a 'belly,' as we call it, on the same principle as a violin. The wood is supposed to be as dry as possible, but, of course, it contains some moisture, and gathers a lot more on damp days and in handling. Now, when you put a piano in an overheated, dry room, all this moisture is dried out, and the board loses its 'belly,' and gets flabby, and finally cracks. Even if it doesn't crack, the tone loses its resonance and grows thin and tinny, and the felt cloth and leather used in the action dry up, and the whole machine rattles, and everybody kicks.

"How can you prevent it? Easily enough. Keep a growing plant in the room, and so long as your plant thrives your piano ought to, or else there's something wrong with it. Just try it, and see how much more water you'll have to pour in the flower-pot in the room where your piano is than in any other room. Some people keep a huge vase or urn with a sopping-wet sponge in it near or under the piano, and keep it moistened, just as a cigar dealer keeps his stock. They keep this up all the time the fires are on."

DIFFERENCE BETWEEN WOOL AND HAIR.—Although there is a very great difference between wool and hair, it is found quite difficult to correctly explain what that difference is—the one sometimes seems to run almost imperceptibly into the other. A correspondent of the St. Louis *Globe-Democrat* furnishes the following very interesting paragraph on this subject: The difference between wool and hair is not so great as might be supposed, since very fine hair bears a strong resemblance to very coarse wool; but when the microscope is brought into operation a marked difference may be observed. The surface of the hair will appear to be perfectly smooth, as though it were polished, while the surface of a fiber of wool is imbricated, as though the trunk were covered with infinitely small scales. A hair is therefore seen to be an entirely different thing from a fiber of wool; and a further variation is noticed in the fact that hair never curls in the way wool does, for hair—when it is curly at all—curls in long, wavy lines, and wool in short half circles, which almost return into themselves. The texture of wool is also varied by fine lines, from 2000 to 4000 in the inch; so, by means of the microscope, wool may be easily known from cotton or any other animal or vegetable fiber.

AN ECONOMICAL CONTRAST.—In 1816 one bushel of corn would buy one pound of nails. In 1889 one bushel of corn will buy ten pounds of nails. In 1816 a pair of woolen blankets cost as much as a cow; in 1889 a cow will buy five pairs of woolen blankets. In 1816 it required sixty-four bushels of barley to buy one yard of broadcloth; in 1889, sixty-four bushels of barley will buy twenty yards of broadcloth. In 1816 it took twenty dozen eggs to buy one bushel of salt; in 1889, twenty dozen of eggs will buy ten bushels of salt. In 1816 it required one bushel of wheat to buy one yard of calico; in 1889, one bushel of wheat will buy twenty yards of calico. With these figures before them, who can justly claim that farm products are not improving? The outlook for the productions of the farm is certainly hopeful. The farmer can exchange his crop for more of the necessaries and luxuries of life than at any former period in the history of our country. Let farmers take courage; what they produce will always bring money or a large equivalent in needed supplies for the family.

A POINT IN STONE BREAKING.—It is well known that a stone, however large, may be broken by striking a sufficient number of blows with a hammer along the line where it is desired to break the stone. In this process the force of the blow is expended in gradually weakening the cohesion of the particles in a line following the direction of the blows. This weakening is increased by each successive blow until finally rupture occurs.

TESTING ROOF SLATES.—A German trade journal advocates the following method of testing the quality of roof slates: The samples of the slate to be tested should be carefully weighed, and then put into boiling water for a quarter of an hour. The water must, however, be fairly free from lime, saltpeter and ammonia. The slates are then reweighed, and those that show the greatest increase of weight are those most capable of resisting deterioration.

BREAKING UP SHIPS.—The Norwegians break up worn-out wooden ships in a singular way. They take the vessel to some dangerous point on the coast, and anchor it there, leaving it to be broken into bits by the sea in the first heavy gale. The fragments are carried ashore, and are collected and sold at good rates for firewood.

A GOOD EXAMPLE.—The German Empress wears an apron at home as a token that she attends to the children and the cook, and does not meddle with social and political questions, nor seek to win a place in the intellectual world.

THE LAW ABOUT POSTAL-CARDS.—Persons sending postal-cards who write upon the address side of them "in haste," or other words unconnected with their delivery, subject them to letter postage, and they are held as unmailable.

PEACH-STONES FOR FUEL.—In Vaca valley some of the farmers are burning peach stones for fuel. They find them equal to a good quality of coal and cheaper, as the price of the peach-stones is only $6 per ton.

INDIANS.—It is a curious fact that there are as many real Indians in New York State as in Minnesota—about 500.

BLINDERS FOR HORSES.—In Russia, where blinders are never used on horses, a shying horse is almost unknown.

GOOD HEALTH.

Health of the State.

We collect from the monthly report of the State Board of Health for December the following information in regard to the general health of the State:

Mortality reports received from 75 cities and towns within the State give collectively the number of decedents as 917, in an estimated population of 700,600 exclusive of those towns reporting no deaths, having a population of 10,500, so that actually in a population of 719,100 the mortality gives the exceedingly low percentage of 1.27 per 1000 for the month of December, when the death rate is expectedly increased everywhere within the temperate zone. If our mortality reports were reported as they should be, from every village and town in the State, we have no doubt the same condition of diminished mortality would be found. We trust the Legislature will see the importance of so amending our health laws that reliable statistics may be obtained, as by them we can demonstrate clearly the advantages of California as a health resort.

Reports received from 65 towns indicate, with few exceptions, that the amount of sickness is very limited, and what does prevail is of a mild and not serious character. This may be owing to the favorable temperature throughout the month, which was not characterized by any sudden changes.

Diarrhea and dysentery have subsided almost everywhere. Cholera infantum is almost entirely absent from the State, or so seldom met with that it is no longer reported. Measles is reported in several places, but the number of cases is very limited, and it is no longer epidemic.

Scarlet fever is more widely diffused, but in a very mild form.

Diphtheria occupies quite an extensive range. Dr. H. N. Miller, writing from Colfax, says that 13 cases came under his observation during the month, but the type is mild. We have yet to learn upon what factor or factors the type of an epidemic depends, and, again, to what we owe the appearance of certain diseases in regular cycles, appearing and disappearing with a certain regularity that has so far baffled the sanitarian.

Croup accompanies diphtheria with unfailing regularity, almost compelling us to believe in the identity of the diseases.

Whooping-cough was in North Bloomfield, Lodi, Angels Camp, Anderson, Downey, Placerville and San Francisco.

Erysipelas was observed in Red Bluff, Fresno, College City, Cedarville, Newcastle, Downieville, Sierra City, Lincoln, Truckee and Lockeford.

Typhoid fever is reported in quite a number of localities. The range over which typhoid fever prevails would indicate that sanitary defects exist in these places that ought to be remedied. Typhoid fever is, of all diseases, the most preventable, and if the Sanitary Inspector, which the State hopes to appoint according to law, does nothing but instruct the people how to keep clean and prevent the development of typhoid, he will have earned his salary and saved the State many thousands of dollars.

Remittent fever is mentioned as prevailing in many places, but in type is not severe and mortality very limited.

Pneumonia still prevails to a considerable extent, but is not nearly so prevalent as it was in November.

Continued Evidence of Cancer Cures.

Since the publication of the pamphlet "On the Curability of Cancer," which was issued from the office of the MINING AND SCIENTIFIC PRESS in October, 1887, and contained the names of a large number of patients who have been pronounced by well-known physicians of this city as afflicted with cancer, and who were subsequently *cured* of that dread disease by Mrs. Dr. Cook of 224 Post street, San Francisco, there have, from time to time, been discharged as cured of the same disease no less than *forty* in number, nearly every one of which cases had been pronounced genuine cancer by competent physicians, before being treated by Dr. Cook. All these names, with their postoffice addresses, have been placed in our hands. There are several other cases who are unwilling that their names should be given out. There are also now under treatment many persons who are in a fair way of recovery.

Of course, during this time the doctor has lost quite a number of patients, all of whom, however, have come to her in a late stage of the disease and after they had been for a longer or shorter time under the care of other physicians. Not a patient has been lost who has sought her aid in anything like an early stage of the disease or before having submitted to other and severe treatment.

After the large number whose names and addresses have already been given, with more or less full particulars in regard to the cases, it would be superfluous to give either the names or particulars of these many added cases. Suffice it to say that they have all been added to the list within the last 15 months, and that the list is open to the inspection of any who may choose to call for that purpose. We will also furnish it to any who may desire to receive it by mail. We make this statement as a general answer to the numerous queries as to whether we still have the same faith in this treatment as we did two years or more ago when we first entered upon this discussion.

THE CAUSES OF BOILS.—A boil may attack any portion of the body, but it oftener appears on the neck than on any other part, and no spot seems to the patient so undesirable to have it as the very one upon which it is located. The causes of these painful visitations are not well understood. They occur not only in the debilitated, but in those who are seemingly in ordinary health. Some writers assume that they are the result of a low and depraved state of the system induced by general debility, excessive fatigue, nervous depression, improper food and exercise, irregularity of the functions of the body, and the like. Not unfrequently they appear on athletes while training. There are certain diseases—among them diabetes—during the course of which boils, singly or in corps, are quite apt to occur. They are also noted in skin affections, which are characterized by severe itching; the constant irritation of the skin seems to invite their appearance. Certain medicines when used externally are capable of producing an eruption of boils. One writer says: "To judge from the previous observations, I think I may say that individuals who have a rough skin, thick, dark hair, and a vigorous growth of hair, are more predisposed to the formation of furuncles."—*Boston Journal of Health.*

TOBACCO SMOKE.—In the country districts of England, 40 or 50 years ago, it was universally believed that tobacco smoke was a prophylactic against fever. Nurses smoked at the bedside of fever patients, and friends were called in to take a hygienic pipe in the sick-room. The superstition has been dissipated by the known results of careful scientific investigation. It has, however, been revived in Florida by the reported fact that not a single cigar-maker has been attacked by yellow fever throughout the course of the epidemic, which has ravaged Jacksonville so terribly. The physicians there, it is said, recommend tobacco smoking as preventive, even women being advised to take an occasional cigarette as a precautionary measure. This will prove a pleasant doctrine to smokers, who will argue that the greater includes the less, and if tobacco will keep away the infection of yellow fever, it will serve as a preventive to other minor maladies as well. So it will. 'Tis fear kills more than infection, and in a believer's mouth a pipe may be an antidote to fear.

A POISON STOPPER.—An ingenious stopper has lately been patented for use in bottles containing poisons. The stopper is made of india-rubber, and is surmounted by a perforated ball of india-rubber, brightly colored so as to render it distinctive in the light, and containing a bell which rattles when the bottle is moved, thus drawing attention to the character of the contents even though it be impossible to see the label. Such a warning stopper would have rendered impossible many of the accidents which have, from time to time, taken place, notably one a few months ago, when a distinguished surgeon lost his life owing to a mistake as to a bottle containing poisonous medicine.

ENGINEERING NOTES.

SLIPPING OF LOCOMOTIVE WHEELS.—The *Railroad Gazette* thus effectually disposes of a current fallacy: "The statement that engines slip continually while running at full speed is often made, but almost invariably by persons of no practical experience, who appear to be unaware that any slip of the drivers can be instantly detected by an engine-runner. Any one who has run a fast train knows that on entering a damp tunnel, slipping occasionally occurs, but the vibration imparted to the engine is so peculiar that no one who has once felt it is likely to fail to recognize it again. Messrs. Abbey and Baldwin, when making some observations on the running of a Jersey Central express passenger engine on the Bound Brook route, found that the slip at high speed was practically nil. The wheels, as calculated from their diameter, should give 298 98 revolutions per mile. A counter showed that 298 62 revolutions per mile had been actually made, the difference being negative and only one-third of a revolution per mile, or within the limits of errors of observation. As these engines are run very hard and made to do their utmost, it might reasonably be expected that they would show slip, if any existed, at high speed. It is, therefore, reasonable to suppose that any contiguous slipping at high speed is non-existant. The continuous slipping theory is supported by so very little evidence, either practical or theoretical, that it must take its place among the numerous other pseudo scientific delusions."

THE GREAT FRENCH LOCAL CANAL, about which much has been said of late, between Bordeaux on the Atlantic and Narbonne on the Mediterranean, will cost some $130,000,000 and will be about 330 miles in length. It would save a detour *via* Gibraltar of about 700 miles. The plan contemplates a canal with a railroad along its banks, by means of which locomotives could be used to tow the canal boats, by means of which, it is believed, a speed of about seven miles an hour could be kept up night and day—electric lights being used by night. The business of such a canal would be very large. There would be 38 locks required and a depth of 27 feet of water, sufficient to float the largest merchant ships, and even the most of armor-clad warships. It would have been far better for De Lesseps and France if he had devoted his energies to such a home-work instead of wasting them, as he has probably done, in his Panama canal.

TURNING THE ALLEGHANY RIVER.—John McLaren, a Pittsburg lawyer, has suggested a novel scheme to the authorities of Pittsburg and Alleghany City. He wants to turn the Alleghany river from its proper channel. The river separates the two cities. Mr. McLaren's plan is to have the Alleghany leave its proper course at Sharpsburg, north of Alleghany City, wend its way through the valleys back of Alleghany, and join the Ohio river at Jack's Run. Geologists are credited with saying that this was the original course of the river. The change would make a tract of land about a mile wide and seven miles long through which the streets of Pittsburg and Alleghany could be made to connect. Twenty years ago a civil engineer suggested this idea and made plans for carrying it out, with the proviso that he was to receive a portion of the new-made land.

A NEW MEXICAN RAILROAD PROPOSITION.—Among the numerous railway enterprises which continue to be made public, one of the most ambitious is that of the Mexican Pacific, which contemplates a line from San Diego, Cal., southeast to the Gulf of California, thence south along the coast to Mazatlan and thence to the City of Mexico, a total distance of some 1900 miles. Such a line would run through regions abounding in coal, valuable woods, cotton and woolen manufactories and many other sources of traffic, while it would reach a vast population to whom a railway is unknown.

THE ELECTRIC LIGHT IN GERMANY.—Tests have recently been made in Germany with the electric light for night firing. The targets were placed 400 meters from the rifleman, and the powerful light 200 meters behind the position of the rifle. The results were most satisfactory, nine out of ten shots fired hitting the target. The electric light is making great progress in Berlin, the number of lamps now in use there being about 25,000, against 850 at the end of 1886.

THE DANISH SOUND TUNNEL has found a successor in the shape of a projected bridge across the sound at its narrowest place, between Elsinore in Denmark and Helsinborg in Sweden. The distance is a trifle over three miles and the greatest water depth only 70 feet.

RAILROADS IN SIBERIA.—A powerful American syndicate is about to be formed for the purpose of building roads in Siberia. Besides a large subsidy, the Government will give $3,000,000 yearly for the transportation of mails and convicts.

RAILROAD INCREASE LAST YEAR.—A total of 5790 miles of new road was added to the railroad system of the United States last year.

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SAN FRANCISCO
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TABLE OF CONTENTS.

EDITORIALS.—A 40-Inch Telescope; Underground Telegraphing, 71. Passing Events; Annual Mining Review, 78-82.

ILLUSTRATIONS.—Drilling at the Face of the Drift; At the Mouth of the Tunnel, 71. Fig. 1.—Suspension Hoist for Quarries; Fig. 2.—General Arrangement of Double Cable Suspension Hoist for Large Open-Cut Workings, 73.

CORRESPONDENCE.—Value of Montana's Product; White Oaks, New Mexico; Mines and Mills Near Kernville; That Lake of Volcanic Glass, 72. Washington Territory Mines, 73.

MISCELLANEOUS.—Suspension Hoists in Mining, The Water Walker; Monkeys as Coin-Testers; Why Tinware is Cheap; Reducing Ores on the Comstock, 78.

MECHANICAL PROGRESS.—A Good Mechanical Suggestion; An Embroidery Machine; Transmission of Power by Cable; Another Reported English Discovery; A New Padlock; A Great Invention; A New Toothed Wheel, 76.

SCIENTIFIC PROGRESS.—The Reason Why; Sound, Light, Etc.; Fish Gills; Saccharine as a Substitute for Sugar; Photographing Rifle Balls; Use of the Beaver's Tail; Still Another Alleged Improvement in Telegraphy; Birds as Ventriloquists; Early Food Use of Oysters; Another Comet Discovered; Exploring Central China; A Luscious Spring, 76.

USEFUL INFORMATION.—Why Pianos Get Out of Tune; Difference Between Wool and Hair; An Economical Contrast; A Point in Stone Breaking; Testing Roof Slates; Breaking Up Ships; A Good Example; The Law About Postal-Cards; Peach Stones for Fuel; Blinders for Horses, 77.

GOOD HEALTH.—Health of the State; Continued Evidence of Cancer Cures; The Cause of Boils; Tobacco Smoke; A Poison Stopper, 77.

ENGINEERING NOTES.—Slipping of Locomotive Wheels; Turning the Alleghany River; A New Mexican Railroad Proposition; The Electric Light in Germany; Railroads in Siberia, 77.

MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 74-5.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 86.

Business Announcements.

[NEW THIS ISSUE.]

New York Belting and Packing Company.

☞ *See Advertising Columns.*

Passing Events.

A double edition of the MINING AND SCIENTIFIC PRESS is published this week in order to make room for our annual review of the mining industry. This number is a good one for our readers to send to friends, and also to file for reference.

The idea of having a State Commission on Mining Debris, as proposed by a bill in the Legislature, does not appear to meet with the approval of the members from the mining counties, who think the Government Commission now at work will do all that is necessary toward investigating the subject.

The public mind is agitated just now over the difficulties in the Samoan islands and the possibilities of trouble with Germany. Work is being hastened on the warships building in this city and elsewhere in case they should be shortly needed for service in the South Pacific.

All over this coast a rapid industrial development is going on. New factories, workshops, and other industrial establishments, are being started in the many growing cities and towns, and much capital is being invested. These are adding largely to our industrial population, greatly to the benefit of the country.

Annual Mining Review.

Operations and Conditions of the Industry in 1888.

The mining industries and interests of the past year have throughout all our Pacific States and Territories been fairly prosperous. The output of bullion amounts for the year to $114,341,592, being the largest annual product ever made by $9,695,633. On this product the net profits have also been larger than usual—a result due to causes that will further on be pointed out.

While the bullion product has been so considerably increased, this increment does not denote the most significant gains of the year. These consist in the greater caution, economy and generally improved management that have marked the business of mining. In this respect satisfactory advancement has been made in every section of the country and in every department of the industry.

Although the past year has not been distinguished by any great mineral discoveries or other specially notable events, it has not been lacking in enterprise and progress. During no preceding year has more attention been paid to mining nor more money been put into the business with a view to reaching practical results. The spirit of speculation has year by year been subsiding, until it seems now hardly more rife in this than in several other leading industries. Compared with operations in oil and railroad shares, deals in wheat, or even with real estate ventures, mining for the precious metals seems a staid and sober pursuit. The business of speculating in mining stocks has everywhere dwindled to small proportions, so small on this coast that they no longer work here any grave mischief.

Output of Bullion in 1888.

As embodying the most reliable information on the subject we present here the report of J. J. Valentine, general superintendent of Wells, Fargo & Co.'s express, showing the bullion product of the Pacific Coast during the past year:

STATES AND TERRITORIES.	Gold dust and bullion by express.	Gold dust and bullion by other conveyances.	Silver bullion by express.	Ores and base bullion by freight.	Total
California	$9,100,093	$ 916,008	$ 652,652	$31,304,725	$42,073,478
Nevada	2,810,566	100,000	6,938,530	2,570,805	12,419,901
Oregon	691,112	30,000			721,112
Washington	94,112	820,000		120,000	1,034,112
Alaska				820,000	820,000
Idaho	2,685,000		3,700,000	8,695,000	15,080,000
Montana	6,100,000		11,600,000	22,276,000	39,976,000
Utah	277,720		3,479,138	3,500,383	7,257,241
Colorado	3,100,000		17,725,100	6,930,400	27,755,500
New Mexico		50,000	183,641	2,782,040	3,015,681
Arizona	712,610	100,000	860,788	3,460,470	5,133,868
Dakota	2,300,716	100,000	468,216		2,868,932
Mexico (West Coast of)	9,00		1,196,673		1,205,673
British Columbia	479,400				479,400
Totals	$27,622,020	$2,116,008	$46,598,738	$83,004,896	$114,341,592

The gross yield for 1888, shown above, segregated, is approximately as follows:

Gold	26.65	$30,468,052
Silver	47.53	54 348,420
Copper	15 97	18,261,490
Lead	9.85	11,263,630
Total		$114,341,592

In regard to the probable accuracy of the above tables and the increasing difficulty of obtaining exact data on this subject, Mr. Valentine remarks as follows:

"The facilities afforded for the transportation of bullion, ores and base metals, by the extension of railroads into mining districts, increase the difficulty of verifying the reports of the products from several important localities. Especially is this the case in the reports from Colorado and Montana. And the general tendency is to exaggeration when the actual values are not obtainable from authentic sources; but the aggregate result as shown herein we think may be relied on as being approximately correct."

Mr. Valentine also furnishes a statement of the annual product of lead, copper, silver and gold in the States and Territories west of the Missouri river from 1870 to 1888 inclusive:

YEAR.	Production as per W. F. & Co.'s statements, including amounts from British Columbia and west coast of Mexico.	Product after deducting amts from British Columbia and west coast of Mexico.	The net products of the States and Territories west of the Missouri river, exclusive of British Columbia and west coast of Mexico, divided, is as follows: LEAD.	COPPER.	SILVER.	GOLD.
1870	$ 54,000,000	$ 52,150,000	$ 1,080,000		$17,220,000	$33 750 000
1871	58,284,000	56,784,000	2,100,000		34,398,000	34,177,395
1872	62,236,269	60,831,324	2,250,000		27,453,302	38,460,458
1873	72,536,603	70,130,863	3,450,000		39,968,194	39,066,558
1874	74,401,045	71,965,610	3,800,000		42,896,935	38,177,395
1875	80,889,067	76,703,433	5,100,000		31,635,239	39,202,424
1876	90,675,173	87,219,859	6,040,000		39,202,424	44,896,935
1877	98,421,764	96,811,582	6,785,250		44,896,935	45,846,109
1878	91,154,922	79,458,587	4,482,000		37,285,857	37,976,080
1879	93,187,036	77,239,512	5,742,200		34,038,057	37,976,080
1880	93,187,036	84,604,417	5,742,200		34,038,057	37,976,080
1881	84,604,417	81,198,474	6,361,002		42,987,613	30,653,959
1882	92,411,835	89,207,549	8,008,155		48,139,039	29,011,318
1883	90,313,612	84,633,212	8,163,550		42,975,101	27,816,640
1884	84,976,954	81,633,395	6,384,091		43,529,925	26,158,567
1885	90,181,260	87,321,382	8,662,991		44,516,599	29,393,756
1886	103,011,701	100,160,222	9,136,192		59,158,851	29,561,424
1887	104,646,519	103,327,770	9,631,073		60,383,854	32,500,687
1888	114,341,592	112,666,569	11,263,630		55,153,747	29,987,702

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, $25,793,207; from Marseilles, $1,128,688; from Venice, $———; from San Francisco, $14,621,431. Total, $41,543,326, as against $43,006,618 last year. Pounds sterling estimated at $4.84.

Comparing the bullion product of 1888 with that of the preceding year, the following losses and gains have, according to Mr. Valentine's reports, taken place: Montana has gained $6,892,725; Colorado, $3,462,500; Nevada, $2,073,150; Idaho, $445,000; west coast of Mexico, $434,588; and Alaska, $211,000. The losses are: California, $1,599,455; New Mexico, $1,019 956; Arizona, $647,682; Oregon, $248,434; Dakota, $114,673; Utah, $80,489; British Columbia, $76,754; and Washington, $35,888, the aggregate gains amounting to $9,695,633.

Comparing the gold product of these two years, there is seen to be a falling off of $3,607,970, while the value of the silver product has been increased $2,770,302; of the lead, $1,632,557; and of the copper, $7 893,744, the most notable feature of these statistics being the largely increased value of the copper product, caused by the late remarkable advance in the price of that metal.

CALIFORNIA.

While the bullion product of California has so fallen off during the past 12 months, she still remains much the largest gold-producer of any of our States or Territories, her output of that metal last year being nearly twice as much as that of Montana, the next largest gold producer on the list.

The largest portion of our gold now comes from the quartz mines. The quartz mining industry was never in a more flourishing condition than now in California. Ore is being worked very cheaply, and the business is conducted on closer and better principles than formerly. It would be impossible in the brief space at our disposal to give consideration to the very many individual quartz mines in the State, and as we have given weekly reports concerning them in our "Mining Summary," it is scarcely necessary.

Of these the year under review has been prolific, there being no branch of mining but has had its full complement of novelties and inventions. Every method, implement and appliance employed in ore extraction and reduction has been revolutionized or radically improved, if the claims of innovators and inventors may be admitted as tenable; and that material progress has been made in this direction cannot be denied. In almost everything some betterments are to be noted—in the rock-breaker and ore-feeder; in the crushers, mortars and amalgamators; in the roasters, concentrators and settlers; in the water-wheels and other motors, more especially in the application of electricity to the transmission of power and the propulsion of machinery. While a few of these new methods and devices have been devoid of merit or of doubtful value, the majority of them have proved of unquestionable utility, a few of the first importance, the gains they have worked to mining being vital and permanent. As will naturally be inferred, the number of patents issued for this class of inventions has, during the past year, been unusually large.

Drift Mining.

This branch of placer mining continues to be confined almost wholly to California, it being here only that the deposits adapted to be worked by this method are found on a large scale. Of the placer gold produced in this State, nearly one-half, since the general suspension of hydraulic mining, is obtained by drifting. The latter has, in fact, since, and partially by reason of the suspension of hydraulic operations, received a decided impetus.

The Forest Hill divide, Placer county, the Butte creeks, and the Magalia district in Butte county, and the vicinity of Bald mountain in Sierra county, continue to be the sites of the principal drift operations in California, the business in the first-mentioned locality having, during the past year, undergone a considerable expansion. In nearly all the central and northern counties more or less drift mining is practiced, very little being carried on south of Calaveras county. For exploiting this class of deposits several long tunnels have lately been run, one of these driven by the Mayflower Company on the Forest Hill divide, and but recently completed, having a length of 5000 feet. The Breece & Wheeler tunnel, in the same neighborhood, is 7000 feet long, while the tunnels driven in the Mountain Gate and Hidden Treasure mines, further up the divide, have each a length of 8000 feet, there being elsewhere in the State several of these structures equally long. The cost of driving these tunnels ranges from $6 to $15 per linear foot, the average cost being about $10.

While the gravel now being extracted from the Breece and Wheeler mine yields at the rate of $9 per carload of one ton, this is more than three times as rich as the average throughout the State, and much above the average grade heretofore taken from this mine. Though the Mountain Gate and the Hidden Treasure affords each a large amount of material, it does not, taken all together, yield over $2.50 per carload.

The number of men employed in this class of mines varies from half a dozen or less to 150. Very few of them, however, employ over 100 hands—generally about 20 or 30. The number of carloads taken out daily ranges from four to eight per man, the average being about six. A good deal of this drift gravel has to be crushed with stamps before the gold can be recovered from it. This class of material is, however, apt to be rich, rendering its reduction profitable notwithstanding the increased cost of working it.

Hydraulic Mining.

Of this branch of mining, once a productive and profitable industry in California, very little can now be said, since its suppression throughout so large a portion of the State by legal process. In the northern counties, however, where the business has been suffered to go on without impediment, it has not only prospered, but undergone steady enlargement for several years past. The field of its now active and successful operations covers in California the counties of Siskiyou, Trinity and Del Norte, it being pursued also on sufferance and mostly in a small way at a few other localities in the State. There is as much hydraulic gravel in these three counties as in any other of like number in California, the larger of these deposits lying along or adjacent to the principal streams that traverse this section of country. These streams consist of the Trinity, Scott, Klamath, Smith and Salmon rivers and their tributaries, of which they have a great number. Next to the Sacramento and the San Joaquin the Klamath, below its junction with the Trinity, its largest confluent, carries more water than any other river in the State. But notwithstanding their heavy flow, none of these rivers are navigable, even for craft of the lightest draft. They are, in fact, rocky, tortuous, swift-flowing streams, incapable of being navigated even by an Indian canoe.

Of these rivers, only two, the Klamath and Smith, empty directly into the ocean, the others being all confluents of the Klamath, the mouth of which is so impeded by a bar that no sea-going vessel could enter it, were any portion of the stream above navigable by such craft.

The hydraulic deposits in this portion of the State differ in many respects from those found in the counties along the main gold belt farther to the south. The gravel in these northern counties, while it is of good grade, is for the most part free from volcanic or other barren matter, and generally so little impacted that it can be broken down and disintegrated with the hydraulic pipe, recourse to powder for this purpose rarely ever being necessary. The gold occurs here so generally diffused through the gravel that the value of the latter can, while yet in place, be calculated with considerable closeness. Not often are bedrock tunnels here required for opening up the deposits, the most of which occur in the form of benches having a considerable elevation above the outletting streams, a position that insures ample fall for disposing of the tailings.

Invited by these favorable conditions, a good deal of capital is now being invested in hydraulic operations in this portion of the State, several large enterprises of this kind having during the past year been inaugurated in the three counties mentioned. Negotiations for other of these properties are now in progress and likely to be consummated, having been examined and favorably reported upon by competent experts. Should sales follow, these properties will be supplied with water and equipped with first-class plants, insuring a largely increased output of gold from that very promising hydraulic district.

From the commission now in session to inquire into, consider and pass on the debris question, the hydraulic miners feel that they have something to hope. That these very capable gentlemen will be able to see their way to some measure of partial relief at least, there is every reason to believe. Whatever conclusions

the commission may reach, while they may not be wholly determinate, they will go far toward settling this much-vexed question at rest, even though adverse to the miners.

River-Bed Operations.

River-bed, like drift-mining, is not much practiced outside of California. In this State the principal sites of these operations are in the northern counties, though something is being done in this line of mining along most of the large gold-bearing streams in the central and southern counties, where the business is largely in the hands of the Chinese, the river-beds here having been worked over so often and so thoroughly that they will no longer remunerate white labor.

In operating by this method the water is diverted wholly or in part from its natural channels, the beds of which being thus laid bare, are dug up and washed in sluices for the gold they contain. Some of these operations are of great magnitude, the most extensive being conducted along the Scott, Klamath and Salmon rivers in Siskiyou county, where some of them have been in progress for 20 years or more, employing, during the busy season, which reaches from July to November, from 50 to 100 men each.

The past has been a good year for this class of miners, the water in the rivers having fallen to a low stage earlier than usual and so remained until late in the fall, thus insuring to these miners a long working season. As a result, many exceptionally large cleanups have been made, the most of them along the Siskiyou rivers.

Quicksilver.

As will be seen by the annexed table, prepared by Mr. J. B. Randol, the quicksilver product has fallen off in the past year. There are only nine or ten mines now operating in California. Some new furnaces have been put up on a mine in Oregon, and a small production has been made. The California production for the past three years was as follows:

MINES.	1886.	1887.	1888.
New Almaden	18,000	20,000	18,000
Aetna	3,478	2 694	959
Napa Con	1,769	2 880	1,065
Great Western	1,049	1,446	625
Sulphur Bank	1,449	1,890	2,164
New Idria	1,401	1,490	1,320
Great Eastern	735	689	1,151
Redington	409	673	126
Guadalupe			
Bradford		1,543	3,848
Various	786	455	992
Total, Flasks	29,881	33,760	33,250
Lowest price per flask	$ 32.00	$ 36 50	$ 37.00
Highest price per flask	39 00	48 00	48.00
Average price per flask	35.50	42.25	42 50
Total value, at av'ge price	1,060,000	1,425,000	1,415,000

Salt.

The receipts of Liverpool salt at this port last year aggregated 8,768,009 pounds, against 13,362,167 pounds in 1887. The falling off in the importation is due to two causes: First, high cost of salt abroad and high freights; second, to a decided improvement in the quality of the California product through solar evaporation. The consumption of Californian has grown to about 30,000 tons, equal to 60,000,000 pounds. Probably the purest salt put up here is that where solar evaporation is on planked floors. To understand this better, we cite the Union Salt Company's mode of evaporation. The company has eight acres of land covered over or planked with matched and planed boards on which the salt is spread instead of on the ground, as is generally done. They also have elevated vats. By their method of treatment the salt is purged of all gypsum, lime and other impurities and made purer than the best imported. Prices of California salt are regulated by a combination of the manufacturers and made so low as to cut off all importations outside of Liverpool salt, and this latter is in a fair way of being entirely shut off owing to a combination of manufacturers abroad, advancing prices, and also to the high cost of freights from Liverpool to this coast.

Chrome Iron Ore.

From Messrs. Kruse & Euler of this city we obtain the following:

But little can be said of chrome iron ore for 1888. The tariff discussion in Congress and the attempts to place it on the free list, had the effect of causing active operations on the Pacific Coast to almost entirely cease; it having been protected by a duty of $3 per long ton on all imported ores. Exports from California were reduced to 1500 tons, against 3000 tons in 1887, and 2000 tons in 1886.

The Tyron Mining Co. of Baltimore being assured that the duty will not be removed, have resumed active operations in Del Norte and Shasta counties, and we hope that in a short time the Pacific Coast will be able to supply the demand for the whole country, to the exclusion of imports from the Mediterranean of both the mineral and its products.

To show how deeply these imports affect our home industry, we give the following from "The Report of the Geological Survey of the Department of the Interior" on the mineral resources of the United States:

In 1886 there were shipped from California to the manufacturing centers at the East, 2000 tons at an actual cost in California of $15 per ton, while to the same markets there were imported for the same year, 1,985,809 pounds of bichromate of potash, equal to 2000 tons of ore, at an invoice cost of $7 per ton, and 3356 tons of ore, invoice cost $13 per ton, equal to 5356 tons of ore, or a total value of $182,949.

The latest Government report, 1887, gives the imports as follows: Bichromate of potash 1,722,465 pounds, equal to 1600 tons of ore, value $120,305, and 1404 tons of ore, value $20 812. The report for 1888 will show about the same proportion.

Borax.

Of this salt there was received in the City of San Francisco during 1888 a total of 7,589,000 pounds, which amount very nearly represents the product of the Pacific Coast for the year. Shipments from this point amounted meantime to 6,865,800 pounds. As compared with the preceding year the product of last year shows a falling off of nearly three and a half million pounds, the result of a combination entered into by our home companies toward the end of 1887, with a view of restricting and otherwise regulating production. By reason of this movement expenses have been somewhat curtailed and better prices realized, rendering the business fairly profitable, a condition it had not before attained for many years. Refined borax is now selling in this city at 7½c per pound wholesale, the price here being less than in New York by the cost of transportation, a little more than one cent per pound.

The companies now operating on this coast, all in California and Nevada, are the San Bernardino, the Pacific Salt and Borax, the Teale's Marsh, and the Nevada Salt and Borax. The Harmony Company, formerly owned by Wm. T. Coleman, having been idle most of the past year, no new companies have entered the field, nor have any new sources of supply been discovered during the past 12 months.

NEVADA.

Wells, Fargo & Co.'s bullion statistics credit the State of Nevada with a product in 1888 of $12,305,603, which is a very good showing. One district alone, the Comstock, furnishes the larger proportion of this. The bullion and dividend record of leading Comstock mines for 1888 is as follows:

	Bullion.	Dividends.
Con. Cal. and Virginia	$4,877,345	$1,188,000
Confidence	977,387	174,720
Gould and Curry	58,117	.....
Challar	86,360	.....
Hale and Norcross	$40,026	224,000
Potosi	107,625	.....
Savage	334,832	.....
Seven other mines	137,777	.....
Totals	$7,419,469	$1,586,720

The discount on the silver product of the California mine for the year was over $650,000, or enough to pay six of the usual monthly dividends of 50 cents per share. An effort is to be made to reduce the cost of milling ore at this mine and thus utilize a large amount of low-grade ore.

This record for the year is pretty good for a "camp" that is often styled a "played-out" one. The leading mine produced nearly five millions. In any other region there would be a great deal of talk about this. The prospect that the yield of the current year will exceed that of 1888 by about $2,000,000 is flattering, even if no further ore discoveries should be made than are now developed. There are now 12 bullion-producing mines on the lode, and that number will be increased to 15 and probably 18 before the middle of the current year.

The Virginia *Chronicle* gives figures slightly different from those above quoted. That paper says: During the year 1888 a total of 280,500 tons of ore was extracted from the Comstock mines, yielding bullion valued at $6,500,000. The total cost of extracting this ore and handling it until the bullion was taken out was about $3,640,000, or at the rate of about $13.50 per ton. The Sutro Tunnel Company derived about $280,000 in royalties on the ore. The Virginia & Truckee railroad received about $250,000 for hauling a portion of it to the mills on the Carson river. The stamp-mill owners derived nearly $2,000,000 for crushing the ore, and it is safe to say that about $1,000,000 of this was clear profit, and this profit would have been much larger had it not been for costly changes and improvements which it was necessary to make at some of the mills. The silver portion of the bullion produced was subject to a heavy discount when sold.

The total bullion yield of the lode from June 30, 1875, to Dec. 31, 1888, was $149,999,777. During that period the lowest yield was in 1881, when the total product was $1,399,428, and the highest in 1876, footed up $43,693,833. There is no record of the yield prior to the last two quarters in 1875 in the Recorder's office, as the bullion tax law did not take effect before that date. From the best information obtainable of local secretaries, the total bullion yield of the lode from its discovery until the present date will exceed $500,000,000, counting the assay value of the ore crushed, only 50 per cent of which was saved until about 1874.

As showing the value of ore, etc., some figures from the leading mine will be of interest. The official returns of the ore worked and bullion produced for account of the Consolidated California and Virginia mine during the month of December were received with the closing shipment for the month. There were worked at the Morgan mill 4825 tons of ore, yielding bullion of the assay value of $110.497.97, of which $55,502.53 was gold and $55,994.44 was silver. The average yield of the ore per ton in bullion was $22.90, and the average assay value of the battery samples was $28.27 per ton. There were worked at the Eureka mill 6370 tons of ore, yielding bullion of the assay value of $149 822 59, of which $77,204 20 was gold and $72,618 39 was silver. The average yield of the ore in bullion per ton at this mill was $23 52, and the average assay value of the battery samples was $30.48 per ton. There were worked at both mills a total of 11,195 tons of ore, yielding bullion of the gross assay value of $260 320 56, of which $132,706 73 was gold and $127,618 33 was silver. In addition, there was produced from the assay-office cleanup for 1888 from granulations, bullion valued at $1389 34, and from ashes, sweepings and slag, bullion valued at $5921 37, making a grand total of $267,631.27 produced and shipped for the month of December. The average yield of the ore in bullion per ton was $23.25, of which $11 85 was in gold and $11 39 was in silver. The average assay value of the battery samples was $29 53 per ton. It is worthy of note that the proportion of gold contained in the Consolidated California and Virginia bullion produced in December exceeded that of the silver. This made a material gain in the profits of the company.

Tuscarora district came quite prominently to the front during the year, being next in importance to the Comstock. The district contains a network of small veins of very rich ore, and there are vast quantities of low to medium grade ores. These last named ores constitute the backbone of the district. They cannot be properly or profitably worked by the ordinary stamp and pan process. The leading mine-owners, however, have erected concentrating works which are now in successful operation. By concentrating the low-grade ores, a high percentage of the metal is saved, and there is profit in thus treating them. So successful has this profit become that larger works will be erected during the year. The milling facilities of the district are constantly being increased. There is now an abundant and never-failing supply of water.

The Tuscarora mines for the year 1888 produced bullion as follows:

North Belle Isle	$564,955 03
Nevada Queen	207,908 20
Grand Prize	103,897 84
Commonwealth	71,062 69
Navajo	61,030 91
Total	$1,008,854 72

During the same period, North Belle Isle has disbursed in dividends the sum of $200,000.

Following is the bullion and dividend record of certain Nevada mines for 1888:

	Bullion.	Dividends.
Commonwealth	$71,063	.....
Grand Prize	103,898	.....
Navajo	61,031	.....
Nevada Queen	207,908	.....
North Belle Isle	564,955	$200,000
Tuscarora district	$1,008,855	$200,000
Eureka Con	478,243	75,000
Mt. Diablo	422,487	40,000
Paradise Valley	75,000	.....
Totals	$1,984,485	$315,000
Comstock mines	7,419,469	1,585,720
Totals	$9,404,054	$1,900,720

This is a good exhibit for Nevada, but it does not show the full amount of bullion produced in that State last year.

Eureka district has had a bad setback, due to the Government suits against the mines for timber used. The furnaces have shut down, and the recent efforts to start them up again under lease have failed.

Work has been resumed in the old Raymond & Ely mine, at Pioche, Nev., by the Pioche Consolidated Mining Company. The shaft is to be overhauled and retimbered from top to bottom and the Cornish pump put in working order.

The districts along the line of the Carson & Colorado railroad have not shown up as well for the year as was hoped. The great need in that region is reduction works.

There are many districts in the State which badly need the aid of capital. There are many hundreds of good mines being worked in a small way which should be properly opened and developed. There is no part of the coast which offers better inducements for capital than Nevada, but miners without means are unable to do very much. Money has gone into the larger districts, to some extent, but the less prominent camps are working out their own fortunes with little assistance from the outside. Montana amounted to little until it had the aid of capital, and now it stands at the head in mining affairs.

The big mining men have gone into Comstock stock and milling deals more than has been good for the rest of the State, and it seems difficult to attract the attention of capital outside the two principal camps of the State. Transportation facilities are not good, and Nevada will not advance much until these are extended. Scores of mining districts now comparatively obscure would come into prominence were capital to aid them and railroad facilities given.

ARIZONA.

Arizona is credited by Wells, Fargo & Co.'s statistics with a bullion product of $5,123,868 for 1888. The Territory shows fair progress, notwithstanding its famous camp at Tombstone no longer produces as formerly. The Arizona *Journal-Miner* says: The mining industry has progressed to such an extent that it is safe to say that enterprises representing more than a million dollars of invested capital have been begun within the last 18 months in Yavapai county, and upward of 1000 more men are employed in the county than were here one year ago. The large copper producing mines of the United Verde group have been yielding steadily since May last, and it is very likely that the output will increase from now forward. The Congress mine has undergone astonishing development within the last year and has recently been producing for shipment more than 100 tons per month of high-grade gold ore, while the ore in sight in the mine and on the dumps is almost unlimited. The Senator mine has been reopened; very large bodies of rich gold rock have been exposed and the production of hundreds of thousands of dollars assured. Phelps, Dodge & Co. are extensively developing the Copper Basin mines; the Crowned King and Oro Bella companies are pushing their improvements on a large scale; the mill of the Boaz company at Minnehaha Flat is pounding out bullion, and dozens of other promising enterprises are being projected. The sampling works have had to be enlarged in order to properly handle the increased ore shipments, and the progress in all directions is healthy.

The same paper adds: The year 1888 has seen a greater mineral output from this section than any previous year in its history. The estimated shipments of the sampling works of the Arizona Ore Sampling Co. for the year are 2,017,761 pounds, or 1008 tons. The shipments from the Congress amounted to over 600 tons, valued at $105,000, while the Hillside shipped 620 tons, making an aggregate of 2208 tons. Shipments of bullion by Wells, Fargo & Co. for the year amounted to between $150,000 and $160,000, while Tip Top district, which exports its product via Phœnix, reports an output of ore amounting in round numbers to $75,000. The above does not include the shipment of copper bullion and matte from the United Verde mines.

Ex-U. S. Marshal Turner of Globe, A. T., speaking of the copper mines, says: "A man who has a copper mine there, or anywhere now, is lucky. The big Globe mine is employing 200 men and is getting out 50 tons of copper in a day. It would get out 100 tons if they could obtain coke enough at their smelter. As it is, only one of the two furnaces is running.

"The Silver King mine, 25 miles from Globe, yields both copper and silver. There are 300 men working in and about this mine. The copper product from it is heavy, and shipments are being made steadily. Right around Globe there are about 500 men working in the copper mines. The entire city is growing rapidly."

The excitement of the year has been that at the Harqua Hala mines, but there are conflicting opinions as to the merits of the camp.

COLORADO.

Colorado takes second position this year in proportion of bullion product, being distanced by Montana, as our tabulated statement in another column shows. It would be impossible in the brief space at our disposal to make mention of the many districts of this flourishing State or its many producing mines.

Following is the amount and value of the gold, silver, lead and copper mined in Colorado during the past year:

198,627 ounces of gold	$ 3,105,519
18,200,227 ounces of silver	17,025,628
65,529 tons of lead	5,776,552
901,543 pounds of copper	153,347

The product of the different smelting companies in 1888 was as follows:

Omaha and Grant	$8,044,199 53
Boston and Colorado	4,059 213 82
Holden	4,404,641 66
Harrison, Leadville	1,269,588 00
American M and S. Co	1,900,116 00
Arkansas Valley S. Co	2,356 346 00
Manville Smelter	868,176 00
San Juan Co., Durango	777,877 00
Colo. S. Co, Pueblo	1,725,799 00
Pueblo S. and R. Co	2,934 675 00
Philadelphia Co, Pueblo	57,510 00
Total	$24,061,546 00

Leadville is one of the noted mining camps in the country. The bullion product of Leadville for a number of years, according to the local paper, has been as follows:

1869-79	$10,700,000	1884	$12,837,500
1879	10,333,700	1885	12,357,700
1880	15,065 100	1886	13,750,800
1881	13,147 300	1887	12,073,000
1882	17,127,400	1888	11,830,200
1883	15,638,400		
Total			$144,721,100

The product last year consisted of 17,234 ounces gold, valued at $20 67 per ounce; 7,345,575 ounces silver, valued at 93½ cents per ounce, and 82,890,688 pounds lead, valued at 4½ cents per pound. Leadville produces one-third of the American supply. As the average price of silver last year was 8 cents per ounce lower than in 1887, the depreciation made a difference of $587,646 in the returns of the Leadville mines. No new mines were added to the camp last year, though there were some good developments made in old mines.

DAKOTA.

Aside from Dakota's precious-metal mines, she has the only tin mines in the United States except those of California. The trouble has been that capital seems loth to take hold of the tin claims and open them. Efforts are being made to obtain financial aid from England. Thos. H. White of Deadwood, now in California examining some mines, has this to say concerning the mining interests of Dakota:

"A material change has taken place in the Black Hills. R. H. Clark of Cortez, Nev., was induced by a lot of us in Deadwood some time ago to come there and establish his leaching

works. They are now completed at a cost of $75,000, and are just commencing work on the silica-gold ore that, up to this time, has been refractory. This ore is plentiful and runs about $25 per ton.

"The product of the Deadwood district in 1888, or of Dakota, which is the same thing—for all the mines are within ten miles of Deadwood—was $1,750,000. The principal mines are the Homestake and Caledonia, at Lake City, four miles away from Deadwood and connected by a railroad which has been built this year. Three miles beyond this is the gold region I first spoke of. Large ore bodies have been found in both the mines I have named, the former of which is owned largely by Senator Hearst. The stock of the Homestake two years ago was weak at $10 and $10 50. Now it is $13 50 and $14 strong, and it pays 20 cents per month regular dividends, and will for 20 years to come. The stock of the Caledonia 2½ years ago was selling at 70 cents, and not a pound of ore was in sight. Now it is worth from $3 to $3.50, and is paying 5 cents per month dividends, and they expect $10. Machinery and tunnels to the amount of $100,000 have also been paid for. Twenty stamps have been added to the stamp-mill, making a total of 50 in use.

"The town of Deadwood is bristling up. The Fremont & Elkhorn Valley railroad is now within eight miles of it, and people don't have to stage 200 miles, as they did formerly, from Sidney. New people have come in. The Harney Peak tin mines are now to be prospected, something which should have been done in the first place. There is very good tin there, but as yet the trouble is there is not enough of it."

MONTANA.

Montana this year takes first place in bullion product over all other States and Territories.

It is impossible in this brief review to make even mention of the many producing mines. There are now 1120 stamps running in the Territory, and the 12 smelters have a combined capacity of 5280 tons per day. The Anaconda smelters alone can handle 3500 tons of ore per day. This last-named mine is now the leading copper-producer in the United States. This company will soon construct 30 miles of railroad of its own between Butte and Anaconda, exclusively for the transportation of ore from the mines to its smelters.

The Butte *Miner* gives the following as the metal output of Butte for the year 1888, as nearly as it can be ascertained from official and semi-official sources. In several instances the sums are estimated, but, if anything, they are lower rather than in excess of the actual product. The increase, as compared with the product of 1887, is over $6,000,000.

Silver by Pacific Express Co., Butte	$ 4,334,000
Silver by Pacific Express Co., Anaconda	300,000
Anaconda—100,000,000 lbs. copper matte, estimated	7,450,000
Anaconda silver in matte, estimated	1,250,000
Parrot, fine copper, 12,000,000 lbs.	1,500,000
Boston & Montana Co., 14,425,554 lbs. copper	2,527,000
Colorado smelter, silver and copper	750,000
Butte sampling Works	250,000
Clark's Butte Reduction Works, 5,500,000 lbs. copper fine	715,000
Gold and silver in matte, Clark's Reduction Works	610,000
Silver in matte from all other sources	1,250,000
Placer mines	100,000
Ores shipped direct to outside smelters	600,000
Total	$22,937,000

"In addition to the Butte output, as given above, a low estimate of the product of the mines in the other parts of the Territory, made by experts, places it at $17,500,000, which will make a grand total of $40,437,000." On another page of the same paper the output is given as $34,000,000. The figures, as given by Wells, Fargo & Co., are $32,376,000. The *Inter-Mountain* places the output at between $30,000,000 and $35,000,000. On another page of the PRESS a correspondent has also something to say on the subject.

The December reports from dividend-paying mines in Montana bring the record for the year 1888 up to $3,318,600. This excels any previous year in the total amount of dividends declared.

Boston & Montana (copper)	$ 900,000
Granite Mountain	1,200,000
Hope	50,000
Houston	6,000
Jay Gould	100,000
Montana Limited	334,000
Parrott	146,000
Original	6,000
Hecla Con.	176,000
Total	$3,318,000

IDAHO.

H. F. Wild, assayer in charge of the United States Assay Office at Boise City, Idaho, gives an estimate of the product of gold, silver and lead in Idaho, by counties, during the year, as $9,467,443, of which $2,552,269 was in gold.

The Yankee Fork country was comparatively quiet during the past year, but it is in excellent shape for future increased operations. The Salt Lake *Tribune* gives in a condensed form a summary of operations in this Territory, from which we make extracts:

There was much activity at Rocky Bar during the last year. The Alturas Gold Limited Company kept its 50 stamps running much of the time, and has pushed development ahead in the mine.

At Atlanta considerable ore was extracted from one or two old properties which have been idle for several years, and the camp has prospects of activity again at an early date.

Pine Grove is a new district 20 miles south of Rocky Bar on the road to Mountain Home. It is also a gold district. A number of lodes were opened to considerable extent, the largest being by a St. Louis company.

In the Wood River country the decline on lead and silver and the cost of transportation had the effect of stopping production, but about September a reduction in freight charges was made by the railway company, which caused active work to commence again.

The Hailey and Bellevue Sampling Mills handled during the year 6,033,423 pounds of ore.

Considerable progress was made in Smoky district in development work.

The Sawtooth country was almost dormant, except the Silver King, which worked a good force and shipped much rich ore, the property being under lease to Hyndman & Co.

Sea Foam is a new district located 15 miles north of Ketchum, the nearest point. It attracted many prospectors, who pretty well staked out the country, which shows fine surface indications and gives promise of good mines as soon as the country is made more accessible.

Following down the Salmon, we find the country about Clayton very prosperous, with the Clayton smelter making a steady run, sending out more bullion than ever before and shipping large quantities of high-grade ore. The Bay Horse smelter and concentrator did a larger business than ever, while the mines in that locality have greatly improved.

The Owyhee country took on new life during the year. Early in the year Mr. Kemp Van Ee became so impressed with the camp as to investigate its ledges, and this resulted in the purchase of two groups of mines, each having 12 or 15 claims. In the old Oro Fino rich bodies of ore have been developed, some of which is shipped while the lower grades is worked in the 20-stamp mill, purchased by the Oro Fino syndicate, and since enlarged and improved. The process is that of concentration, instead of the old system of amalgamation. These operations have encouraged others, so that work is progressing on many old claims, and the several stamp-mills have been kept busy since last summer, so that the output for the camp was quite large.

The country north of Weiser, Mineral, Seven Devils, etc., attracted some attention, and a Montana syndicate went to work in the fall on some large copper lodes there.

While mining was crippled the past year by heavy freight and the working charge rates and low prices of lead and silver, there is a more hopeful outlook now.

NEW MEXICO.

New Mexico by no means holds the position as a bullion-producer that she could, provided she had better transportation facilities, and more abundant capital to develop her mineral resources. Long and patient waiting has not as yet brought these things, so badly needed. There are many camps and mines in all directions not nearly as well developed as they should be. The prospectors have opened their claims in the various camps, and more or less of them ship ore, but money is needed for machinery and development. Reduction works, too, are needed. The Silver City *Enterprise* is not satisfied with Wells, Fargo & Co.'s statistics of its gold production, and says:

The Wells-Fargo statistician, Mr. Valentine, credits this Territory with a total of only $243,508 in gold, and this is published broadcast as an absolute fact, even when figures are obtainable, which disproves their own statements.

The Carlisle Gold M. Co. alone, during the year 1888, produced $396,063.35 in gold, which is $152,465 35 more than is credited to the entire Territory by our distinguished friend, Mr. Valentine. East Camp shows a product of $2687, making a total for the Carlisle mining district in gold alone of $398,650, and of silver, $61,677, both of which metals, it is reasonable to infer, were shipped per express. To the above must be added the value of 80,000 pounds of copper matte, which will yield on separation 25 per cent of pure copper, worth at present New York quotations, 17 cents per pound, a total, $340,000. In addition to this the company produced 1,546 900 pounds of lead, worth $3.25 per hundred, $50,374.25, making a grand total of $544,801 25, as the output of Carlisle alone.

Now as to Pinos Altos, we desire to direct the attention of Mr. V. to another fact equally as important, though not quite so extended as those referred to in the yearly product of Carlisle. The Mountain Key mill and mine turned out $114,403, and the Bell and Stevens, $62,799, or from these two mills alone we have a gross output of $177,212, which, added to the Carlisle product, makes $722,013 25, which is nearly one-third the amount—$3,000,000 in gold and silver—which is credited to New Mexico by the Wells-Fargo annual exhibit of the bullion product of the nation.

OREGON.

Oregon only produced last year $701,566 in gold and silver, but many new camps are now being opened which ought to greatly add to this this year. More attention is now being paid to the quartz interests of the State, and some capital is coming in. There are many hundreds of mines still undeveloped. The main mineral wealth of Oregon lies in her coal and iron mines, of which something is said in another column. Many placer claims are being worked successfully, but it is being found that the quartz-mining industry will be profitable when capital is invested. The State is now rapidly being settled up and with the advent of new settlers no doubt these interests will assume more importance. Some of the new camps opened last year have attracted the attention of capital, and Oregon will soon be given more reduction works, which are badly needed.

UTAH.

The year has averaged fairly well for Utah miners. The Salt Lake *Tribune* has an excellent detailed review of operations, from which we condense the following: Park City, the largest mining camp in Utah, moved on steadily the past year. The district now has a population of between five and six thousand people.

Of course the great Ontario stands at the head in magnitude of operations. During the year 1888 its product was:

	Tons.	Value.
Ore crushed	25,000	$850,000 00
Ore shipped	7,700	750,000 00
Totals	32,700	$1,750,000 00

Bringing the product of the camp down to values, the net for the camp would be about this for the year:

Ontario	$1,750,000
Daly	1,000,000
Crescent	198,871
Woodside	75,000
Sundry mines	100,000
Total	$3,101,871

By net is meant the return after paying working charges and freight, all of which should be added to show the actual production of the mines.

The Tintic country made an excellent showing for the year 1888. The two largest mines had been handicapped for three years through vexatious litigations, which kept them back in their development, and also in the quantity of ore extracted and shipped. A compromise was effected in early June, since which there has been more activity.

Fully three-quarters of the silver-lead ore shipped from Tintic went out of the Territory for reduction. The ore shipments for the year were 56,850,800 pounds.

Shipments from Silver City and Ironton in 1888, aggregate 56,850 800 pounds. Of the 5588 tons of iron ore shipped, over 2000 tons went to Butte, Montana.

At Bingham the operations of the Lead Mining Co. the past year were quite satisfactory, their mines having produced in the neighborhood of 13,000 tons of first-class ore, concentrates and roasted product.

The ore shipments from this camp aggregated more than 13,000 tons. The 42 mines shipped in all 13,754 tons.

Stockton, like all lead districts, suffered much from the low prices of lead and silver, which cut down production very much, and also retarded prospecting and development of many claims, and yet much was done in the way of preparation for future operations. The ore shipments from the camp in 1888 over the Utah & Nevada R. R. were 14,103,973 pounds.

New life is being given to Frisco Mining district through the French company reorganization under the title of the Comet Smelting Works Co., and which is backed up by ample capital.

The Great Horn Silver, once the life of the camp, and which has produced its millions in the past, has been conducted on a small scale the past year. During the past year the shipments averaged in the neighborhood of 230 tons per month.

The old Silver Sandstone camp of Silver Reef has moved along quietly. The Stormont runs five of its ten stamps part of the year, crushing about 30 tons of ore per day, which run all the way from 10 to 75 ounces silver per ton. This ore was worked for chloriders, and produced about 40,000 ounces silver.

Last October the Christy Co. met with heavy loss in the burning of the Stormy King hoisting works and the double compartment shaft down 250 feet. The damage has been repaired and the works again started. The company is employing about 80 men at the mine, and a good force at the mill, which produced last year about $200,000 worth of silver.

A table of the bullion product of Utah is given on page 82.

WASHINGTON.

The mineral wealth of Washington Territory lies more in its coal than its precious metals. It is only credited with $124,112 in gold and silver for the year. A number of new claims have been opened, however, during the year. The Conconully district, in the northern portion of the Territory, has silver ores, but the claims are thus far not well developed. The coal output of the Territory was, in round numbers, 950,000 tons, valued at $4,300,000. Of this amount Seattle shipped 450,000 tons, valued at $2,300,000. In another place in this article is given more in detail the yield of the coal mines.

THE *Calistogian* says: A week ago the Chinamen at the Bradford mine went on a strike because they could not get their meat at summer prices. The proprietors at once sent to San Francisco for white men, and in the future intend to run the mine without having the coolies around.

CHINAMEN are not allowed to visit Harqua Hala.

Other Mineral Products.

Copper.

As was anticipated at its beginning, the past year has witnessed an enormous output of copper, the product having not only surpassed expectation, but exceeded all precedent, the increment in this country having been greater than in any other. The remarkable impetus given to this industry was due, of course, to the advance in the price of this metal, which, commencing toward the close of 1887, has since been maintained.

The output of Montana, now the largest copper-producing country in the world, stood last year as follows: The Anaconda mine, 63,245,473 pounds; the Parrott mine, 10,750,000 pounds; the Boston, Montana and Liquidator, 18 273 667 pounds; the Butte Reduction Works, 3 521,565 pounds; various other small mines bringing the year's product up to a total of 95 500,000 pounds against 78 700,000 pounds in 1887.

The Lake Superior mines, formerly the largest copper-producers extant, and now second on the list, turned out last year a total of 86,859,000 pounds; of this amount the Calumet and Hecla made only 2 360,552 pounds, about the quantity here turned out in 1887. In the underground works of this property, for a long time the foremost copper-producer in the country a fire has for the past two years been smoldering, making it impossible to get out any large amount of ore; hence this great shrinkage of production.

The output of the Arizona copper mines last year was as follows: Copper Queen, 9,379,949 pounds; Old Dominion, 4,870,000 pounds; Arizona Copper, 7,133,188 pounds; Detroit, 5,420,224 pounds; United Verde, 3,200,000 pounds; all other mines, 3,196,000 pounds; total, 33,200,000 pounds. The product of Colorado for the year was 3,000,000 pounds; of Utah, 2 500,000; of New Mexico, 2,000,000; all other countries in the United States, California included, 4,960,000.

The production of copper in California was largely increased in 1888 over that of the few years preceding, the low price of ingot ruling in the East and Europe during '85, '86 and '87 having nearly extinguished the copper-mining interest in this State. The formation of the French syndicate of 15 months ago has had the effect of increasing the produce in California, as elsewhere, but the field for a much larger increase is very extensive, as there are many fine undeveloped "locations" on the "great copper belt," which runs N. W. and S. E. throughout the whole length of the State, and the facilities for transportation, fuel and cheap labor in many localities are far superior to those of any of the surrounding States and Territories. Evidently the time will come, perhaps in the near future, when copper mining and smelting, or lixiviation, will become a very great and important industry of the Golden State.

This improvement in the copper market has not only led to a largely increased output from the mines that have been continuously operated, but it has led to the development of new deposits and in many instances to a resumption of work on mines that had long been idle, there having occurred several cases of the latter kind in this State. Among notable examples we have the rehabilitation of the Union mine at Copperopolis, Calaveras county, which, after a long interregnum, has during the past year been restored to an actively productive condition; so also the Napoleon mine in the same county and the Newton in the adjoining county of Amador.

More recently ore extraction has been resumed on the Buchanan copper mine in Fresno county, where some ten years ago a good deal of high-grade ore was taken out and shipped to San Francisco at a handsome profit. On some of the other small veins, of which there are several in the vicinity of the Buchanan, work has been begun, these also carrying ore of good grade.

Besides the high price that copper now commands, the owners of these deposits have been encouraged to commence the work of their development by the prospect of increased transportation facilities through the early construction of the Stockton, Fresno & Southern railroad, the line of which, as surveyed and fixed, runs quite near these mines. When this road is completed the distance the ores here will have to be hauled on wagons will be so shortened that the present cost of delivering them at San Francisco will be reduced more than one-half. Besides the copper interest, the rich and extensive mineral belt that occupies the whole westerly slope of the Sierras will, through the building of this road, be immensely benefited. This belt, which covers an area of more than 2000 square miles, abounds with mineral deposits of almost every kind, gold, silver, copper, lead and iron constituting its more important resources of this kind, for the entire country is as well adapted for fruit and grape growing as any other part of the State, the eastern half of this belt with the much larger area of mountain lands to the east being covered with magnificent forests. To the lumberman, the fruit and the grape growers, hardly less than to the miners, the completion of this road will, therefore, be a great boon.

The principal mines to produce in the State last year were at Copperopolis (the old "Union," which was closed down for 19 years after producing from '61 to '66 over 75,000 tons of shipping ore) re-opened in 1887; at Campo

Seco, the Campo Seco and Satellite (formerly Lancha Plana) mines; and at Ione City the Newton. The Union produced only shipping ore; the last three named copper cement—a manufactured article by lixiviation. The Union and Newton, under the San Francisco management of Col. H. D. Ranlett, have been quite extensively worked. Some 4000 tons of 16 per cent ore from the former were mined and shipped around Cape Horn to Eastern smelting works, and at the latter 50 tons of 80 per cent copper cement were manufactured from old dumps, besides several thousand tons of ores mined and set on fire for leaching this year.

The Campo Seco mines are managed by San Francisco corporations, and produced considerable amounts of copper cement—in all, several hundred tons—and are now mining and setting on fire thousands of tons for the present year's leaching. At Spanceville the old "Dumps," formerly belonging to the San Francisco Copper Company (now working the "Satellite" at Campo Seco), were sold last winter to two employes who have produced quite an amount of cement copper (some 50 or 60 tons) and part of which was smelted at the mine into 98 to 99 per cent bars and used by brass founders in this city. Nearly all the copper product of California goes East for smelting or refining either by rail, steam or the Cape, Col. Ranlett, as representative of Eastern smelting works, shipping the greater part either under purchase or advances. Small amounts of copper cement have also been made at Telegraph City and one or two other points, and some shipments of ore have been made to Liverpool. It is expected the present year's yield of copper will be double that of 1888 for California, which is estimated at about 1000 tons pure of a value in ingot of about $300,000.

In 1887 the Societe des Metaux of Paris, the largest consumers of copper in the world, headed a movement to control the copper output of the world, which led to the forming of a syndicate on July 1st of that year. The market was the more readily controlled owing to its cheapness, Lake copper selling as low as 10¼ cents in New York City. The low prices had induced greater consumption and lessened the production, so that the supply and demand was about the same. The mine-owners readily came into the movement, and favorable terms for three years were made. The price of copper was advanced toward the close of 1887, and continued well up and steady throughout last year, as is shown by the following table of monthly averages for Chili bars by the long ton in London and Lake copper by the pound in New York:

	Chili Bars.	Lake.
January	£ 85	16¼
February	77½	16
March	78½	16
April	80	16
May	80½	16
June	80½	16¼
July	81	16¼
August	80½	16¼
September	80	17
October	100	16½
November	78½	16½
December	77½	16¼
Average year	£82½	16¼

Although the prices last year were the highest on record for many years past, still they are not to such an extreme as to curtail the consumption. The high prices have no doubt stimulated the production, for the supply is said to be steadily gaining over the consumption. In the United States the stock on hand on December 31, 1887, was 40,000,000 pounds, and on December 31, 1888, it was 78,000,000. The *Engineering and Mining Journal* gives the following production in this country last year by States and Territories:

	Lbs.
Michigan	86,850,000
Montana	98,500,000
Arizona	32,200,000
Colorado	3,000,000
Utah	2,500,000
New Mexico	2,000,000
All other sources	4,950,000
Total domestic copper 1888	231,000,000
From imported ores	5,000,000
Grand total	236,000,000

The largest producing mine is the Anaconda of Montana, which last year turned out 63,245,473 pounds. The next on the list comes the Calumet and Hecla of Michigan, with 50,402,000 pounds, which is followed in turn by the Tamarack of Michigan, with 11,411,000 pounds. The largest copper mine in Arizona is the Copper Queen, which turned out last year over 10,000,000 pounds.

The world's product of fine copper in 1888 was 255,357 long tons. These figures have been mainly collated from the delivery-books of the French syndicate, as follows:

	Tons. (2240 lbs.)
Australia	8,000
Bolivia	1,000
Chili	27,000
Cape Copper Company	5,750
Namaqua	1,500
England	1,500
Japan	11,500
Mexico—Bedeo	4,000
Newfoundland	1,481
Norway and Sweden	1,800
Rio Tinto	31,200
Tharsis	10,500
Mason & Barry	6,550
Portugenza	1,200
New Quebrada	2,800
Total syndicate mines	115,784
Germany	16,000
Other mines not included above	18,216
Total foreign product	150,000
American product	105,357
Total copper product, 1888	255,357

The American mines produced 41½ per cent of the world's supply last year. These mines also produced upward of 70,000,000 pounds more than in 1887. It would not be much of a surprise if they doubled that increase this year, which means a product of 100,000,000 pounds more than in 1887. The world's product last year was 60,440,000 pounds greater than in 1887, and the largest ever reported. Ten years ago it was only 150,000 tons. For the past five years it has averaged 227,000 tons.

Silver.

The following table gives the highest and lowest prices by months in 1888 and 1887 in the London market:

Months.	1888 Highest	1888 Lowest	1887 Highest	1887 Lowest
January	41 11-16	41	42	40
February	44	43 3-16	42 13-16	40 1-16
March	43¾	43	43 7-16	41 1-16
April	44	43¾	44	43
May	45	44	44	43 7-16
June	45	44	44	43 5-16
July	45 7-16	42	44 7-16	43 5-16
August	44	41 11-16	45	44
September	44	42 1-16	44 1-16	43 7-16
October	43	42¾	44	44
November	44	42	44 1-16	43 11-16
December	44 11-16	42	44	43 11-16

The range of prices last year was from 1d. to about 2 d. lower in each month than was that of 1887. The causes that brought about the lower values are so varied, and also so well known, they do not require reproducing further than saying that the decline has been going on forseveral years, with a decided dropping within the past half decade, owing to India's necessities causing that country to throw on the London market larger quantities of India council bills, the allotment of which came in direct competition with silver. It is now claimed that by reason of the internal improvements (railroads, etc.) in India being so far advanced, India bills will decrease for two or three years to come, which, if correct, must react in favor of silver. That the falling off in the Indian demand has been felt abroad is shown by the following comparative table of bullion on hand in the principal European banks the second week in 1888 and 1889:

Bank of	Jan. 10, 1889 Gold. £	Jan. 10, 1889 Silver. £	Jan. 12, 1888 Gold. £	Jan. 12, 1888 Silver. £
England	24,170,000	.....	20,610,000	.....
France	40,512,317	18,076,068	43,771,015	17,226,973
Germany	28,078,000	11,200,000	28,078,000	10,920,000
Aust.-Hungary	7,920,000	15,840,000	6,528,000	14,703,000
Netherlands	5,080,000	7,140,000	4,675,000	8,171,000
Nat. Belgium	2,541,000	1,270,000	2,667,000	1,349,000
Nat. Italy	6,918,000	1,085,000	6,083,000	1,118,000
Total this week	109,709,317	88,611,068	111,222,533	85,525,973
Total prev wk.	109,665,145	88,688,116	110,742,378	85,621,383

The above shows a decided increase for the year in silver bullion and a marked falling off in gold bullion. There can be no doubt but the falling off in gold is due to the loans negotiated by Buenos Ayres and Russia, both nations taking unusually large quantities of gold.

The output of silver on this coast is given in another column, but that of the world is not obtainable at this writing. It is quite safe, though, to state that the output was less in 1888 than in 1887. This assertion is based on the low price of silver causing many mines to become unprofitable and therefore their either being shut down or else worked to a limited extent.

This city was last year a more profitable market for silver bullion than was the East, due to the small obtainable supply here and the good Asiatic and India demand. Taking Selby's Smelting and Refining Co. as a guide and the above becomes more convincing, for it is well known that in former years the company was at times compelled to carry large quantities of bar silver for customers, but the past year the parity of prices being so much better than New York allowed of their patrons, who wished, cleaning up each steamer leaving for China. There is a diversified opinion regarding the coast's output this year, but the majority think that there will be no material increase until well into the year, probably not much before fall, when many silver-mining districts, notably the Comstock, will be in good working condition and the bullion probably be produced cheaper. The favorable showing in West Con. Virginia, at Virginia City, caused all the work in the mines on the Comstock lode to be run to the West or Red lode and with every prospect of the best results following.

Coal.

The total production in the world is put at 420,000,000 tons, of which Great Britain's output is 160,000,000 tons, the United States 120,000,000 tons, and Germany 75,000,000 tons.

The development of coal on this coast is making rapid strides, principally in Washington Territory, where there are 180,000 acres of coal lands. For the year ending Sept. 30, 1888, the output of the mines in Washington Territory is officially placed as follows:

Mine.	Men Employed.	Tons.
Franklin	160	181,921
Black Diamond	275	186,532
Roslyn (before strike)	700	231,201
Cedar Mountain	60	32,813
Newcastle	175	168,134
Gilman	185	115,528
Bucoda	78	147,180
South Prairie	100	108,147
New Tacoma	50	43,113
Wilkeson	50	6,930
Totals	2,133	1,133,099

We are unable to give a comparison of the output for the like time ending with Sept. 30, 1887, the only available data for comparison being the fiscal year ending June 30, 1887, for which time the output aggregated 525,705 tons.

Several of the companies only get fairly to work in last year, and, of course, their output will be largely increased in the future. After Sept. 30th Roslyn 3 was developed, and from this mine large quantities of coal are being turned out. The Oregon Railway & Navigation Co. is developing the coal land near Cle-Elum, with every probability that the mines there will be added to the producing mines at a near day.

The output last year of the British Columbia coal mines is estimated by their correspondents in this city as follows:

	Tons.
Wellington	250,000
East Wellington	[illegible]
Nanaimo	[illegible]
Total	340,000

The bulk of the products of these mines seeks this city for a market.

The Coos Bay, Oregon, coal mines output last year aggregated in round figures 62,000 tons.

In this State the only mines turning out much coal are the Empire and Pittsburg, both in Contra Costa county. Their aggregate output last year is placed at 72,000 tons. The Mt. Diablo mine is still shut down. The coal deposits in Livermore valley are being developed. Wells are being sunk in some of the southern counties of this State for coal, but as yet with indifferent success.

For two years the price of house coal has ruled high, with the highest prices reached in 1888, when Wellington sold at $16 to the trade. This high price caused consumers to take to other and less expensive coals. Naturally the increased consumption of other coals caused the prices to be advanced. The high prices invited importations by rail of house coals from the Rocky Mountain collieries to this and the interior central cities, and of New Mexico coals into the southern part of the State, besides stimulating the output of the older mines on the coast and the developing of new collieries. On December 1, 1888, the price of Wellington was unexpectedly dropped to $12 a ton, compelling a corresponding reduction in prices by other coast coal-mining companies, which was followed by a further drop in this month in price by the latter companies. This last decline has shut off the importations of Rocky Mountain coals, owing to the latter costing delivered here $10 a ton. The mild character of the winter, combined with the use of more gas and oil stoves being in use, have had quite a decided effect on the consumption of house coal, which, compared with the like time in 1887, is much less, and this, too, in the face of a larger population.

The consumption of steam coal on this coast has increased to large proportions, and to this, no doubt, is due the ease with which coal values were maintained in 1887 and 1888. The large increase in the number of steam vessels, locomotives and manufactories has been fully 50 per cent the past two years, creating a corresponding consumption of steam coals. For the year 1888 the price of steam coals has been the more easily maintained owing to a three-months' strike of miners in the Australian collieries. Referring to this an exchange says: The long strike in the Australian mines was brought to an end on the 23d of November. It was in force for nearly three months. It will be about the 1st of April before the regularity in the Australian coal supply for this market is fully restored. The supply from Sydney was not interrupted by the strike. There are ten cargoes on the way here from Sydney and six from Newcastle. These cargoes will arrive at intervals in the next 60 days. It is expected that all of them will be here by the 1st of March. This will give us only about 35,000 tons Australian coal in the next nine weeks, or an average of 510 tons per day. Fortunately the yards are too well stocked to have this scant prospective supply from that region affect values. In fact the tendency in Australian coal has been weak and declining for the past few weeks. Several cargoes have been sold in this interval at a net loss to the importers of $1 and upward per ton. The wheat crop in Australia, now about ready to harvest, is quite light, and this will add many more vessels to the coal fleet. The owners of these vessels will be glad to send them this way with coal at 20s and even less, in order that they may return next fall to England with wheat from this port.

Lead.

Elsewhere the output of the coast for 1888 is given. The more satisfactory prices ruling at the East, owing to the running of a corner, had a stimulating effect on the production, but withlits collapse in November and values sinking to a lower level, there does not exist so much of a desire to increase the output. The consumption in this city aggregates about 600 tons a month, of which the Selby Smelting and Refining Co. takes from 250 to 275 tons and the Pioneer Lead Company about the same, or perhaps a little more. This year it is not at all unlikely but the consumption will be larger, owing to the increasing consumption of lead paint, shot, lead pipes, etc. If it was not for the Standard Oil Co., so as to divide the trade of the Pioneer Lead Co. on this coast, introducing a brand of lead paint made at the East, the consumption of lead on this coast would be much larger, for the consumption of paint has made rapid strides. This competition was brought about by a coal-oil "war" between Whittier, Fuller & Co., proprietors of the Pioneer Lead-Paint Works, and the Standard Oil Company.

MARKET REPORTS

Local Market.

SAN FRANCISCO, Jan. 31, 1889.

Although general trade continues dull yet large wholesale houses look for a very active spring business. The impression they are [illegible] importing extensively in their special lines. Prices are not likely to be lower but the [illegible] due to the [illegible] the [illegible] market. The backs in this city continue [illegible] liberal paper at the rate of [illegible] per cent. The weekly returns of the clearing-house [illegible] receipts of the last week in 1888 were [illegible] the corresponding week in 1887. Among [illegible] general business interests, Among New York [illegible] very high, are cutting [illegible] against what it [illegible] the [illegible] of [illegible] for the [illegible] during the [illegible] made [illegible] advance on the New [illegible] The basis to [illegible] the money market to-day, with only a moderate demand running [illegible] been more doing in wheat [illegible] and [illegible] feel assured funds to keep the [illegible] spring. [illegible] mining stocks [illegible] [illegible] light owing to the majority of the general [illegible] either having sold out or else buying [illegible] this leaves the most of the [illegible] to have [illegible] counts at the banks. The [illegible] has [illegible] listed on the two exchanges, particularly the [illegible] stock issues, is of a very important character, and presages more active times than early days of the stock market. In nearly all of the [illegible] where deadwork has been the order, the work will be more of a prospecting and developing character, but of necessity this takes time. In Virginia [illegible] Belcher, Sag. Belcher, Crown Point, Ophir, Mexican, Union, Sierra Nevada and Utah the ore is said to be of the most important character [illegible] bullion-producing mines—[illegible] Virginia, the [illegible] dle mines," challenge [illegible] prudence—the work continues favorable. In Savage, the recent development on the [illegible] foot level running west, is said [illegible] very important, but it will take time to get [illegible] ged working condition. The coming week is [illegible] claimed, a thorough test will be made of the [illegible] namos for running the Nevada mill, and if they prove as successful as it is supposed, the Nevada mill will drop to stamps, while the Caledonia mill will drop its full complement of stamps, owing to its having a supply of water. It is now asserted that the electric amalgamation experiments at the Douglass mill have proven a success. If this is true this process will be generally adopted on the Comstock, and as it saves more bullion and quicksilver it will have a very decided bearing on the profits of the mines, and make ore grading less than now worked at a loss or barely even to yield a profit.

Official advices from Palisade Silver mine, Stafford, Nevada, encourage the belief that that district will be a large producer of silver bullion before the close of the present year.

The dividends disbursed in this city in January aggregated this year $1,080,000, against $1,075,000 in January, 1888. Of this the mining companies paid out $250,250 last month, against $205,500 for the like month last year.

Messrs. Hayward & Hobart have sold a controlling interest in the Nevada mill, Virginia City, to U. S. Senator Jones and S. H. Jones. The change in the control will not cause a change in the ore milled, unless it be that the mill will crush Savage ore as well as Chollar and Potosi.

SILVER—The market has held throughout the week to strong prices at fully ½ to ⅝c per ounce over the New York quotations. The strength of the market here is due to the light available supply of silver bullion and the high rate of exchange on New York. The latest sale of silver reported in our market was made at 93 5-16c, but at the close it is claimed that a slight advance on the above sale can be had. A fair range of quotations would be 93¾ to 93¾c. From all present advices, it is not at all likely that there will be much of an increase in the silver output of the coast until well into spring.

QUICKSILVER—The market is dull but steady at former quotations.

LEAD—The market is without essential change. The demand is said to show signs of improving.

COPPER—The New York market the past week broke some under a report that the "Syndicate" would not take supplies at previous prices, but under advices that the report was without foundation, values recovered. It is said that there is a large February short interest out.

TIN—The demand is improving, causing a firmer market to obtain, but with no advance in quotations.

The San Jacinto tin mines in San Bernardino county have been sold to an English syndicate. The new owners, with an authorized capital of $1,500,000 will proceed immediately to the development of the property.

COKE—Imports foot up 750 tons, but being sold to arrive, it had no effect on spot prices, which are still quoted strong at $20.

COAL—Quite a reduction in prices for all kinds of coals has been made. The heavy output of Washington Territory, together with the yards being full, have their natural effect on the market. It is very generally claimed that still lower prices will obtain before the summer months pass by.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Jan. 31, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42⅞	92¾	$17 00	$3 81½	$21 60
Friday	42⅞	92¾	16 90	3 80	22 00
Saturday	42 9-16	93	16 90	3 80	21 65
Monday	42 9-16	93	16 90	3 80	21 55
Tuesday	42⅝	93	16 50	3 80	21 45
Wednesday	42⅝	93¼	17 00	3 80	21 55

Borax is weak and under a light demand, but may recover for soap use, as tallow has decreased in cost. Quicksilver is lower and quiet at $60@61. There is a moderate movement in Lake copper—February delivery, $16.50; March, $17.25@17. May is about as high. Pig lead is light. Sales, January, $3.80;

March, $3.85@3.87½. Refined petroleum, per barrel, $7.10; plain cases, $9.10.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, ——@——; Billiton Tin, $24.50@ ——; Banca Tin, $24.25@24.50; Baltimore Copper, ——@——; Orford Copper, $16.00@16.25; P. S. C. Copper, ——@——; Foreign Lead, $4.75@5.00; Foreign Spelter, $5.95@6.00; Antimony, Hallett's, $10.75@11.00; Cookson's, $12.50@13.50.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Jan. 31, 1889.

ANTIMONY—French Star	13½@ 14½
BORAX—Refined	7½@ 7¾
Powdered	7½@ 7¾
Concentrated	6½@ 7¾
COPPER—	
Bolt	26 @ 27
Sheathing	26 @ —
Ingot	16 90 @19 00
Fire Box Sheets	25 @ 26
IRON—Glengarnock ton	28 @ —
Eglinton, ton	28 @ —
American Soft, No. 1, ton	— @31 00
Oregon Pig, ton	— @30 00
Clay Lane White	— @21 50
Shotts, No. 1	— @29 00
Bar Iron (base price) ₱ lb	2½@ 3
Chrome iron ore, ₱ ton	8 00 @10 00
LEAD—Pig	4½@ —
Bar	5 @ —
Sheet	8 @ —
Pipe	7 @ —
Shot, discount 10% on 500 bags Drop, ₱ bag	1 55 @ —
Buck, ₱ bag	1 75 @ —
Chilled, do	1 95 @ —
STEEL—English, lb	16 @ 20
Canton tool	9½@ —
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Toe Calk	4½@ —
TINPLATE—Coke, prompt shipment	4 75 @ 4 85
Coke on spot	5 10 @ 5 20
Charcoal, 14x20	6 75 @ 7 25
do roofing, 14x20	5 50 @ 5 62
Pig tin, ₱ lb	23 @ —
QUICKSILVER—By the flask	@42 50
Flasks, new	1 05 @ —
Flasks, old	85 @ —
COKE—English, ton, spot	20 00 @— —
Do. do, to arrive	13 50 @— —

PRICES OF COAL "TO ARRIVE."

Per Ton.		Per Ton
Australian	$ 7 00 @ 7 50 Cardiff	9 50@10 00
Liverpool St'm	10 00 @10 50 Lehigh Lump.	16 50@17 00
West Hartley.	11 00 @12 25 Cumberland bk	16 00@16 50
Scotch Splint.	11 00 @11 25 Egg, bard	15 50@16 00

THERE is much indignation among miners north of Redding on account of locating agricultural claims on land known to be mineral.—*Shasta Courier.*

THE Alaska mine, at Pike City, has by process of law fallen into the hands of some of the miners to whom the company was indebted for labor performed.

Legislative.

Senator Pinder's bill to provide against danger to persons from machinery, elevators, etc., was beaten. The objections to the bill are contained in Senator White's explanation of his vote. He said: "I vote against the bill because it seeks to confer upon whoever may be Labor Commissioner the power, without hearing or legal trial, to condemn and thereby destroy the use of property, and makes it criminal to decline obedience to the order of such Commissioner, who is not required to have any technical or other knowledge of the subject upon which he is called to give final judgment." Campbell moved to strike out the enacting clause, as such a bill would close up every shop in the State and was meant merely to satisfy the whims of a few individuals who did not know what they wanted. Concluding, he said: "It gives the Labor Commissioner almost absolute control, yet he is not a mechanic. Such bills do more than anything else to bring on war between labor and capital, and the laborer always suffers. I believe the bill should be killed and killed now, because it is a bad bill and now is the time to kill it."

General Salomon has introduced a bill which, if passed, will cause a sensation in all branches of trade in San Francisco by making it a misdemeanor to sell short weight, and providing ample means of detecting and punishing the present frauds.

The Senate has passed a bill of considerable importance to employers of labor. It provides that the Labor Commissioner shall have free access to all places and works of labor, and any principal, owner, operator, manager or lessee of any mine, factory, works, shop, warehouse, manufacturing or mercantile establishment, or any agent or employe of such principal, owner, operator, manager or lessee, who shall refuse the Commissioner or his duly authorized representative admission therein, or who shall, when requested by him, wilfully neglect or refuse to furnish him any statistics or information pertaining to his lawful duties, which may be in the possession or under the control of said principal, owner, operator, lessee, manager or agent thereof, shall be punished by a fine of not less than $50, nor more than $200.

By unanimous decision of the Assembly Committee on Mining and Mining Interests, it was resolved not to report favorably on the "Burwell Debris Commission Bill," the latter having in contemplation joint action with the "Federal Debris Commission." It was deemed prudent by the representatives from the mountain counties not to drag this question before the Legislature, but to leave it to the U. S. Commission already at work.

Utah's Metal Product for 1888.

Wells, Fargo & Co.'s Statement of the Mineral Product of Utah for 1888.

	Lbs. of Copper.	Lbs. Lead Refined.	Lbs. Lead Unrefined.	Ozs. Silver in Bars.	Ozs. Silver in Bullion and Ores.	Ozs. Gold in Bars.	Ozs. Gold in Bullion and Ores.
Germania Lead Works	499,250	.....	7,072 700	.....	442,137	....	2,386
Hanauer Smelter	.....	.....	9,882 000	.....	522,550	....	2,363
Mingo Furnace Co	256,519	.....	5,129,100	.....	247,768	....	2,276
Daly Mining Co	.....	.....	1,283.102	856,438	238,311	588	318
Ontario Silver Mining Co	.....	.....	1,924,702	1,074 965	930,623	....	1,058
Silver Reef District	.....	.....	.....	263,468	3,000	.....	.....
Other Mines and Placers	.....	.....	.....	1,769	.....	444	.....
Net Product Bars and Base Bullion	755,769	.....	25,291,664	2,196,638	2,384,389	1032	8,401
Contents Ore Shipped	.....	.....	18,150,778	.....	1,393,100	....	4,045
Contents Ore and Matte Shipped	2 131,047	.....	1,124,715	.....	204,728	....	408
Totals	2,886,816	.....	44,567,157	2,196,638	3,982 217	1032	12,854

RECAPITULATION.

2,886,816 lbs. Copper, at 10 cents per lb	$ 288,681.60
44,567,157 lbs. Unrefined Lead at $54.00 per ton	1,203,313 23
6,178,855 ozs. Fine Silver at 80 92½ per oz	5,787,527.51
13,886 ozs. Fine Gold at $20 per oz	277,720.00
Total Export Value	$7,557,242.34

Computing the Gold and Silver at their mint valuation and other metals at their value at the seaboard, it would increase the value of the product to $10,993,781.02

Comparative Statement, showing the quantity of the Silver and Gold contained in base bullion produced in Utah:

YEAR.	Total Ounces of Silver Produced.	Total Ounces of Gold Produced.	Ounces of Silver in Ores and Base Bullion.	Ounces of Gold in Ores and Base Bullion.	Per Cent of Total Silver Product.	Per Cent of Total Gold Product.
1879	3,835,047	15,932	1,797,589	5,693	46.8-10	35.7-10
1880	3,783,566	8,020	1,403,819	2,878	37.1-10	35.8-10
1881	5,400,101	7,058	2,643,899	2,622	48.9-10	32.9-10
1882	5,435,444	9,039	2,581,789	5,016	47.3-10	55.5-10
1883	4,581,763	6,901	2,351,190	5,597	51.3-10	80.
1884	5,669,483	5,530	3,253,084	3,806	57.4-10	68.8-10
1885	5,972,689	8,903	3,189,576	7,289	53.4-10	81.8-10
1886	5,918,842	10,577	2,838,263	8,369	47.9-10	79.1-10
1887	6,161,737	11,387	4,049,273	10,714	65.7-10	94
1888	6,178,855	13,886	3,982.217	12,854	64.4-10	92.5-10

Comparative Statement of the value of lead bullion, including silver and gold necessarily produced in its manufacture west of the Missouri River, compiled from the annual reports issued by John J. Valentine, Vice-President and General Manager, Wells, Fargo & Co., San Francisco.

YEAR.	Total Value of Precious Metals, including Lead.	Total Value of Lead Bullion, including Gold and Silver Contents.	Per Cent of Entire Product.
1880	$80,167,936	$28,114,564	35.
1881	84,504,417	30,253,430	35.8-10
1882	92,411,835	35,793,750	38.7-10
1883	90,313,612	34,810,022	38.5-10
1884	84,975,954	31,191,250	36 7-10
1885	90,181,263	35,731,711	39.6-10
1886	103,011,761	44,635,655	43.3-10
1887	104,645,959	41,395,353	39.7-10

The metals, lead, silver and gold are obtained in small quantities in almost all the productive mines located in this inter-mountain region. The ores are mostly low grade, and the assimilation of the metals causes the process of smelting to be the favorite and most economical method of reduction. This fact will explain the increase in the percentage of gold and silver produced in the manufacture of base bullion. It demonstrates conclusively, that any legislation, having for its object the repeal of the present tariff on lead, or the placing of the product of lead or lead ores on the free list, must diminish its production, and decrease in the same ratio the gold and silver product of the United States. This injury to our great mining industry is augmented by the action of the Treasury Department in admitting foreign ores (notably from Mexico) free of duty under a strained and doubtful interpretation of the present laws.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING JAN. 22, 1889.

396,541.—OIL-BURNING LIMEKILN — Clark & Mapel, S. F.

396,649.—CABLE RAILROAD TURNTABLE—W. Davidson, Oakland, Cal.

396,651.—BALE TIE TWISTER—Chris. Franco, Livermore, Cal.

396,555.—CAN OPENER—T. H. Gilham, Cortez, Nev.

396,480.—SULKY PLOW—G. W. Haines, Stockton, Cal.

396,562.—DRIER—A. J. Hatch, S. F.

396,564.—EXTENSION LADDER—H. T. Hayes, Oakland, Cal.

396,565.—EXTENSION LADDER—H. T. Hayes, Oakland, Cal.

396,573.—CAMERA-CARRYING CASE, ETC.—Jas. H. Johnson, S. F.

396,440.—BEVERAGE—W. B. Starbird, Stockton, Cal.

396,441.—CULTIVATOR — H. H. Taylor, Santa Rosa, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CAMERA-CARRYING CASE AND PLATE-CHANGING BOX.—James H. Johnson, S. F. No. 396,573. Dated Jan. 22, 1889. This invention relates to the cases or boxes for carrying the camera and accessories and providing for their proper manipulation. It consists of an exterior frame having a hinged lid, and in an interior frame telescoping in the exterior frame, and provided with hand-holes with wrist-boards, the two frames forming, when closed, a complete case for carrying the camera, and, when extended, a box in which the plates may be readily changed. The object of the invention is to provide a simple and convenient structure which may serve the combined purpose of a case for carrying the camera and a box in which the plates may be readily and safely changed.

BALE-TIE TWISTER.—Chris. Franco, Livermore, Cal. No. 396,651. Dated Jan. 22, 1889. The object of this device is to cut the wire of which the bale-ties are constructed to the proper length to form the loops upon opposite ends of the wires and to shape these loops so that they may be locked together after the wire has been placed around the bale. With this machine the wire may be taken from the reel or bale and all cut into equal lengths with the equally sized and properly shaped loops formed upon the ends, so that, the size of the bales being determined, the wires for these bales will all be of the same length and have correspondingly sized and shaped loops upon their ends. The manner of securing these wires is to simply pass the hook-shaped loop through the oval one while the bale is being compressed, and then, the hooks turning transversely to the oval loop, as soon as the bale is released the elasticity of the material draws the wire tight around it and makes a secure fastening. By this contrivance any farmer can manufacture his own bale-ties with great rapidity and little expense at the time and place where used and in the quantity required.

OIL-BURNING LIMEKILN.—Albert V. Clark and E. T. Mapel, Alameda. No. 396,541. Dated Jan. 22, 1889. The invention relates to the class of furnaces which are especially adapted for burning oil, and especially to those furnaces for making sewer pipe, pottery, fire-bricks, etc., in which a circular shell incloses the kiln, and is provided with a number of fire-places. The invention consists in the novel arrangement of the fire chambers, oil burners and supply pipes, steam pipe and superheating chamber. The object of the invention is to provide for burning oil in a furnace of this character and a means for employing a low fire at the beginning of the operation, the heat from said fire being utilized to heat the steam which is furnished to the burner, and after the necessity for a low fire has passed, to provide for employing a fire chamber and burner for the subsequent high fire. This arrangement provides for the burners of both fire chambers the necessary dry or superheated steam for their operation, and at the same time by the arrangement of the fireplaces provision is made for the low and high fire at different periods of the operation.

DRIER.—Andrew J. Hatch, S. F. No. 396,562. Dated Jan. 22, 1889. The invention relates to that class of driers for fruit, etc., in which means are provided for producing a horizontal draft through the drying chamber, and in which the fruit is contained on trays carried by cars traveling on tracks into and out of the side or front of the chamber. The patent covers certain details of construction and combinations of devices for perfecting the drier.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

A. F. JEWETT—Tulare Co.
F. B. LOGAN—Southern California.
H. G. PARSONS—Southern California.
GEO. WILSON—Sacramento Co.
W. W. THEOBALDS—San Diego Co.
JOHN L. DOYLE—Napa Co.
J. C. HOAG—San Francisco.
J. G. H. LAMPADIUS—San Francisco and Oakland.
CHAS. F. BLACKBURN—Idaho.

IS IT WORTH THE RISK?—Some engineers have an inclination to use kerosene for removing scale from boilers. It is well for those so inclined to be admonished that its vapor is highly explosive and that recently an engineer, Mr. Jno. Thornton, a prominent member of the N. A. S. E., was badly burned by it. He was examining his boiler, and, as usual, with a lamp in his hand. Aside from this risk, which is not a small one, it is very doubtful if it will accomplish its object. Several who have tried it have concluded they want no more of it. Some who have been advised to try it have, upon making figures on cost, found that "Winans' Anti-Incrustation Powder" is cheaper and perfectly effective.

A VALUABLE PATENT FOR SALE.

Grain-Saving Attachment

This Patent was issued to R. M. Cochran, Dec 22, 1885, and has proven its worth to the farmers of this coast. It can be attached to the combined harvesters now in use, as well as to stationary separators.

Recommendations as to the efficacy of the Grain-Saving Attachment can be furnished from the leading grain-growers of the coast. The purchaser will be given the entire right for the United States, without reserve. Detailed information can be obtained at this office, or of

MRS. R. M. COCHRAN,
Sissons, Siskiyou Co., Cal.

Violin for Sale. A first-rate Violin, good as new, can be bought at a bargain by applying to CHAS. HAMMOND, Music Store, 2513 Mission St., S. F., and referring to this advertisement.

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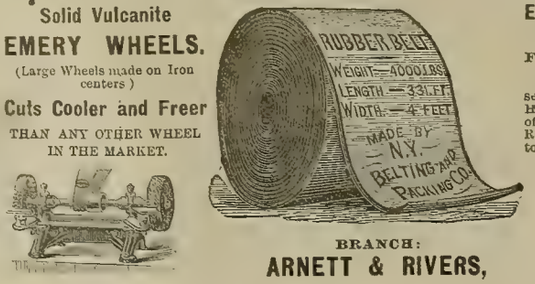

Emery Vulcanite Wheel.

EXTRA RUBBER BELTING and HOSE

For MINING PURPOSES

Circular woven Seamless Antiseptic RUBBER LINED "CABLE" HOSE and TEST HOSE for the use of Steam Engines, Force Pumps, Rolling Mills, Iron Works, Factories, etc.

Extra Steam Hose.

BRANCH:
ARNETT & RIVERS,
17 and 19 MAIN ST., SAN FRANCISCO.

EXTENSIVE GOLD MINE FOR SALE.

To be sold at public auction by the undersigned, at the Merchants' Exchange, in the City of Halifax, on Thursday the Fourteenth day of March next, at twelve o'clock noon, that extensive valuable and well-equipped Gold Mine known as the Dufferin Gold Mine, situate on the Atlantic coast, about ninety miles east of said city. Daily mail from Halifax. Telegraph office at Salmon river, four miles from the works. Salmon river harbor never freezes, and is safe and easy of access. The mine embraces 342 areas, each 150x250 feet, all in one block. The entire area measures fifteen hundred feet in width across, and eight thousand five hundred and fifty feet along the lodes. The leases have nearly fourteen years to run, and can at any time be renewed for a period of twenty-one years, upon payment of two dollars per area. Within this area is a belt of veins dipping on each side of an anticlinal. They have been found by tests made on the surface to extend upwards of 4,000 feet. The ore has been partially removed to a depth of 200 feet over a distance of about 700 feet, and to a depth averaging about 70 feet over an additional 1,000 feet in length or thereabouts. The veins are of various width, the largest averaging about ten feet of solid quartz.

This mine was discovered in the Autumn of 1880, but was not worked to any extent until the Autumn of 1881. It has yielded up to the end of November, 31,012 ounces of gold from 64,408 tons of quartz, according to the sworn returns made to the Mines Office. The gold can be produced at a cost which will leave a very handsome margin of profit.

The mine is operated by machinery worked by water power, the power being transmitted by a line of wire rope running from the water wheel to the mine a distance of about 4,750 feet—and lying parallel to the outcrop of said veins, at a distance therefrom of about fifty feet. The Salmon river crosses the property twice. It supplies the hoisting and pumping power, and the same water is afterwards used to drive the crusher. The latter has thirty-eight stamps, and there is ample water power to operate three times that number. Sixty stamps can be operated with present machinery. Of the 120 horse power existing for pumping and hoisting only about twenty-five is used. There are also 700 acres of well timbered and well watered land owned with the mine. This partly covers the areas, and where it does not immediately adjoins them. It is also provided with a steam plant to operate hoisting gear and pumps in case of accident to the transmission power, a sawmill, sufficient for the requirements of the property, a tramway from the mine to the crusher for carrying quartz, and stables, offices, and boarding-houses, sufficient to accommodate a large number of employees.

The mine is owned and has been operated by a partnership, and owing to the death of one of the principal owners it has to be sold to enable his estate to be settled. A good title will be given.

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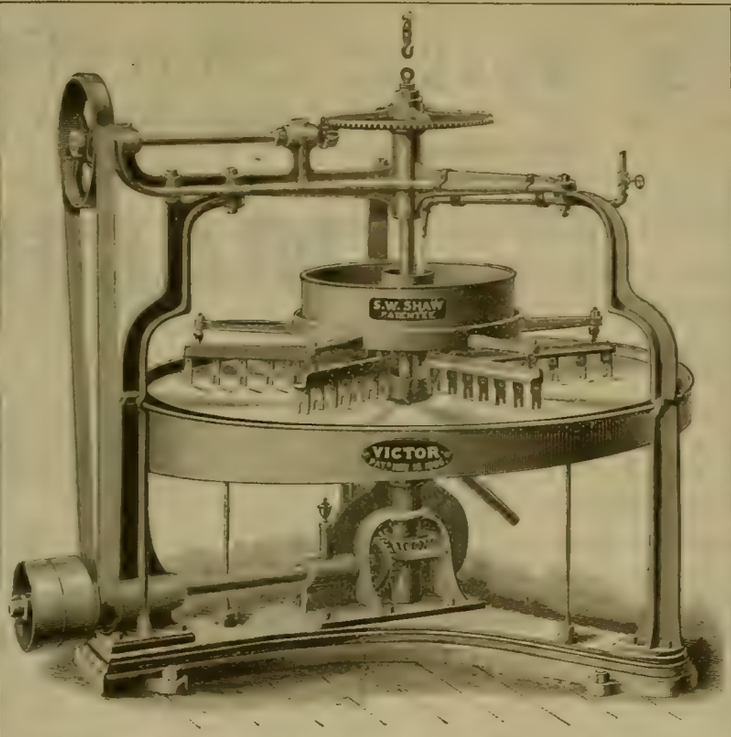

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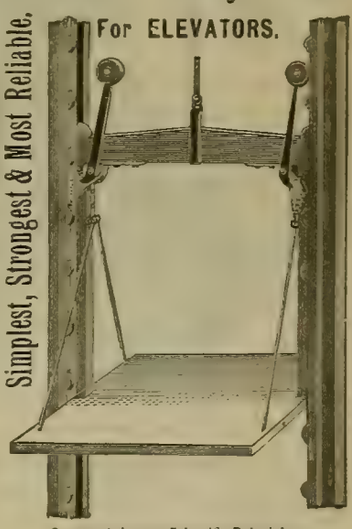

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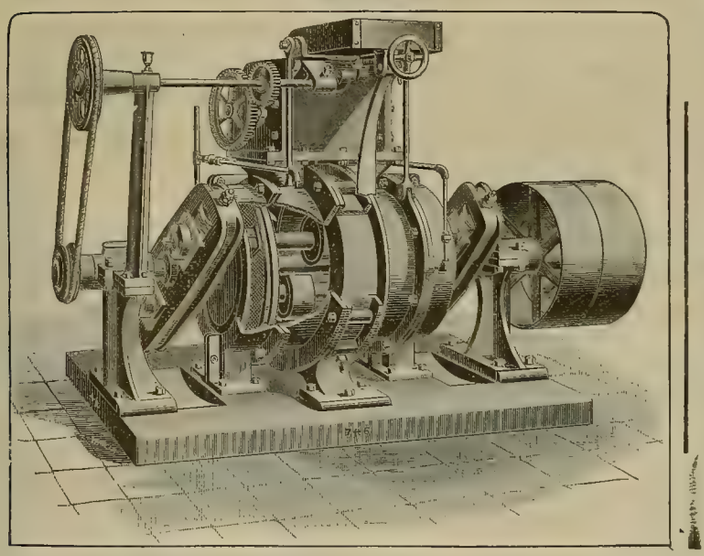

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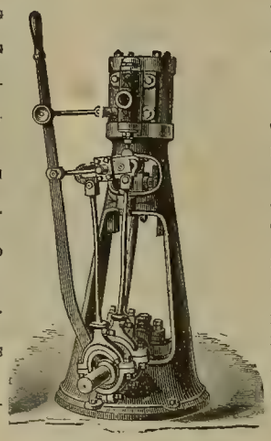

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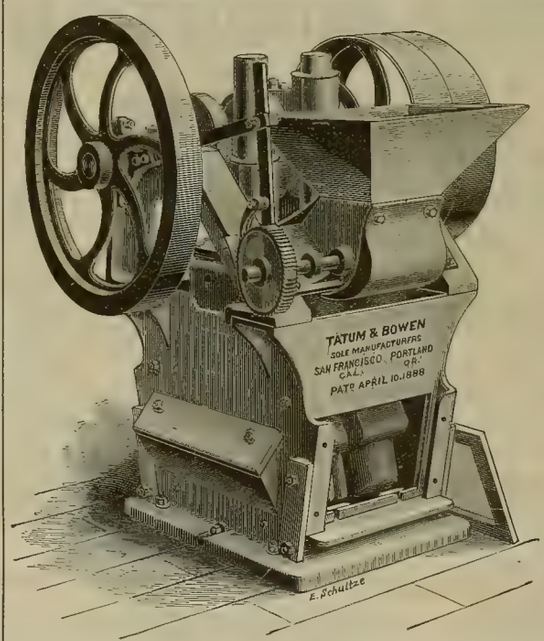

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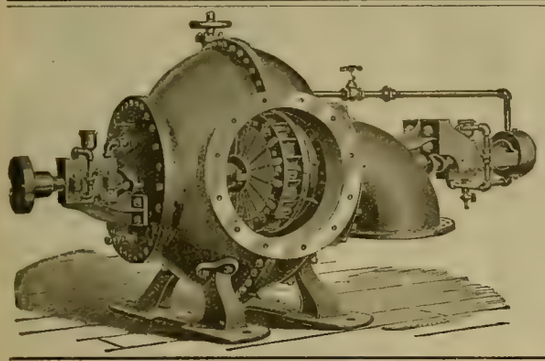

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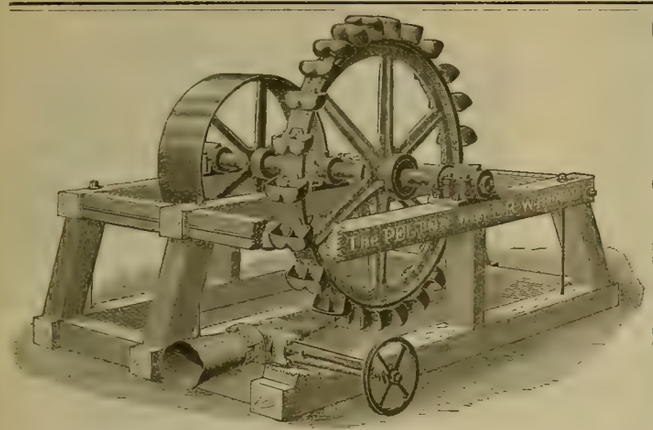

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Big Canyon G M Co	California	1	20	Dec 20	Jan 22	Feb 7	T W Nolin	230 Montgomery St
Concordia M C	Nevada	2	50	Nov 12	Jan 24	Feb 12	G G Higgins	121 Montgomery st
California Slate Co	California	3	30	Dec 13	Jan 19	Feb 18	J O Hansome	10 California St
Gould & Curry M Co	Nevada	61	30	Jan 10	Feb 14	Mar 7	A K Durbrow	309 Montgomery St
Gray Eagle M Co	California	11	03	Jan 23	Feb 26	Mar 19	O H Bogart	327 Pine St
Horseshoe Bar Con M Co	California	2	10	Dec 7	Jan 14	Feb 4	D M Kent	330 Pine St
Martin White M Co	Nevada	22	25	Jan 19	Mar 6	Mar 26	A B Cooper	325 Montgomery St
Mayflower M Co	California	44	50	Jan 14	Feb 18	Mar 11	J Morizio	328 Montgomery St
North Gould & Curry M Co	Nevada	10	20	Dec 18	Jan 18	Feb 4	C H Mason	331 Montgomery St
Nevada Queen M Co	Nevada	4	50	Dec 21	Jan 28	Feb 25	H Deas	309 Montgomery St
North Belle Isle M Co	Nevada	16	50	Jan 3	Feb 6	Feb 27	J W Pew	310 Pine St
Overman M Co	Nevada	59	25	Jan 15	Feb 19	Mar 12	G D Edwards	414 California St
Occidental Con M Co	Nevada	3	25	Dec 27	Jan 31	Feb 25	A K Durbrow	309 Montgomery St
Puget Sound Iron Co	Wash Ter	13	1.00	Dec 29	Feb 2	Feb 25	A Halsey	328 Montgomery St
Peer M Co	Arizona	7	10	Jan 28	Mar 5	Mar 25	A Waterman	309 Montgomery St
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S F Natural Gas & Oil Co	California	1	25	Jan 3	Feb 4	Feb 25	J Scoville	309 Montgomery St
St Louis M Co	Nevada	2	05	Jan 14	Feb 18	Mar 16	W E Dean	309 Montgomery St
Scorpion M Co	Nevada	24	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
Union Con M Co	Nevada	37	25	Jan 4	Feb 8	Mar 1	J M Buffington	303 California St

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NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Alabama, Humboldt & Bailey M Co		W H Watson	302 Montgomery St	Annual	Feb 11
Cibolo Creek M & M Co		L Osborn	309 Montgomery St	Annual	Feb 4
Gt Western Q M Co	California	A Halsey	328 Montgomery St	Annual	Feb 4
Holmes M Co	Nevada	C E Elliott	309 Montgomery St	Annual	Feb 12
Lucky Hill Con M Co		F D Block	Baldwin Hotel	Annual	Feb 14
Spring Valley G M Co	California	H Pichoir	320 Sansome St	Special	Feb 26

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Jan 10
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	Nov 26
Candelaria Con M Co	Mexico	C T Givens	221 Market St	50	Nov 12
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Idaho M Co	California		Grass Valley	50	Oct 11
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Dec 10

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 10.		WEEK ENDING Jan. 17.		WEEK ENDING Jan. 24.		WEEK ENDING Jan. 31.	
Alpha	2.40	2.80	2.25	2.65	2.15	2.50	1.95	2.30
Alta	2.60	2.80	2.65	2.80	2.45	2.80	2.25	2.40
Andes	1.05	1.15	1.05	1.20	1.00	1.15	1.05	1.15
Argenta	....	.10	....	.10	.10	.15	.10	.15
Belcher	5.00	6.00	4.80	5⅞	4.60	5.25	3.25	4.80
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	5.50	7.00	5.25	6.00	5⅝	6.75	5⅝	6⅛
Bullion	1.20	1.40	1.25	1.55	1.15	1.45	1.15	1.20
Baltimore	.35	.40	....	....	.35	.40	....	.35
Belle Isle	.35	.45	.40	.45	....	.45	....	....
Bodie Con	1.60	2.15	1.50	1.75	....	....	1.55	1.80
Benton	2.75	3.00	3.25	6⅛	4.00	6.25	3.30	3.50
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.60	.65	....	.65	....	.55	.50	.55
Con. Va. & Cal	8⅛	10	8⅜	9⅛	8.50	9.00	7⅞	8.50
Challenge	4.60	5⅛	4.50	6.25	4.50	4.90	4.25	4.50
Champion	....	....	....	....	....	....	....	....
Chollar	2.35	3.50	2.70	4.10	3.10	3.80	3.15	3.35
Confidence	15⅛	15	13⅛	14⅛	13	13⅛	12⅝	13
Con. Imperial	.70	.90	.75	.85	.75	.35	.70	.75
Caledonia	....	.45	.40	.45	....	.40	....	....
Con. Pacific	....	.15	....	....	....	....	....	.05
Crown Point	5⅛	7.00	5.25	6⅛	5⅛	6.00	4.90	5.50
Crocker	.80	1.05	.80	.95	.85	1.05	.85	1.10
Central	....	....	....	....	....	....	....	....
Dudley	....	....	....	....	....	....	....	.15
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	....	....	....	....	2.50	....	2.25
Exchequer	1.70	1.25	1.00	1.35	1.05	1.20	1.00	1.15
Grand Prize	.70	.90	.75	1.05	.95	1.10	1.10	1.25
Gould & Curry	3.05	3.50	2.75	3.15	2.75	3.20	2.70	2.90
Hale & Norcross	4.90	5.50	4.85	5⅝	5.00	5.25	4.85	5.00
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	.50	....	....
Iowa	....	....	....	....	.35	.40	....	.35
Julia	.25	.35	.35	.40	....	.35	....	.35
Justice	2.10	2.45	2.10	2.45	1.95	2.30	1.95	2.10
Kentuck	2.20	2.25	2.25	2.80	2.05	2.10	3.00	2.10
Lady Wash	.50	.55	.55	.05	....	.55	.45	.50
Martin White	....	....	....	....	....	....	....	....
Mono	1.25	1.55	1.10	1.25	1.10	1.15	1.20	1.25
Mexican	3.40	4.00	3.25	3.90	3.35	4.00	3.30	3.60
Mt. Diablo	....	2.75	2.50	2.60	....	2.75	....	2.25
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.60	1.70	1.45	1.70	1.50	1.65	1.55	1.65
North Belle Isle	2.25	2.50	2.45	2.70	2.50	2.60	2.40	2.50
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.50	2.90	2.75	3.20	2.95	3.15	3.35	2.70
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.80	1.75	1.50	1.60	1.50	1.65	1.05	1.55
Ophir	5.25	6.50	5⅛	6⅜	5⅜	6⅛	5⅛	5⅜
Overman	1.55	1.70	1.55	1.70	1.25	1.55	1.25	1.40
Potosi	2.00	2.60	2.25	2.50	2.25	2.90	2.35	2.45
Peerless	1.20	1.40	1.10	1.35	1.35	1.45	1.20	1.35
Peer	.40	.60	.35	.40	.35	.40	....	.40
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	3.00	3.40	2.70	3.20	2.75	3.20	2.85	3.20
S. B. & M	3.00	3.50	3.15	3.45	2.90	3.30	2.75	2.95
Sierra Nevada	3.00	3.30	3.00	3.65	3.00	3.50	2.95	3.05
Silver Hill	.85	1.00	.85	.95	.75	.90	.75	.80
Silver King	....	1.50	1.25	1.40	1.25	1.40	1.00	1.30
Scorpion	.45	.50	.50	.55	.45	.55	.45	.50
Syndicate	....	.15	....	.10	....	....	....	....
Union Con	2.75	3.10	2.70	3.20	2.75	3.15	2.60	2.75
Utah	1.25	1.35	1.20	1.50	1.25	1.40	....	1.25
Yellow Jacket	4.50	5⅛	4.40	5⅛	4.50	5.00	4.10	4.75

Sales at San Francisco Stock Exchange.

THURSDAY, Jan. 31.

100	Alpha	2.05	
50	Argenta	.10c	
400	Andes	1.05	
50	Belcher	4.70	
2.0	B. & Belcher	5⅛	
50	Bodie	1.60	
100	Bullion	1.10	
20	Benton Con	3.00	
150	Belle Isle	.40c	
30	Caledonia	.45c	
50	Chollar	3.50	
400	Con Va & Cal	8⅜	
250	Con. Imperial	.70c	
20	Crown Point	5⅛	
150	Commonwealth	5⅜	
20	Confidence	13	
50	Exchequer	1.05	
250	Grand Prize	1.10	
150	Gould & Curry	2.75	
80	Hale & Nor	4.95	
200	Justice	2.10	
100	Kentuck	2.05	
100	Mexican	3.45	
150	New Queen	3.30	
100	Ophir	5⅛	
300	Navajo	1.55	
250	Ophir	5⅛	
100	Overman	1.30	
250	Potosi	2.50	
245	Peerless	1.15	
100	Savage	2.90	
550	Sierra Nevada	3.10	
200	S. B. & M	2.90	
100	Silver Hill	3.c	
100	Scorpion	.45c	
100	Utah	1.30	
25	Union	2.75	
50	W Comstock	.45c	
50	Yellow Jacket	4.30	

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Pamlico, Jan. 26, $36,000; Savage, 26, $18,104; Cons. California and Virginia, 26, $55,958; total to date, $112,253; Navajo, 28, $14,100; Lexington, 25, $22,928; Hanauer, 23, $3850; 24, $1875; 25, $3600; 26, $1800; Hale and Norcross, 30, $4444; Mt. Diablo, 30, $8346; total on January account, $28,360.

THE Victoria *Colonist* says: The steamship Idaho arrived at Nanaimo on Saturday and brought news of the discovery of an immensely rich silver mine at Ship Creek, seven miles from Juneau, Alaska.

Mining Share Market.

Low prices and light sales continue to be the rule in the mining stock market. As soon as a stock shows a slight advance it seems to get set back again with remarkable promptitude. In speaking of Comstock shares, the Virginia *Enterprise* says: They have tallen into a rut from which nothing appears to have power to lift them. Neither new developments nor bullion shipments are potent to produce even the slightest upward movement. They are all down in the mud at the bottom of the wheel, and the wheel is frozen fast. In these times the wisdom of the men of "pointers" is as the idiot—mere vain imaginings and wind. As no one knows why prices remain down, so they will presently be seen to go up without any apparent cause.

The reports received at the Bay that all the mills on the Carson river were frozen up and the mines had ceased shipping ore, also doubtless caused some intending purchasers to pause and hold back their coin in the hope of a more propitious season for taking in their favorites.

The news from the lower levels of the leading mines continues favorable, the majority having in sight considerable bodies of ore of good milling grade.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

GLOBE DRY ORE CONCENTRATOR CO., Jan. 24. Capital stock, $500,000, in 100,000 shares. Directors—C. F. Jacobson, S. Denis de Porte, A. T. von Ettinger, H. K. Stolberg, L. P. Martin, D. H. Fogus and W. F. Gibson.

FRUTO & ROUND VALLEY WAGON-ROAD CO., Jan. 24. The road is to be constructed from Bridgeport, Stony Creek valley, Colusa county, thence by the most accessible route around the south fork of Grindstone and Cold creeks, a distance of 24 miles. Capital stock, $24,000, in 2400 shares. Directors—D. W. Grover, W. C. Murdock, H. M. Hanmore, J. C. Storey, Frank Maskey, Charles Garthorn, F. T. Scott, Edward Foster and L. B. McCormick.

CALIFORNIA ARCHITECTURAL PUBLISHING CO., Jan. 26. Directors—W. J. Cuthbertson, Oliver Everett, Albert Pissis, W. P. Moore, H. T. Bestor, R. H. White and W. J. Mathews.

SHERMAN M. CO., Jan. 26. Location, El Dorado county. Capital stock, $1,000,000. Directors—J. T. Cochran, E. B. Dean, D. J. Moulton, Nathan Rosenberg, and F. R. Cotton.

SHENANDOAH M. CO., Jan. 25. Location, Plumas county. Capital stock, $1,000,000. Directors—F. B. Whiting of Quincy, Plumas county; W. W. Camron, J. S. White, W. R. Thomas, and A. F. Merriman of Oakland.

SAN FRANCISCO POLYCLINIC SOCIETY, Jan. 29. The corporation is formed, and pursuant to an Act of the Legislature, entitled "An Act providing for the incorporation of colleges and seminaries of learning, approved March 14, 1885." The object is to give gratuitous treatment to the deserving poor and to carry on and maintain a hospital, with all its necessities, and to give post-graduate instruction to graduates of regular colleges of medicine. Directors—Drs. H. Kreutzmann, Von Hoffmann, H. L. Wagner, R. J. Bowie and M. Regensburger.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, *or beyond the time he intends to pay for it*, let him not fail to write us *direct* to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or of some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

Sampling Works for Sale.

The works are situated at Daggett, Cal., in the Calico Mining District, and on side-track of the Atlantic & Pacific Railroad. They contain a first-class Engine and Boiler with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPY & CHILDS, 123 California street, San Francisco.

DELINQUENT NOTICE.

Lord of Lorn Gold and Silver Mining Company. Location of principal place of business, San Francisco, California. Location of works, Gold Hill Mining District, Nevada.

NOTICE.—There are delinquent, upon the following described stock, on account of Assessment (No. 4) levied on the 19th day of December, 1888, the several amounts set opposite the names of the respective Shareholders, as follows:

NAMES.	No. Certificate.	No. Shares.	Am't.
Jas. T. McDougall, Tr	72	80	$8 00
Jas. T. McDougall, Tr	194	15	1 50
Jas. T. McDougall, Tr	208	10	1 00
John Wright, Tr	50	150	15 00
John Wright, Tr	74	200	20 00
John Wright, Tr	83	100	10 00
John Wright, Tr	84	100	10 00
John Wright, Tr	85	100	10 00
John Wright, Tr	86	100	10 00
John Wright, Tr	130	150	15 00
John Wright, Tr	132	50	5 00
John Wright, Tr	134	100	10 00
John Wright, Tr	145	50	5 00
John Wright, Tr	151	50	5 00
John Wright, Tr	153	50	5 00
John Wright, Tr	154	250	25 00
John Wright, Tr	160	50	5 00
John Wright, Tr	163	250	25 00
John Wright, Tr	169	100	10 00
John Wright, Tr	170	100	10 00
John Wright, Tr	172	25	2 50
John Wright, Tr	175	50	5 00
John Wright, Tr	176	50	5 00
John Wright, Tr	177	100	10 00
John Wright, Tr	178	100	10 00
John Wright, Tr	179	100	10 00
John Wright, Tr	180	100	10 00
John Wright, Tr	181	100	10 00
John Wright, Tr	182	100	10 00
John Wright, Tr	183	100	10 00
John Wright, Tr	184	100	10 00
John Wright, Tr	188	100	10 00
John Wright, Tr	189	100	10 00
John Wright, Tr	190	100	10 00
John Wright, Tr	191	100	10 00
John Wright, Tr	192	100	10 00
John Wright, Tr	196	200	20 00
John Wright, Tr	199	25	2 50
John Wright, Tr	200	100	10 10
John Wright, Tr	201	100	10 00
John Wright, Tr	202	100	10 00
John Wright, Tr	203	100	10 00
John Wright, Tr	204	50	5 00
John Wright, Tr	209	100	10 00
John Wright, Tr	210	100	10 00
John Wright, Tr	211	100	10 00
John Wright, Tr	212	100	10 00
John Wright, Tr	213	100	10 00
John Wright, Tr	216	100	10 00
John Wright, Tr	217	100	10 00
John Wright, Tr	218	50	5 00
John Wright, Tr	219	100	10 00
John Wright, Tr	220	50	5 00
John Wright, Tr	221	50	5 00
John Wright, Tr	225	100	10 00
John Wright, Tr	228	50	5 00
John Wright, Tr	235	40	4 00
John Wright, Tr	236	20	2 00
John Wright, Tr	237	20	2 00
John Wright, Tr	238	8	80
John Wright, Tr	269	25	2 50
Thomas Nelson, Tr	20	50	5 00
Thomas Nelson, Tr	21	50	5 00
Thomas Nelson, Tr	24	50	5 00
Thomas Nelson, Tr	25	50	5 00
Thomas Nelson, Tr	26	50	5 00
Thomas Nelson, Tr	37	50	5 00
Thomas Nelson, Tr	39	50	5 00
Thomas Nelson, Tr	40	50	5 00
Thomas Nelson, Tr	52	150	15 00
Thomas Nelson, Tr	57	35	3 50
Thomas Nelson, Tr	61	200	20 00
Thomas Nelson, Tr	65	40	4 00
Thomas Nelson, Tr	69	40	4 00
Thomas Nelson, Tr	95	200	20 00
Thomas Nelson, Tr	117	200	20 00
Thomas Nelson, Tr	119	200	20 00
Thomas Nelson, Tr	122	100	10 00
Thomas Nelson, Tr	123	50	5 00
Thomas Nelson, Tr	124	50	5 00
Thomas Nelson, Tr	125	50	5 00
Thomas Nelson, Tr	126	50	5 00
Thomas Nelson, Tr	166	50	5 00
Thomas Nelson	246	1000	100 00
Thomas Nelson	247	250	25 00
Thomas Nelson	248	250	25 00
Thomas Nelson	249	100	10 00
Thomas Nelson	250	100	10 00
Thomas Nelson	251	100	10 00
H. B Atkins	42	100	10 00
Elizabeth Nelson	51	50	5 00
E B. Hamlin	138	50	5 00
E. A. Learned	146	100	10 00
E. A. Learned	252	50	5 00
E. A. Learned	276	50	5 00
E. A. Learned	278	107	10 70
E. A. Learned	296	150	15 00
E. A. Learned	297	203	20 30
Asa Fisk	193	200	20 00
F. A. Webb, Tr	263	25	2 50
F. A. Webb, Tr	264	75	7 50
F. A. Webb Tr	281	90	9 00
F. A. Webb, Tr	283	45	4 50
Wm. Drury	258	10	1 00
Wm. Drury	265	25	2 50
Wm. Drury	268	25	2 50
Wm. Drury	294	5	50
Wm. Drury	295	5	50
Jos. Battersby	267	25	2 50
Eben. Jordan	262	20	2 00
Mrs. E. E. Van Brunt	303	166	16 60
Martin White, Tr	313	3332	333 20
Irving Lawton, Tr	310	3995	399 50

And in accordance with law, and an order of the Board of Directors, made on the 19th day of December, 1888, so many shares of each parcel of such stock as may be necessary, will be sold at public Auction at the office of the Lord of Lorn Gold and Silver Mining Company, 313 California street, San Francisco, California, on Monday, the 11th day of February, 1889, at the hour of twelve o'clock M., of said day, to pay Delinquent Assessments thereon, together with costs of advertising and expenses of the sale. L. G. HARVEY, Secretary.

OFFICE—313 California street, San Francisco, Cal.

THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Leller, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No. 1, 32 ft.; No. 2, 9½ ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

STOCKHOLDERS' MEETING.

OFFICE OF

The Superior Mill and Mining Company.

A SPECIAL MEETING of the stockholders of the Superior Mill and Mining Company will be held at the office of the company, Room 11, 303 California Street, San Francisco, California, on Wednesday, February 20, 1889, at 1 o'clock P. M., for the purpose of taking into consideration the increasing of the capital stock of said company from ten million (10,000,000) dollars, divided into one hundred thousand (100,000) shares of the par value of one hundred (100) dollars per share, to fifteen million (15,000,000) dollars, divided into one hundred and fifty thousand (150,000) shares of the par value of one hundred (100) dollars each. Transfer books will close on Monday, February 18, 1889, at 3 o'clock P. M. By order of the Board of Directors.

J. M BUFFINGTON, Secretary.

OFFICE—Room 11, No. 303 California Street, San Francisco, California.

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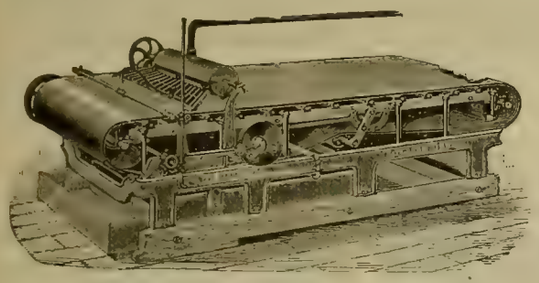

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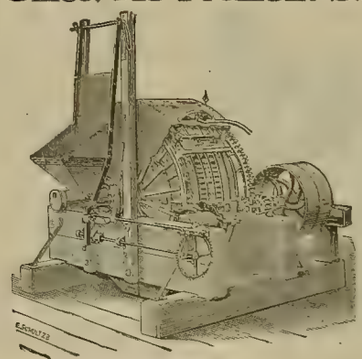

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A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for $2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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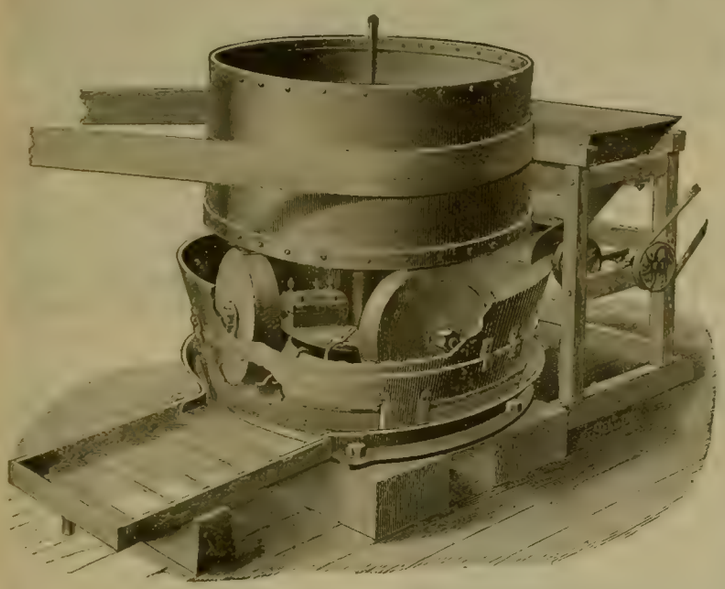

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Yours truly, D. M. BURNS, Superintendent

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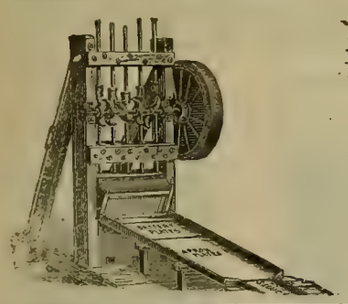

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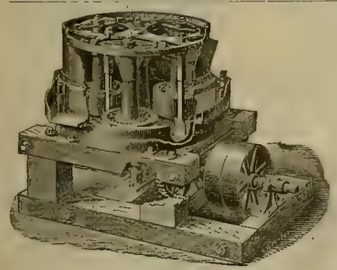

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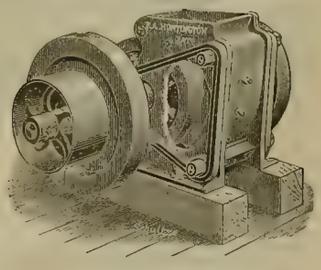

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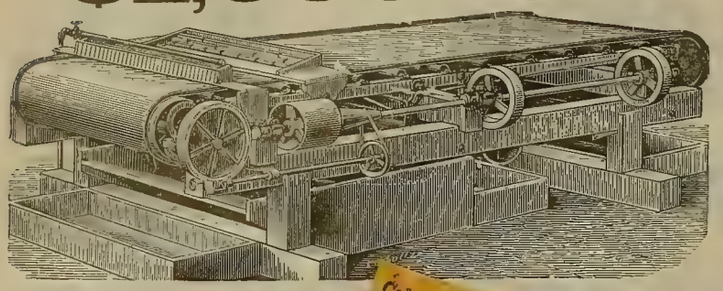

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OR VANNING MACHINE.

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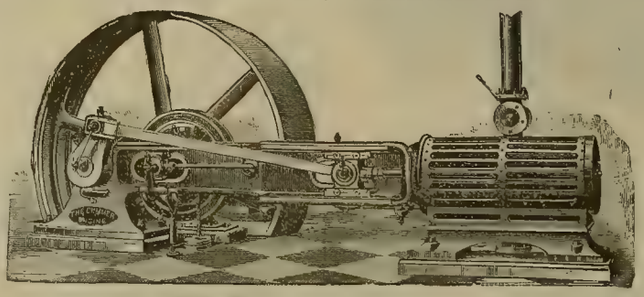

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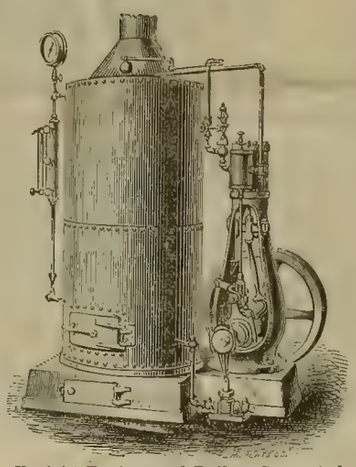

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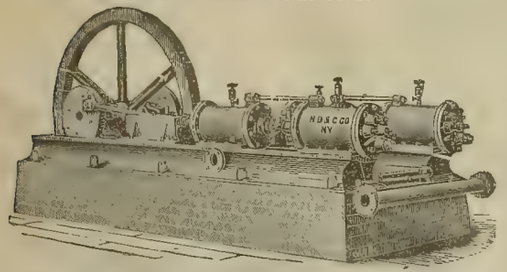

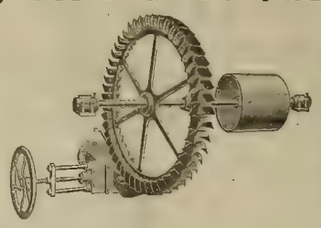

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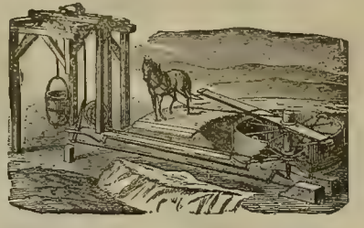

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MINING AND SCIENTIFIC PRESS.

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TWENTY-PAGE EDITION.

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Pneumatic Locomotive for Mines.

Compressed air offers a valuable source of motive power in mines where the conditions of ventilation, or other causes, preclude the introduction of steam locomotives. Unlike steam, its operation introduces fresh, pure air into the passageways of mines, instead of deleterious gases which must be prevented from reaching the lungs of the workmen. In the construction of long railway tunnels, the removal of large quantities of material, without injuriously affecting the ventilation, becomes an important question. The experience of the engineers of the St. Gothard railway showed most conclusively the value of pneumatic locomotives for such work. The locomotives, as represented in the accompanying illustration, are especially well adapted to similar service.

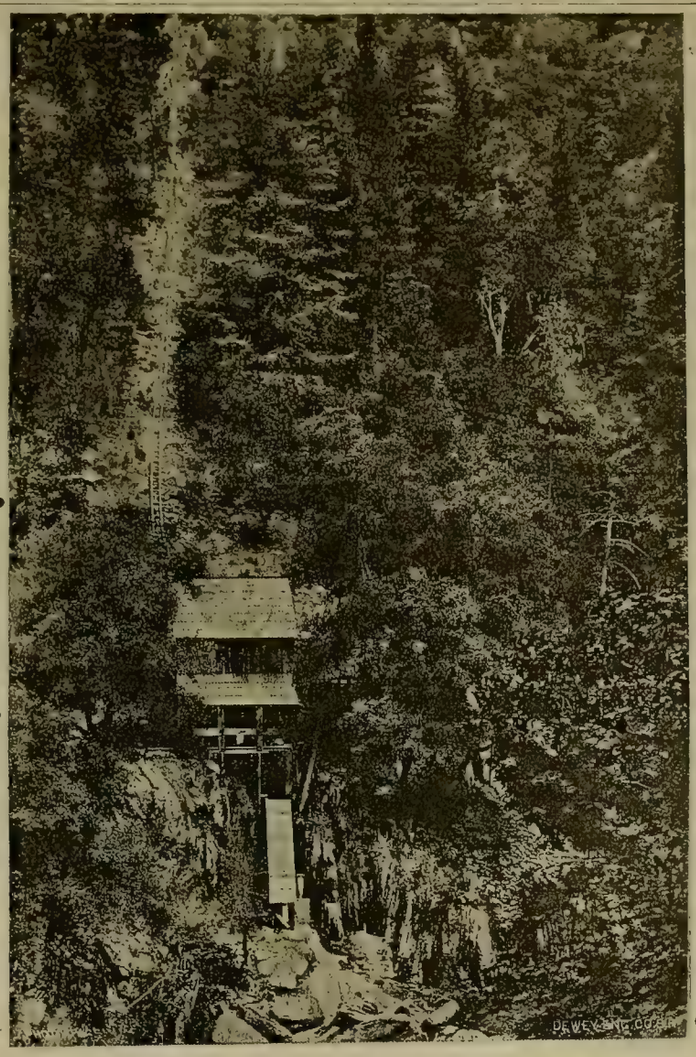
The following may be enumerated as among the advantages peculiar to pneumatic locomotives:

In their use no deterioration can result from the burning out of fire-box or flues, nor from the injurious effects of alternate heating and cooling of the boiler and fire-box. Nor can the reservoirs become weakened from the formation of incrustations, nor from corrosion, if properly cared for. Such immunity from deterioration conduces greatly to economy of maintenance and repairs.

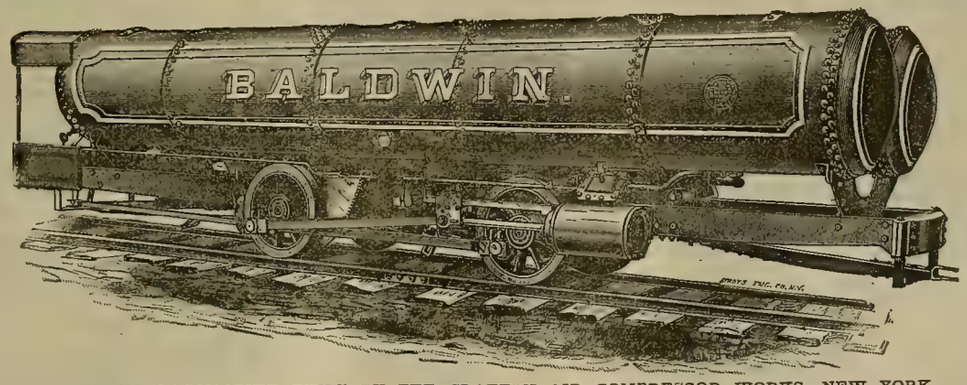
There can be no liability to explosion from any sudden increase of pressure, from exposure of crown sheets, nor from the failure of safety valves to act. The initial pressure, which is obtained from the storage reservoir, and which can be readily gauged, is the greatest which can at any time come upon the main reservoir. In many mines where the temperature is constantly at from 80° to 90° Fahrenheit, the introduction of the cold air which escapes from the exhaust ports of pneumatic locomotives is most salubrious. The substitution of compressed air for steam, for running the hoisting-engines in the mines of the Plymouth Coal Co., Luzerne county, Penn., resulted in a reduction of the temperature in the section of the mine where engines were at work, one-third, viz., from 90° to 60° Fahrenheit.

No injury to the health of workmen can result from the operation of pneumatic locomotives in passages difficult of ventilation or in the intake airways of mines. Renewal of the atmosphere, rather than vitiation, results from their presence. Their presence entails no liability to explosions from the ignition of dangerous gases, such as have caused the loss of thousands of lives and the destruction of millions of dollars' worth of property. These are considerations which cannot fail to recommend pneumatic-power as a means of locomotion to the managers of mines.

The Clayton Air-Compressor Works, 43 Dey street, New York, from whose catalogue the above cut is taken, and whose air compressors for mining and tunneling purposes are so favorably known on this coast, build a special design of air compressors for supplying compressed air to pneumatic locomotives at a pressure of 400 to 600 pounds per square inch, experience having shown that the latter is as high a pressure as can be conveniently used. The compressors are built either duplex or single, with or without compound compression cylinders.



TRAMWAY AND MILL AT THE DORER MINE.



PNEUMATIC LOCOMOTIVE BUILT BY THE CLAYTON AIR COMPRESSOR WORKS, NEW YORK.

Proxies in Mining-Company Elections.

Senator Dargie of Alameda county has introduced into the State Senate a bill designed to prevent a few brokers from controlling a mine, unless they own the controlling number of shares. One needs to look back only a few months in San Francisco to get evidence of how the system of proxies has worked injuriously with reference to the election of certain mining corporations. The bill above referred to, and which, if it becomes a law, will be introduced into the Corporation law of the State, reads as follows: Section 3. It shall be unlawful for any such corporation, or the secretary thereof, to close the books of said corporation more than two days prior to the day of election. At such election the stock of said corporation shall be voted by the bona-fide owners thereof, as shown by the books of said corporation, unless the certificate of stock, duly indorsed, be produced at such election, or by proxies or representatives. All proxies must be in writing, and must be executed by the bona-fide owner of the stock, and must be accompanied with the affidavit of such owner. Brokers or persons holding such stock as security, are not bona fide owners in the sense in which the words are used in this section.

A Mine Tramway.

In last week's PRESS we gave two photo-facsimiles of views photographed at the Dorer mine, on the South Fork of the North Fork of the American river. The mill is run by water-power, and is on the river-bank. The mine is on the divide, above the river, and the ore is brought down to the mill by a tramway 3100 feet long. This tramway has three tracks halfway and an automatic switch. A view of this tramway is shown in the accompanying cut, which was made from a photograph by Geo. W. Bornin

LAKE COUNTY MINES.—Gold has been found recently at Middle Mountain, about six miles from Upper Lake, in Lake county. A. N. Poe, Jr., has located both placer and quartz claims. Specimens procured have been pronounced good "prospects" by old miners. The placers are on the mountain and it will be hard to get water to them. The quartz claims are to be developed immediately, for, though it has been known that there was some gold in the vicinity, until now no systematic work has been done. Several claims have been located. The success of the Los Burros mines, Monterey county, has upset the theory of there being no gold mines in the Coast Range, and other localities are now being prospected and tested.

COAL.—Receipts of coal at this port in January were 95,177 tons, against 100,757 tons in January, 1888. Of last month's receipts, 71,700 tons were from collieries. The coal market continues weak. Stocks of both house and steam coal are now ample.

California Forestry.

The California State Board of Forestry has made another notable contribution to the popularization of tree lore and to the cause of preserving and extending our forest area in their Second Biennial Report, which has just been issued from the office of the State Printer.

It is a volume of 182 pages and contains much matter of interest regarding the work of the Board and also advice of value about tree-culture. The present Commissioners are Abbot Kinney of San Gabriel, John D. Spreckels of this city, and Walker S. Moore of Los Angeles. The secretary is Sands W. Forman.

In our reports of the meetings of the Board during the past two years, we have kept our readers generally informed on the establishment of Forestry Stations, the propagation and distributing of seedlings, etc. Concerning the purposes of the Board with reference to these stations, the report says:

These stations are at Santa Monica, Chico, Merced, Hesperia and San Jacinto, and land has been offered for two others. The plan is to plant these stations in park form, while also having all the trees properly labeled and catalogued, so that the people will be charmed by the beauties of these parks, and at the same time instructed by the information they will give as to the capacities of different trees in our different soils and climates. Golden Gate park is of inestimable value to all citizens. The experimental parks of this board, if properly supported and carried out, will have the same and an additional value to the residents of the State where they are situated. Besides this, they will add greatly to the attractiveness of the State itself. Few places in France are more generally visited than the botanical gardens at Paris; in England than the gardens at Kew; in Germany than the Thier Garten, near Berlin, etc.

In these parks scientific tree-culture is the main feature. Our experimental stations in California, owing to our climate, can be made both more useful and more attractive than any of them. It seems certainly advisable to show by such State institutions what the different parts of the State are capable of in tree-culture. These stations will do this by actual visible experiment to show what will succeed, and by reliable record to show what will not succeed, and thus save time and expense to the citizens, all the time attracting the settler by the beauties demonstrated in the park itself as a capacity of California.

Other portions of the volume contain reports from the engineer of the Board, H. S. Davidson, who submits detailed forestry maps of several of the northern counties of the State, and reports concerning the illegal cutting of forests on Government land, which the Board is endeavoring to stop. There is also a report by W. S. Lyon, head forester, concerning the adaptation of certain trees to California conditions, which we shall present to our readers at another time.

Our attention is naturally arrested in this first glance at the Report of the Commission by the work of Prof. and Mrs. J. G. Lemmon, the botanist and artist of the Board. They visited nearly every county of the State and Lower California in their investigations of the pines of the Pacific Slope. After introductory statements treating of ocean currents, atmospheric conditions and land configuration—the several factors of forest production—a brief general view is taken of the Pacific forests, and especially those of the Sierra Nevada. Then follows a conspectus of the order of cone-bearers and tables showing distribution, etc., after which the main body of the work is reached—the pines of the Pacific Slope, giving first a descriptive list of the groups and species. The cone-bearers of the Pacific Slope, classed in three sub-orders or tribes, compriss 14 genera and 52 species.

Prof. Lemmon is entitled to special credit from lay readers in that he makes the attempt, which seems to us notably successful, to so classify, name, and simplify descriptions as to popularize the study of our interesting pines by the ordinary reader, who is often deterred from study by the many technical particulars used in most works of instruction or discussion.

Following the "descriptive list" are extended descriptions of each of the California species, including in most instances a history of their discovery. A special investigation of two of our most valuable lumber trees—*Pinus ponderosa* and *P. Jeffreyi*—follow, after which are placed "Pines in Literature;" and various topics of interest, including the discussion of the microscopic and other abstruse characters which, however, are necessary to a correct and full study of the pines, and are presented in a paper by themselves, "The Diagnosis of the Genus Pinus," placed at the end of the report.

Artotype illustrations, 24 in number, from photographs taken in the forests of characteristic trees, and from prepared specimens of cones, flowers, leaves, seeds, microscopic cross-sections of leaves, etc., have been carefully prepared. The larger and more elaborate water-color paintings by Mrs. Lemmon, treating closely of details, life size, of our California pines, could not be chromo-lithographed for this report, owing to the much greater expense of such works; but they will be perfected in certain details and augmented by other paintings, completing the series of California pines, when, it is hoped, a future report may be accompanied by these finished and most instructive illustrations.

But we cannot follow this valuable report further at this time. Though the name of the chairman of the commission, Abbot Kinney of Los Angeles county, only appears incidentally in the work, those who know his zeal and thoroughness in pursuit of ends he believes in well know that a leading share of the credit for the work done is due to him, and will award honor to whom honor is due.

Portable Buildings.

Under the auspices of the Red Cross Society an exhibition was held at Antwerp in Sept., 1885, of buildings especially adapted for isolated and field hospitals; and from the number exhibited (upward of 70) the one invented and patented by Mr. Wm. M. Ducker of Brooklyn, New York, U. S. A., came the nearest to filling all the specifications of the society. It received a special medal, offered by Her Majesty, the Empress of Germany, and the warmest encomiums from civil and military surgeons, engineers, architects and philanthropists from all parts of the civilized world.

A commission appointed by the Minister of War for France, to examine this and other portable buildings, has decided in favor of the "Ducker portable building." The German War Department made no awards for plans received, but bought a building exhibited by the Ducker Company. Wherever it has been exhibited in the United States it has been adopted, and is now in use in the United States Naval and Marine hospital service.

The English Government has adopted the system, and are now using these buildings at the Wellington barracks in London.

These buildings combine most of the comforts and advantages of a permanent structure, with the qualities of simplicity, stability, lightness, ease of transportation, quickness of putting up and taking down, ventilation, heating, facility of cleansing and disinfecting.

They are serviceable for contractors (who can sell them readily when their work is completed) and for large estates, especially cattle and sheep ranches, for surveyors and prospectors and mining camps, where building material and skilled labor are scarce, and where it is desirable to change location.

These buildings can be especially constructed for hunting and fishing camps, billiard-rooms, boathouses, photographers' studios, lawn pavilions, for dwellings at the seaside, and other summer resorts; and for innumerable services demanded in small houses, they are most convenient.

The price of these buildings, all complete, in New York, delivered f. o. b., will range from $250 to $750, according to size and finish. The Ducker Portable House Co., Nassau and Liberty streets, N. Y., will mail illustrated circular and price list on application.

TINMEN.—At the hotels last evening a large number of gentlemen from the tin districts were seen and interviewed concerning their presence in the city. The only information obtained, however, was to the effect that the annual assessment work had been completed and that their presence in the city combined business and pleasure. One miner said he was looking for the arrival from London of several English capitalists with whom he expected to consummate a big tin deal. The miners are cheerful over the prospects of their locations, sure that work in earnest will be commenced in the production of the most valuable metal tin in the near future. The immense value of the tin mines is no longer a mooted question, and just why capital cannot be found to take hold with a view to producing tin for the market seems surprisingly strange to those who feel and believe "there's millions in it."—*Dakota Republican.*

A BIG MINE.—The Sydney *News* prints the following interesting figures in regard to the Mount Morgan mine: The balance-sheet for the six months ended November 30th shows a balance from the previous half year of £42,691, which with £274,607 received for the sale of gold, and £60 and sundry accounts, make the receipts £317,359 during the half year. The dividends paid amounted to £225,000, leaving a balance to carry forward of £15,495. The expenditure included £24,822 wages, £4600 buildings, £2200 plant and material, £12 748 new plant, £1400 sulphuric acid works, £823 directors' expenses, and £871 electric lighting plant.

TELESCOPES.—Of the world's refraction telescopes, nine have apertures exceeding 20 inches, viz.: Lick Observatory, California, 36 inches; Pulka, Russia, 30; Yale College, 28; Littrow, Vienna, 27; University of Virginia, 26; Washington Naval Observatory, 26; Gateshead, England, 25; Princeton, New Jersey, 23; and Buckingham Palace, London, England, 21. Six of these instruments are the work of an American firm.

PARTIES lately in from the Kenri peninsula, in Alaska, report that there are large areas of huckleberries, sometimes hundreds of acres, also cranberries, and red and black currants, and there are thousands of acres of red-top grass.

Where the Bullion Goes.

E. T. Hale writes to the Virginia *Enterprise* as follows: "I desire to submit a few facts, not opinions, as to where the coin goes to; also where the bullion goes to.

It takes seven hundred and seventy-three and a half (773½) ounces of pure silver bullion to coin one thousand dollars ($1000) of 412½ grains each 900 fine (10 per cent added in alloys), or 723½ ounces to coin $1000 in fractions of one dollar of the same fineness. Now, 773½ ounces of silver at 93 cents per ounce, the price this day, would be equal to $719.35, the amount the producer receives for $1000 worth of silver bullion, and the Government gets $280.65 for placing its stamp on 1000 one-dollar pieces; but as the largest coinage is in fractional currency we will have to see the profit to the Government on fractional currency. It takes 723½ ounces (nearly) to coin $1000 in fractional currency. This, at 93 cents per ounce, would equal $672.85, the purchase price of silver bullion enough to coin $1000 in fractional currency, and here the Government makes a profit of $327.15 off an investment of $672 85. Now, as the Government makes a profit of $280.65 on every $1000, coined at a coinage of $2,000,000 per month, the minimum allowed by law, the monthly profits to the Government would be $561,300, equal to an annual income of $6,735,600 with bullion at 93 cents per ounce, a handsome sum to add to the surplus now too large.

But this is not all. Wells, Fargo & Co.'s annual statement of the bullion yield of 1888 shows there was shipped to China from San Francisco in the last 12 months, $14,621,431 at par value, but they pay only the ruling price per ounce, say 93 cents, the ruling rate of today. They would pay only $10,517,927, making a profit off of the silver producer last year of $4,103,504, and this in favor of China. This amount added to the $6,735 600, the profit to the Government per annum, would be equal to $10,839,104, a net loss to the producer out of $36,621,431 coined by the Government and shipped to China, leaving only $14,531,316 in unsold bullion to be used in the arts, etc. This amount at the same price (93 cents) per ounce, would be equal to $10,453,103, making a loss to producers of $4,078,213, and a total loss of $14,917 317 to the producer for the year 1888, out of a total yield of $53,152,747. This amount divided between the following States and Territories in proportion to production would be as follows:

	Silver Production.	Discount.
California	$ 652,652	$ 183 106
Nevada	6,858,520	1,924,844
Idaho	3,700,000	1,038,405
Montana	11,500,000	3,227,475
Utah	3,479.138	976,420
Colorado	17,725,100	4,974,640
New Mexico	183,641	51,539
Arizona	850,798	238,776
Dakota	453 216	127,195
Base bullion and ore by freight	7,740,682	2,174,918

Three States, California, Nevada and Colorado, represent a bullion product of $25,236,272, and are represented in Congress; but the six Territories, Idaho, Montana, Utah, New Mexico, Arizona and Dakota, have a bullion product of $27,916,475, but have no representation in Congress. This fact alone should make the Pacific Coast representatives in Congress more determined than ever before to have all or a part of the Territories admitted to Statehood, and they would then have more assistance in the halls of Congress in behalf of silver-producers. *Free Coinage* would be the just thing for this coast. No other industry in the United States suffers like the silver-bullion producers.

TOO GOOD A LAW.—If a man locates a claim on the first day of January, he is the legal owner of it for the ensuing two years—it is two years lacking a few hours. This gives the speculative drone a fine opportunity to do the dog-in-the-manger act. It is too much latitude to be allowed to that class of "bar-room prospectors" whose only desire is to make locations and hold on to them without work, in the hope of selling out to somebody who has money to invest. In this manner they control ground which honest workers would like to develop The objections to this clause of the mining law are many, but how to surmount them without injustice to well intentioned prospectors is somewhat of a puzzle. But there is one thing that can be obviated. If a man permits a claim to become delinquent by reason of neglecting to perform the annual labor, he should never be allowed to hold it again, either by location or deed. There are many good parcels of mining ground in Esmeralda county that have been held for years by men who never intend to do any work on them, but the good-natured law enables them to maintain their title by the relocation process, exercised by means of agents who locate and "deed back" to them.—*Hawthorne Bulletin.*

THE Northern Pacific grade through Cœur d'Alene is completed to Mul'an, and the men discharged for the season. A new boat will be put on Lake Pend d'Oreille by the Cœur d'Alene Navigation Company to carry passengers between Hope and the new chloride camp. The boat will carry 100 passengers and 25 tons of freight. Miners, prospectors and capitalists are rushing into the camp at the rate of 200 weekly.

Engine Tests for the Charleston.

The Union Iron Works have been notified by Secretary Whitney that the following conditions will have to be observed during the trial of the engines of the cruiser Charleston on a continuous four-hours' run in Santa Barbara channel:

In order that there may be no mistake due to the failure of the engine-counter to properly register, an additional counter will be fitted for use during the trial; and if there be any difference in the readings of the counters, the readings of the one showing the greatest number will be taken. Indicator diagrams will be taken from the cylinders of the main engines every 15 minutes, and a sufficient number of navy engineers will be detailed to do the work—one for each of the main cylinders, others to attend to the air and circular engines.

The reading of both counters will be taken at the beginning of every quarter of an hour, and again after an interval of ten minutes, and the difference of these readings divided by ten will be taken as the revolutions at the time the indicator cards are taken. Cards will be taken during this ten-minute interval, and during this time neither the stop nor the throttle valve is to be touched. During the next five minutes these valves may be adjusted as found necessary. This method of procedure is to take place every 15 minutes.

The sum of the indicated horse-power of each observation, divided by the number of observations, is to be the mean indicated horse-power of the trial. Defective cards are to be thrown out, and the indications of the two cards nearest to the defective one shall be averaged, and inserted as the proper indications for the defective cards. The air pumps are to be indicated once an hour at regular intervals while the main engines are running.

The other auxiliaries will be indicated one at a time after the trial. The speed of these engines, as well as all the data of their working, will be carefully noted during the trial in order to obtain similar, or as near as possible, results at subsequent trials. The speed of each blower is to be taken at half-hour periods, and the steam pressure, exact opening of the throttle-valve and air pressure in the boiler-room noted.

The four-hours' trial must be consecutive time, but the builders will be allowed the option of trials at their own expense until one satisfactory to them is obtained, the Secretary of the Navy reserving the right to limit and determine the number of these trials.

The Forests of Alaska.

The prevailing forest tree of Alaska, says Mr. George Davidson of the Coast Survey, is the Sitka spruce, growing to great size, covering every part of the ground and climbing the steepest mountain-sides to the hight of 2000 or 2500 feet above the sea.

This tree resembles in form and foliage the silver firs of California. In the Archipelago Alexander, with a shore-line of more than 7800 statute miles, the land is densely wooded from the water's edge. It can never be devastated by forest fires, because the carpet of wet sphagnum over the surface of the country effectually prevents fires from spreading.

We measured felled spruce trees that were 180 feet long and four feet thick at the butt, while adjacent standing trees measured over six feet in diameter, were branchless for over 50 feet, and estimated to be 250 feet high.

Hemlock, alders and willows are found, but the most remarkable wood of the country is the yellow cedar, with fine, even texture, fragrant smell, good size and greater strength than the spruce. It is readily worked, takes a smooth surface and is remarkably durable. It is a valuable addition to cabinet woods, and is superior as a ship timber to any on the coast.

It can be obtained of ample size for frames and knees of ordinary-sized vessels. We measured one 18 feet in circumference, and estimated it to be over 125 feet in hight. We collected part of the keelson and frame of a Russian vessel built of this wood 32 years before, and which had been lying a wreck on the beach for several years. It exhibited no signs of decay nor of teredo attacks, and the wood around the copper and iron bolts is nearly as well preserved as on the day they were driven.

On Kadiak island the forests cease toward the south. The yellow cedar does not grow on the northeast part of the island, but the average size of the spruce is less than two feet in diameter.

Hemlock is found in abundance and has its value for tanning purposes.

When the forests of Washington Territory and Oregon are exhausted, Alaska will be the great and our almost inexhaustible resource in the future.

HOLLISTER COAL.—H. L. Schaffer, an experienced miner who has worked in coal mines in Montana and Idaho, has been prospecting for the last two weeks for coal on the ranch of Mr. A. Sally, six miles southwest of Hollister. He reports that he has uncovered a vein of coal 20 feet in width. The coal is of good quality, burns readily, and makes an excellent fire. It is said to be a first-rate quality of stove coal.—*Free Lance.*

A Flourishing Northern City.

[From Our Own Correspondent.]

Astoria is emphatically a "city by the sea." Its only communication with the world abroad is by means of steamers and other water craft, and the occupation of a large proportion of its inhabitants is related to the navigation of waters or the catching and curing of the fish of the sea.

Astoria has a picturesque appearance, especially when approached from the water-side. Its white buildings stand out in relief against the dark background of a timber-fringed bluff, which rises to a considerable hight in the rear of the city. There is little table-land at the foot of this hill, so that the city extends out over the tide lands, and is fronted by a continuous line of wharves from one end to the other. It is but a block or two from the main street of the city to the water front. As the city grows it will creep up the sides of the bluff, where are excellent building sites, but where there will be a necessity for considerable grading to make the streets conform to business requirements. The present population of the city is said to be 6500, and from a comparison with other cities we should say this was not an overestimation.

Astoria is noted for the magnitude of the operations carried on in the canning of salmon. The greatest salmon fisheries of the world are at the mouth of the Columbia river, and a goodly portion of the Astorians is directly or indirectly connected with this industry. The fleet of fishing boats on the river, after the salmon begin to run in the spring, is a sight to be remembered. Although the weather may be rough, the fishermen go out almost to the bar, and at night may return with loaded boats. Many of the fishermen have accumulated considerable property, and their comfortable houses constitute a large part of the city, which stretches along the river for over two miles. At least 3000 fishermen make this city their home during the fishing season, fully one-half of whom abide here permanently. There are 22 canneries in Astoria, some of which are very extensive institutions, where 50 to 60 employes (largely Chinese, however,) are engaged in the canning operations besides the fishermen. Over $2,000,000 are disbursed annually to the fishermen and laborers in the canneries of this city. The pack in 1887 was valued at $3,000,000.

There are three sawmills in Astoria. One of these cuts 70 M. feet of lumber per day, another 40 M. to 45 M. feet and the third 30 M. feet. Each of these mills has a box factory in connection, and besides making boxes for local use at the canneries, large supplies of box material are sent to San Francisco, San Jose and California towns. There are also three or four iron foundries and machine-shops.

Quite extensive shipping interests are centered at Astoria. Twelve to fifteen small steamers make regular or spasmodic trips to such adjacent towns as Ilwaco, Skipinon, Knappa, Knapton, Gray's Harbor and other smaller places. This city seems to be the main supply for these small towns, and the aggregate of trade from this source is considerable.

Foreign vessels for Portland and other Columbia-river points make report of entry at Astoria. There is a good custom-house here, which serves also for postoffice. The light-house steamer Manzanita, which carries supplies to the light-houses of this portion of the coast, and which attends to the buoys hereabout, makes Astoria its headquarters. The revenue cutter Corwin will also remain here while not engaged in actual service in Alaskan waters.

An ocean steamer touches here on the way from San Francisco to Portland every four days; there are two regular daily steamers between Portland and Astoria, and while the Alaskan steamers are running, they make this point an important stopping-place.

INDUSTRIAL ART AND MECHANICAL DRAWING. From a circular issued by Superintendent of Schools Anderson of this city, we take the following: The Board of Education have decided that the present course of drawing in the primary and grammar schools shall be replaced by an industrial art course for girls and boys up to the second grade and by a mechanical drawing course for boys of the first and second grades. Classes for instruction in the method will be opened at the John Swett Grammar School, Broadway Grammar School, Valencia Grammar School and Lincoln Grammar School, beginning on Monday, the 4th of February. Meetings will be held at the Broadway Grammar and the Lincoln Grammar every Monday and Wednesday until further notice, and at the John Swett Grammar and Valencia Grammar every Tuesday and Thursday until further notice. Classes will be called promptly at 3 P. M. The principals of the several schools will be held responsible for the direction of this work in their respective schools, and it shall be their duty to see that the lessons given by the drawing teacher are given to, and mastered by, the teachers of their respective schools. For this purpose the teachers of each school shall assemble from time to time in their own school buildings and receive instruction under the direction of the principal in the work taught by the drawing teacher.

Photo-facsimile.

A PARTIAL VIEW OF THE CITY AND HARBOR OF ASTORIA, OREGON.

AN ELECTRICIANS' SOCIETY.—A meeting of those connected with the telephone, telegraph, electric light and electrical industries in this city was held last week. Prof. N. S. Keith was elected temporary chairman and M. J. Wall temporary secretary. There were 55 names enrolled as members of the society, which is for the mutual improvement of its members in electrical science and art. It is intended to have lectures, papers, discussions and exhibitions provided on subjects relating to electricity. The meeting was an enthusiastic one. The Committee on Permanent Organization appointed was as follows: N. S. Keith, W. W. Wighte, C. T. Rylands, Jr., W. Shute and V. P. Brown. The committee appointed to wait upon gentlemen connected with electrical science consisted of S. H. Taylor, G. I. Kinney and W. Pelt. D. J. McCarthy had prepared a paper on electrical science to read to the society, but the reading was postponed on account of pressure of business.

THE three staple shipments from Port Harford are beans, butter and bituminous rock. The first go to Boston, Mass., the second to San Diego and the last comes to San Francisco.

Utah Asphaltum.

The Salt Lake *Tribune* says: The North American Asphalt Company, backed by St. Louis capital, have spent $40,000 in putting in machinery near Thistle station on the D. & R. G. Western, to work asphaltum extracted from the extensive mines. This machinery was calculated on a capacity of 500 tons, crude, per day, from which they expect to get about 35 per cent asphaltum. The process is both mechanical and chemical, and the works just ready for operating are expected to be running soon. Besides asphaltum, the works are to produce naphtha, petroleum oils for lubricating, and the greatest product is to be the paving materials. This company hopes to make this a great industry, and soon to be able to supply all the West with paving, varnish and other classes of asphalt.

In Emery county, Utah, near the Colorado line, and not far removed from the Denver & Rio Grande Western, are immense beds of asphaltum, lately discovered, and which are to be improved by some men of Grand Junction, Colorado, who have filed on the land. This asphaltum is found in several distinct forms. The main body is mixed with sand in a black mass, so moist as to be something like putty except for the granulations. Another form less common is in a black, flinty form, being the residue from liquid asphaltum with the volatile portions all gone. This is more or less mixed with clay, and will be easily refined. Then there are springs pouring out a black mass like thick molasses. In this form it can be refined at small expense, and will produce a good quality for the many uses to which liquid asphaltum is put. An analysis of these several varieties shows that that mixed with sand will make a good paving material; the liquid will produce varnishes by being distilled, or can be used in its present condition for roofing or paving, and the dry, flinty kind will make good varnishes or lacquer. The country around is certainly an interesting one because of these deposits, and also on account of the coal measures near there. This coal, of which there are thousands of acres, partakes largely of the character of anthracite, but it is not known to be a true anthracite. In the vein there are seams of what looks to be coal, but which, on burning, throws out an odor of petroleum, and when heated is so soft and tough as to be shaved with a knife like a piece of cheese. These deposits will be developed ere long, and it is believed will prove of great value and add much to the industries of Utah.

MINE PURCHASE.—The people of Placerville are greatly elated over the prospects of great prosperity in the immediate future. A New York company of large means has purchased the Deep Gravel Mining & Water Company's ditch and the Pacific Mining property, on which is a good mill and hoisting works, together with the Oregon, the Eply, the Rose and other mines on the same belt, and they will open up these claims at once. This means employment for several hundred men. The value of the property reaches into the millions. Prof. Price of San Francisco is president of the company.

Water Prospects.

Thus far the outlook for water for agricultural and milling purposes next summer is not flattering. There are now only three feet of snow in the Sierra Nevada mountains, where there should be at least 15 or 20 feet. "Never mind," say the ever-hopeful ones, "we will see plenty of snow in February and March." That is probable. We do not much doubt the occurrence of heavy falls between this time and the end of March, but it is not the season in which the big snowfall of the winter is most desirable. Could we have our way, we would wish to see a fall of 10 or 20 feet early in the winter. It would then become solidified—would be about as firm and compact as ice. It would in that condition constitute a valuable reserve of water—would equal an immense storage reservoir in the mountains.

A fall of snow, however great, late in winter does not properly solidify. It is so loose that the first warm southerly winds cut into it almost as rapidly as would a stream of hot water plunged through a hose. A snow in March would not long endure the warm days of April and May. It would be better than rain, but soon it would all be gone. With storage reservoirs to catch the water during the rush we would be all right, but situated as we are we shall be all wrong. Another short milling season is almost certain. In July we shall have the old fight for water between the millmen and the ranchers, and in August and September there will not be much to fight about.

Curiously enough, in Eastern Nevada they will be better off than we here under the eaves of the Sierras. In all the mountain ranges in Eastern Nevada the fall of snow has been unusually heavy. The *Silver State* of day before yesterday says: "The prospects of high water in the Humboldt next spring are not as good as they might be, though the outlook is more promising than it was a year ago. Railroad men say that the ranchers at Wells estimate that there is twice as much snow in the mountains at the head of the Humboldt as there was this time last year. The snowfall is light in the ranges about Paradise valley, though there is said to be considerable snow at the head of the Little Humboldt. As it is getting rather late in the season for heavy snows to fall in the mountains, farmers and stockmen say the salvation of the country depends upon a wet spring."—*Virginia (Nev.) Enterprise.*

JAPANESE COAL.—The collieries in Japan yearly produce about 1,500,000 tons of coal. The following is the estimated coal wealth of the various districts: 150,000 tons from the Miike mine (Chikugo district); 330,000 tons, Karatsu and Taku (Hizen district); 70,000 tons, Hirago and Imobuku (Hizen district); 670,000 tons, Chikuzen and Buzen districts; 20,000 tons, Amakusa (Hizen district), and 12,000 tons from Horonai (Hokkaido).

A YOUNG MAN named Winters, who resides in Oakland, became blind in one eye, and is threatened with the loss of sight in the other, from looking at the eclipse Jan. 1st without protecting his eyes with smoked glass.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

TRIPP MINE.—*Dispatch*, Feb. 2: The ten-stamp mill on this mine was started last week. They have the benefit of free water from the Mokelumne river. The owners claim with the light expense attached to working the property that they can make money on $1.50 rock.

LIVE OAK.—This mine, 2½ miles west of Jackson, is looking well. The shaft is down 180 feet. A winze is being sunk from the bottom tunnel which is now down 30 feet; at the bottom of the winze they have a ledge 18 inches wide. The little two-stamp mill pounds away as big as life and crushes its five tons per day. It was manufactured by Donnelly & Co. and cost only $700. Seven men are employed at the works; the rock pays from $10 to $15 per ton. Parker and Thomas have certainly a fine prospect.

MECHANICS MINE.—This claim is on Gopher Flat one mile north of Sutter. It is owned by a corporation, there being 33,000 shares of stock in the plant. An English company is now negotiating for a bond on the mine for $40,000.

BELL WETHER.—Everything is progressing nicely at this mine. It is situated in Bright's field, about half a mile from town, and is worked by a tunnel.

COSMOPOLITAN.—East crosscut 190 feet, face in soft slate. West crosscut in 70 feet, face in hard slate. The south drift is on ore 15 feet wide; just started drift north on ledge. They have been closed down for a few days on account of boiler leaking very bad. A new boiler has been purchased in San Francisco.

NORTH CALIFORNIA.—These people are still running their mill, but the scarcity of water will soon close them down. They use water from Dry creek, and a dry winter makes the water supply short.

GOVER.—The new water-hoist will soon be ready. The mill is now run with 30 inches of water. Mr. Call, the superintendent, thinks that after the pipe stops leaking he can run with 25 inches.

OVERPLUS.—They are still taking out ore at this mine, but the mill has closed down again. A good stamp-mill is needed at this mine to make it a paying property.

DRYTOWN CON.—Work began on this mine Feb. 1st. There has been considerable delay on account of the books, which were not correct at first.

HECTOR MINE.—This company has levied assessment No. 1. The object is to raise funds to supply the mine and works with permanent motive-power, and to develop the property in a systematic way.

KENNEDY.—The north shaft is being driven down as rapidly as possible. When 200 feet deeper it will be same depth as south shaft, 1050 feet. A connecting tunnel will then be run from shaft to shaft. The tunnel north of the north shaft is in 500 feet; it is the intention to run the same in 500 feet more to the line of the Oneida, thus prospecting the whole north end of claim.

MISCELLANEOUS. — *Ledger*, Feb. 2: Another rich pocket was taken from the Reed and Askey mine this week. Mr. Askey brought to Jackson a pan full of rock carrying one-third of its weight in gold. This is the richest find yet made in that promising mine. Eli Gardener has bonded his ranch, including two mining claims for two years for $15,000; 10 per cent to be paid in one year. The parties taking the claim are from San Francisco. At the Alpi mine everything continues to look very favorable. The work is now confined to running a tunnel to tap the shaft at a depth of 50 feet. The rock and gouge in this tunnel improves daily. The Plymouth Consolidated will soon get to work on a scale of magnitude approaching its most prosperous days.

Calaveras.

ABANDONED. — Calaveras *Chronicle*, Feb. 2: Operations have ceased at the A and B mine in Poorman gulch. An incline was run to the depth of about 900 feet, and as no gravel was found, we understand the company has decided to abandon the mine.

ALBANY FLAT.—*Mountain Echo*, Jan. 30: Work is progressing finely at the Whipple mine near Albany Flat. The mine is bonded to Mr. Peet, who is now prospecting the property with a view to buying it. The mine is making an excellent showing, in fact, far above the expectation of its manager. The machinery which was recently erected on the Brunner mine, at Albany Flat, was started up one day last week. The works are run by steam-power. The mine is under the management of Mr. Thomas Machell, who has the property bonded. The mine has been freed from water, and the shaft is being repaired preparatory to sinking. The shaft is at present about 60 feet deep.

Inyo.

SILVER.—Inyo *Independent*, Feb. 2: A rich strike of silver ore is reported in the Flag Staff mine, near Swansea, owned by C. Meysan of Lone Pine. The parties leasing the mine will soon make a shipment of ore that assays 200 ounces silver per ton. Felix Meysan and two others are taking very rich ore out of the Coalburner mine, in the same neighborhood. There is a wagon-road within a quarter of a mile of the mines, making shipments very easy, and the boys ought to make a good stake.

DARWIN MINES.—Jack Wilson makes a favorable report of the Darwin country. He says a number of chloriders are at work there and are doing well. Considerable deadwork is being done in the Defiance and some ore taken out. Mr. McKenzie is taking out ore at the Lucky Jim. Mr. Fitzgerald is working a number of men at Lookout and Mr. Wilson says he is doing well. Mr. Farringdon has secured some mines belonging to Mr. Wilson and will fully develop them. Altogether the outlook for Darwin is brighter than for some time past. It is reported that George Lewis has struck it rich.

Mono.

BENTON.—Inyo *Register*, Jan. 28: We learn that affairs in Benton are much the same as for some years past. An encouraging fact, however, is the fact that the Diana mill, recently burned, is to be rebuilt; part of the framework is already in place. It is being put up on the old site. J. F. Millner is now below looking after the interests of the enterprise. Some ore is being taken out all over the hill. A shipment of six carloads of good ore was sent up the road last week by Mr. Millner.

BODIE MINES.—Homer *Index*, Feb. 2: A wire cable 1500 feet long has arrived for the Lent shaft. This is an indication that they will sink the shaft deeper. It looks more like true business than anything that has been done for some years.

MONO.—During the past week the east crosscut from the south drift, 1200 level, was extended 26 feet. The west crosscut from the south drift was advanced 22 feet.

BODIE CON.—During the past week the north drift, 1200 level, was advanced 27 feet. The upraise from the same level was extended 7 feet. The west crosscut from the north drift was driven 24 feet.

BULWER CON.—During the past week the south drift, 200 level, was driven 18 feet. The north upraise on the same level was advanced 12 feet.

STANDARD.—The upraise on the 300 level was advanced 15 feet; the east drift north was advanced 13 feet, and south drift 17 feet. The mill is running steadily. Bullion was shipped on the 21st of Jan.

Nevada.

OMAHA MINE. — Grass Valley *Union*, Feb. 1: The Omaha and Lone Jack Consolidated mine is making an excellent showing at the present time, having good ore both north and south of the shaft. In the No. 9 level north the lode is nearly four feet in width and of fine quality, something which was not expected when work was recommenced on the mine. Connection has been made with the Lone Jack workings on the No. 5 level, but another drift is now being run on the No. 7 level, which will open up new ground in the Lone Jack where it was never before exploited. The working force of the mine, underground and surface, is nearly 100 men, 67 of them being on the payroll of underground workmen. There are but few tributers employed in the mine. The 18 stamp mill is kept regularly going, being driven by water-power with Pelton wheel attachments. No noise is being made about the Omaha, but the stockholders are satisfied with its appearance and the successful management of Supt. George Mainhart.

THE BALTIC "SCHEME." — Nevada *Transcript*, Feb. 2: The Baltic Consolidated Mining Co., lately incorporated, consists of three locations in the Eureka mining district, Nevada county. The Baltic may be all right, but there are people hereabout who do not have much confidence in it as a legitimate mining operation. If any of the stock is put upon the market it would be a sensible idea for intending purchasers to make a careful investigation as to the property and the men at the head of it before they invest.

VALLEY'S BRIGHT PROSPECTS.—*Tidings*, Feb. 1: In the course of a year the entire group of mines in the Allison Ranch locality will be in operation. Already the Omaha and Lone Jack Con. is being profitably worked, after years of idleness, and the Hartery, bonded to A. W. Stoddart, will be started up early in March. Mr. Davis, owner of the once famous Allison Ranch mine, is authoritatively reported as saying he will himself reopen that property this year, if not quickly sold at his own figure, and now the Menlo ground, lying between the Hartery and the Omaha and Lone Jack Con., is once again to be the scene of bustling activity. The Homeward Bound and Wisconsin (Illinois) claims comprise what is known as the Menlo ground, and consolidated, constitute one of the best ventures in this great mining district. Thirty years ago the Wisconsin was the richest mine in the neighborhood—a specimen vein—and, although not worked to a depth of 300 feet, thousands on thousands of dollars were extracted. A few years ago the Wisconsin and Homeward Bound were consolidated and the Menlo Co. of New York took hold of the property. Beyond erecting a first-class pumping and hoisting outfit on the Homeward Bound shaft and cleaning out the shaft, which is less than 200 feet in depth, nothing was done. Not a ton of ore was extracted, the company meeting with reverses elsewhere and becoming bankrupt. In passing, a word about the Homeward Bound ledge is not amiss: There are two parallel veins, one of which is four feet wide and of average ore, while the second vein is of good size and quality. The mine was never properly managed, as we regard mine management in these days. After the Menlo Co.'s failure, the consolidated property became, and is now, the property of Messrs. M. C. Taylor, J. M. Lakenan, Peter Johnston and H. Silvester, who have bonded it for $75,000 to Messrs. Abadie and Wiltze of the North Star. The bond is to endure for two years, and Abadie & Wiltze are to expend $3000 within three months from date. As the plant on the Homeward Bound is in good repair, this means that active operations are to be instituted forthwith, and it is further stipulated that work must be carried on continually, or else the bond shall be void. We reassert that without doubt the entire group of mines in the Allison Ranch locality will be in full operation ere 1889 shall have passed away. The success that has attended the reopening of the Omaha and Lone Jack has brought about this bright prospect, but the present era in Grass Valley's prosperity dates from the reopening of the Empire; the impetus thus given was stimulated by the success crowning the renewal of operations at the North Star, and next came the Omaha and Lone Jack. Now we are to witness the reopening of the Homeward Bound and Wisconsin, the Hartery, and the Allison Ranch. The pumps will soon be at work at the Coe, the Evening Star is slowly being provided with machinery, the Green Mountain is full of promise, the Idaho is good for several years to come, and the Maryland is positively an undeveloped Idaho. Arrangements for the working of other old and new mines are under way, and, in short, our belief that Grass Valley's mining interests will alone increase the district's population to 10,000 souls within the next five years is about to be verified.

Placer.

GOLD DUST.—Placer *Herald*, Feb. 2: General Hamilton has succeeded in controlling the water in the Dardanelles, and the old mine is now turning out lots of dust.

San Diego.

JULIAN MINES.—*Sentinel*, Jan. 30: Work has again been resumed at the Owens mine, and this time in a business-like manner. Alfred James of Los Angeles, one of the owners of the property, arrived in this city Monday evening, and at once advertised for bids for sinking a new shaft and for retimbering the old one. James Courtney secured the contract for sinking the new shaft to a depth of 100 feet, and will commence work some time next week. It will take about 30 days to sink the shaft to the depth called for in the contract, and in the meantime men are engaged in retimbering the old shaft, and when that is done the water will be pumped out and operations begun in the old works. The new shaft will be sunk about 300 feet from the old one, so there will be no danger of coming in contact with the old drifts. The new shaft is to be a double compartment one, and will be timbered with extra heavy timbers. A new hoisting works is to be put up, a new blacksmith shop built, and other improvements made. The timbers for the mine are being sawed at Shaw's mill, the first load of which will be delivered at the mine to-morrow. The news of the reopening of the Owens mine has given new life to our people, and already there is talk of starting up other mines in Julian. In fact, Robert Gardener has already commenced operations on the Blue Hill tunnel, which he intends running in 1500 feet. The Golden Chariot mine will in all probability start soon, as will also the Ready Relief, and the Gold King, the Ella, Hidden Treasure, Fredericks, and a score or more others are now taking out rich rock.

Shasta.

ATTRACTING ATTENTION.—Redding *Free Press*, Feb. 2: H. P. Holland, one of the owners of the Clipper mine on Squaw creek, arrived from San Francisco on Monday and started for the mine the next day to resume active operations. He informed us that Shasta mines, especially those on Squaw creek, are attracting great attention among mining men in the city.

SOUTH FORK, CLEAR CREEK. — Cor. Shasta *Courier*, Feb. 2: Messrs. Hubbard & Kitchen are sinking on a promising ledge near the mouth of Kanaka creek. The ledge prospects along the croppings for over 1000 feet. Eubank's arastra is running on ore from the Live Oak. The contractors are getting on slowly with Gibney's tunnel, the rock being extra hard. Gibney is also sinking an incline on the ledge. J. P. Wright's arastra is running on ore from his mine. Shirland Bros. are running their arastra on Atlantic ore. E. L. Ballou is running his arastra on Falls ore, he having found a large and promising mine east of the old works. W. P. Litten talks of putting up an arastra to work his free ore. Tom White of Igo has sold his claim to a Chinese Co., which has about completed a hydraulic outfit to work the same.

LOWER SPRINGS.—Jo Penrose and Sam Gruber have located a claim on Middle creek, commencing at the bridge and running south 3000 feet. The ledge is ten feet wide, and mostly sulphurets, which show up well. Assays have been sent to different parties. This claim will be known as the Non Such. They have a mine called the Harrison & Morton, which shows flattering prospects. They have a shaft down 20 feet, but cannot sink for water.

Sierra.

FOREST CITY. — *Mountain Messenger*, Feb. 2 The fair weather we have been having of late has been a great drawback to the mines in our surroundings on account of the freezing up of the water. The Ruby mine had to lay off its men during the frosty snap, but started again last Monday. The Red Chief quartz mine, in Kanaka ravine, got up steam in their mill Monday. Everything seems to be working in a very systematic manner, under the management of Prof. L. J. Lewis, superintendent of the mine. The contract for running 60 feet of a drift to right of main tunnel, and sinking to bedrock at a depth of 15 feet in the South Fork mine, was completed a few days ago.

THE HOOSIER LEDGE.—*Tribune*, Feb. 1: The Hoosier claim, situated across the river a short distance from town, is looking well. Three men are at work there and at present they are taking out just enough rock to pound in a mortar each day. The rock is so rich that with this slow way of extracting the gold the men are making daily wages of $4 each. Who says Sierra City district does not beat the world for good mines and rich prospects in quartz?

THE MARGUERITE.—F. Morris, superintendent of the Marguerite mine, is expected to arrive here from below to-morrow. It is said that he is going to remain, and that the mine will be started up shortly. A Cornish pump has been ordered, and as soon as that arrives (which will be soon if the weather permits), it will be put in and work resumed the same as before. Mr. Morris will settle with those to whom the company is indebted for labor, etc., when he gets here.

THE BUFFALO.—The owners of the Buffalo mine at Hog canyon have reason to feel confident that their mine will be one of the best paying properties in Sierra county. Its future is in sight, and anybody who understands quartz mining cannot help but see it. The rock proves to be rich wherever they go. Last week in raising on the ledge from tunnel No. 2 to tunnel No. 1 an immensely rich body of ore was encountered. The rock shows any amount of free gold. The 10-stamp mill is completed, but is not running as yet. The company has not been able to start it up on account of the scarcity of water. There is three feet of snow in places up there now, and there will have to be more storm before there will be sufficient water to run the mill. The company can see now where they made a mistake in not putting a boiler and pump in this winter, instead of trying to run the mill until spring with water-power. If they had done this the mill would be running in full blast now. Fifteen men are employed at the mine at present, and as soon as spring comes the force will be increased to a much larger number.

GOOD LEDGE.—The Salinas & Mercer Co. has opened up a fine-looking ledge in their lower tunnel. It is three feet wide. The tunnel is in a distance of 350 feet.

CONTRACT LET.—George Watkins of the firm of Spellenberg & Watkins of this place, received the contract advertised by the San Luis Mining Co., to run 200 feet farther on the drift at the mine. He took the contract for $3 a foot.

Trinity.

KNOW-NOTHING CREEK.—Cor. Trinity *Journal*, Feb. 2: This is comparatively a new mining district; for both quartz and placers it promises well; the ledges are gold bearing and compare favorably with other ledges in the northern counties. There are five quartz mines working; four of them are bullion-producers. The Hansen, Wolverine, Know-Nothing and the Hungry Hill mines are in a flourishing condition. The most promising of these is the Know-Nothing; the mine is prospected from two levels and a shaft. The shaft is 30 feet deep from the surface, and shows a good strong ledge; the upper level is 70 feet below the bottom of the shaft and runs in on the ledge 160 feet, the ledge showing an improvement on this level; the tunnel will connect with the shaft by an upraise very soon. The lower level is 70 feet below the upper one, making a depth of 170 feet from the surface. This tunnel is in 30 feet on the ledge, which is four feet in width in places and averages about 20 inches. As depth is attained the ledge grows stronger. Tracks are laid on each level and cars bring out ore and waste. The ore is dumped into a bin with a capacity of 100 tons; it is taken from thence to an ore bin at the foot of the hill 357 feet distance by cable cars. This dump, or bin, has a capacity of 20 tons. The ore is then taken in cars on a level track 150 feet to a chute 60 feet in length, on an incline of 45 d grees, into the mill. The mill building is 45x20 feet, with a battery put up for eight stamps, four of which are in place and ran seven days. The ore can be transported from mine to mill for eight cents per ton. The mill and mine are under the superintendency of Mr. P. P. Black. There was, at the time the mill commenced crushing ore on Jan. 8th, 400 tons on hand and enough in sight in the mine to run the mill two years; the mill has a capacity of six tons per day. This mine will give a good account of itself in the near future.

EAST FORK.—*Journal*, Feb. 2: Capt. Trueworthy was in from East Fork the first of the week and gives us the following items from that district: He is working a force of men on the North Star, with Jas. E. Given as superintendent, and is developing a valuable piece of property. Two tunnels have been run in 100 feet on the main ledge; side drifts extend from the main tunnels about 75 feet. Besides development work, he is taking out ore and crushing it. The ledge from which the ore is taken averages 3½ to 4 feet in width. On the smaller ledge is a tunnel 130 feet long. There is a five-stamp mill on the mine and it is now running. The partial cleanups have been highly satisfactory. There are 100 tons of ore on the dump and a large body of good ore in sight. With a 40-stamp mill the property would be one of the best paying in the county. Capt. Trueworthy is also running the arastra on Barney gulch on quartz from the Thanksgiving and Fountain Head mines. Day & Greenwell are taking out ore from the Ozark, situated on Rich gulch, and will begin crushing in a few days. The ore of the Ozark is high grade, averaging $100 to the ton. The Enterprise is running with a good force of men. The mine is being opened and developed so as to be ready for the stamp mill which the company will put on in the spring. The arastra is crushing $100 rock, and yields the company a handsome dividend after paying running expenses. Work is progressing on the Yellowstone, under the superintendency of E. C. Paxton; the mine is being developed and ore taken out and crushed in the arastra. From all reports the mine is looking well and will prove a bonanza. The Niagara M. and M. Co. own the mine and will put up a mill in the spring as soon as the wagon-road is completed.

Tulare.

QUARTZ.—Visalia *Times*, Jan. 31: About 17 years ago James Mankins discovered a quartz vein three miles north of the road to Comstock's mill, on Rattlesnake creek. Free gold was plainly to be seen in the croppings, and every piece of ore that was tested yielded a color. During all these years Mr. Mankins has occasionally prospected the vein, which has been traced for a distance of 5000 feet, and every test made of the rock has been highly satisfactory. Recently W. R. Corrington and James B. Jordan have become interested in the property, and this week Messrs. Corrington and Mankins brought 25 pounds of the ore to Visalia. Samples of it were horn-spooned at Nanscawen's drug store on Tuesday, and the results exceeded all expectations. The owners of the property have purchased blacksmithing and mining tools, a supply of provisions, etc., and will proceed to the mine this week for the purpose of beginning the work of development. Five claims have a ready been located on the lead, the original being named the Rusty Crust.

Yuba.

SMARTSVILLE BOOMING.—*Herald*, Feb. 1: At present Smartsville is booming along gloriously on the road to prosperity, and we are glad of it. The people there are energetic and are rapidly emerging from the "Slough of Despond" into which they were cast by the anti-debris decision a few years back. They have opened drift mines and already 50 or 60 men are given employment, many of them being from French Corral, Sweetland and other places along the ridge below San Juan.

NEVADA.

Washoe District.

CHOLLAR.—Virginia *Enterprise*, Feb. 2: The west drift from the shaft on the 750 level is out 441 feet. The face is in clay and porphyry. The north raise on the 650 level is up (on the slope) a distance of 121 feet. West crosscut No. 2 on the 550 level is out 65 feet. The face is in quartz of no value.

POTOSI.—On the 650 level west crosscut No. 2 is in 82 feet, with clay and quartz in the face. East crosscut No. 3 is in a distance of 85 feet, and shows quartz and porphyry in the face.

SAVAGE.—On the 400 level the main west drift has been advanced 22 feet. Southwest crosscut No. 2 has been advanced 25 feet. On this level, from the old stopes on the north and south drifts are now extracting a considerable amount of ore. In the joint crosscut on the southern boundary they have encountered two feet of good ore. On the 500 level the main west drift has been extended 19 feet. No. 2 west crosscut, on the 500 level, is in quartz, giving low assays. No. 1 east crosscut on this level and the north and south drifts are being extended; also Nos. 2 and 3 on the 600 level. Since last report have shipped 850 tons of ore to the Rock Point mill; average of battery assays, $20.

HALE AND NORCROSS.—The north drift on the 500 level has been advanced 140 feet. It continues in good ore. All the stopes on this level are yielding ore of good quality. The winze, below the track floor of this level (500) is down 40 feet, and is still

in good ore. All the stopes from the 600 to the 700 level are looking well, and supplying the usual quantity of ore. On the 1300 level the north drift continues in low-grade ore. Since last report have milled about 1200 tons of ore. It was worked at the Mexican mill and averaged $22.50 a ton.

NORTH OCCIDENTAL.—Some paying ore is being mined on the 250 level. A large body of quartz has been encountered on this level, in the north drift.

SIERRA NEVADA.—The exploring drifts on the 520 level are still in low-grade vein material.

UNION CON. AND MEXICAN.—Good headway is making in the joint north drift.

OPHIR.—The crosscut on the 1465 level is still in vein porphyry. In places are found some promising stringers of quartz.

CON. CAL. AND VIRGINIA.—Ore is being extracted on all the levels from the 1400 down to the 1950 level. The most productive stopes, however, are those on the 1650 level. The usual amount of ore is being shipped to the river mills.

GOULD AND CURRY.—The west crosscut on the 450 level is still in vein material carrying some metal. The east crosscut on the same level shows streaks of quartz in a mixture of clay and porphyry.

BEST AND BELCHER.—East crosscut No. 2 on the 350 level is in vein material carrying some metal, and the south drift is passing through stringers of quartz. In the west crosscut on the 400 level a large body of quartz has been encountered, which yields low assays.

UTAH.—The south drift on the 600 level is passing through material giving low assays.

OCCIDENTAL.—Some good ore is being extracted on the 300 level; also below on the 450 level.

BALTIMORE.—A good deal of milling ore is being accumulated on the 300 level.

BENTON.—Are arranging for a hoisting plant.

JUSTICE.—Mill running regularly and bullion shipment beginning to be made.

CONFIDENCE.—All the ore-producing sections looking well. Are shipping 450 tons a week to the Brunswick mill. Average battery assays $28 a ton.

ANDES.—Good headway is making in cleaning out and repairing the old drifts on the 175 level.

OVERMAN.—Are sending the usual quantity of ore to the Vivian mill, Carson river.

BELCHER.—A good deal of exploring work is being done on the several levels from the 200 down.

CROWN POINT.—The work being done is principally in the way of prospecting and repairing.

YELLOW JACKET.—The mine is looking well and regular shipments to the mills are continued.

IMPERIAL.—No. 2 east crosscut on the 1100 level is still in vein material of a promising character.

CHALLENGE.—The north drift on the 300 level is showing a mixture of quartz and porphyry in the face. Are still shipping 150 tons of ore a week to the Brunswick. The battery assays average $28 a ton.

Columbus District.

THE MT. DIABLO.—Walker Lake *Bulletin*, Feb. 2: Have stopped the east drift below the fifth level, and have started a south crosscut from it. The stope between the fifth and sixth levels does not look quite so well. The ore body is somewhat smaller in the stope above the fifth level near the No. 1 winze. The main stope between the fourth and fifth shows two feet of $60 ore. The west drift from the south crosscut between the fourth and fifth levels is in five feet and the face shows 18 inches of $60 ore. Are driving a south crosscut between the third and fourth levels near the No. 1 winze, and the face shows a small amount of $80 ore. This crosscut is in 32 feet. A little ore is being extracted from the intermediate above the east drift on the third level. The stope east of the shaft between the first and second levels looks well and is giving some $80 ore. The mill has been running steadily during the week and working the ore to a high percentage. Are now crushing more ore than for some months past.

Pioche District.

EXPECTATIONS.—Salt Lake *Tribune*, Feb. 2: W. S. Godbe has sanguine expectations as to the future of Pioche. He says two mines alone have yielded $15,000,000 within four years, and the outlook is so favorable that Pioche bids fair to develop quicker than did Park City, and will be one of the greatest mining camps in the West. Things will start as soon as the railroad gets in there.

Tuscarora District.

BELLE ISLE.—Tuscarora *Times-Review*, Feb. 1: South drift from east crosscut, 250-foot level, extended 10 feet. The vein is not so large and shows an improvement in grade.

FOUND TREASURE.—A prospect shaft is being sunk near apex of vein between the whim shaft and the Cowles shaft to explore the body of chloride ore existing there.

NORTH COMMONWEALTH AND DEL MONTE COMBINATION SHAFT.—The formation that the shaft is passing into is very favorable for ore.

GRAND PRIZE.—400-foot level: North crosscut has been extended a distance of 16 feet. Formation is more favorable for progress, and intersected with seams of quartz.

NORTH BELLE ISLE.—Winze from the 400-foot level has been sunk 15 feet; total depth 88 feet. No material change in the flow of water or character of rock. After reaching the depth of 105 feet will commence crosscutting.

NAVAJO.—The usual output of ore has been made from the various stopes. Shipped last Monday, $14,696.76.

NEVADA QUEEN.—The concentrating-works has run steadily, doing good work. Will be shut down for a few days to enlarge the ore dump, as at present it is impossible for teams to get in any amount, and causes extra expense dumping outside. The north drift, 450-foot level, has been advanced 18 feet through vein matter giving low assays.

COMMONWEALTH.—225-foot level: No. 1 west crosscut has been advanced 13 feet; a connection has been made with No. 1 winze from 150-foot level, exposing 16 feet of ore. A drift has been started from this crosscut, following the ore north. No. 2 west crosscut has been advanced 18 feet in the vein, giving low assays. Line crosscut has been advanced 7 feet, the rock is hard. 300-foot: No. 1 west crosscut has been advanced 19 feet, encountering small seams carrying sulphurets, and looks favorable. Gangway has been extended 4 feet, with but little change.

ARIZONA.

HARQUA HALA.—Cor. Tombstone *Epitaph*, Feb. 2: I reached this camp a few days ago. It is not all it is blowed up to be. I see a few good surface prospects; one of them is a four-foot hole on the big mine. There is nothing done here to show whether they have got a mine or not. I saw one big nugget they picked up, but that does not say whether it is going to make a mine or not when they go down. I think it will be quite a while before the camp is prospected. There are some men here who have located 20 claims. The boys that have made the rich strike can make a good raise whether it goes down or not. This is a very poor place for a man to be if he is not well fixed. There have been rich pockets of gold struck before, through this part of the county.

MOHAVE MINES.—Kingman *Miner*, Feb. 2: D. W. Grant had a shipment of ore from the Juno mine, Chloride, worked at the sampler this week. Kelly & McKinnon are sacking a carload of ore at the Conner mine. The roads are in good condition after the recent storm. The C. O. D. and Stockton ore-teams are making regular trips. It is expected there will be considerable ore brought in during the next two weeks, as it has been accumulating for two months at some of the smaller camps. Chas. Cummings had two carloads of ore from his recent find near Wallapai springs worked at the sampler this week, some of which worked 180 ounces. Bob Kier and partner have struck some good ore in Jack Johnson's claim between Oak Creek ranch and Cerbat. The Flores well has reached a depth of 154 feet. There is an abundance of water to run the mill night and day, and the management is making arrangements to that end. Wilkinson & Tourtellotte have about 60 tons of $40 gold ore on their dump, near the Flores, and plenty more of the same grade in sight. They are unable to make arrangements to mill it at Cerbat at present, and consequently they are devoting their energies to extracting ore of a higher grade which will stand shipping charges. The recent strike in the Nighthawk proves to be the richest ore body yet discovered in this mine. This body of ore was discovered in virgin ground, and at a depth of more than 300 feet.

COLORADO.

TUNNEL.—Georgetown *Courier*, Feb. 2: The Hall tunnel has been driven nearly 1200 feet. Five-hundred-ounce ore is coming out of the Everett. Work has been started on the Muscovite lode, Ute creek, by Henry Mears. Capt. Ezekiel has been appointed superintendent of the Mary Foster mine. The Miners Works has been running a six-car lot of ore from the Mendota this week. Development work is being pushed on the Aliunde, and some very good ore is coming out. Thirty-five thousand pounds of ore was milled from the Jo Reynolds last week. The mine is producing nearly 20 tons a week. Gabriel Bartholomea, lessee on the Burleigh, has sold his ore to the Holden Smelting Works. He has about 200 tons on hand. The ore mills from 45 to 55 per cent lead, and from 30 to 35 ounces silver per ton. The Mineral Chief lode, Republican mountain, was recorded the first day of August last. The first shipment of ore was made on the 14th of the same month. Up to Jan. 1st 200 tons were shipped. The average value of the ore is 55 per cent lead, 13 ounces silver, and 1.10 ounces gold per ton. A pretty good record for a prospect.

DAKOTA.

CUSTOM WORK.—Deadwood *Pioneer*, Feb. 2: Reports from apparently reliable sources tell us in the event of the present reduction works successfully treating Ruby ore by Clark's process, that company will increase its capacity from 50 to 100 tons per day during the coming summer. Also that a custom works having a capacity of 100 tons per day, will be built by another party in the vicinity of Deadwood. It is reported that the Harney Peak Tin Co. of New York has abandoned the idea of selling its property in England.

BRITISH COLUMBIA.

THE TOAD MOUNTAIN COUNTRY.—Donald *Truth*, Jan. 30: The following is the latest news of the mines in the Galena Bay and Hot Springs districts. These camps present a very busy aspect this winter. About 100 men are at work, and many others are in there, so as to be the first on deck in the spring when the boom is sure to strike that section of Kootenay district. As to the claims, work is progressing well and developments fully equal expectations. The Blue Bell claim at a depth of 126 feet shows 40 feet of concentrating ore, with ore still in the face of the crosscut. As depth is attained the ore increases in richness; on top it only ran from $12 to $20 a ton in silver, while the ore taken from the bottom of the shaft runs from $25 to $40 a ton. This is the big claim of the camp. As to other mines, on the Krao a force is at work sinking a shaft that is expected to tap the vein at a depth of 70 feet. The ore from the claim is a rich sulphide, carrying wire silver. The No. 1 claim is being opened by a tunnel to tap the vein at about 200 feet depth. The surface work resulted in the shipment last fall of 20 tons of $200 ore, and when top work ceased the prospects fully justified the driving of the tunnel 200 feet lower. The work is being pushed with a vim. The Little Donald is being opened with a good-sized crew of men. It shipped 40 tons of $75 ore last fall and at present could duplicate the shipment. All work is done directly on the ledge, which is large and reasonably soft; still water has retarded progress somewhat. The ore has steadily improved in value, one small seam running about $1300 per ton, while the bulk of the ore will go $150 to the ton. Of the Gallagher group of claims, the Let Her Go Gallagher is being opened by a force of six men, who will soon drill from the shaft and tap the vein at a depth of 70 feet. Fifty-two tons of $115 ore were shipped from this claim last fall; it all being mined and sacked by one man in sinking 18 feet, and he taking it out fast enough to keep a 15-animal pack train at work getting the ore to the lake. The Daddy Gallagher has been sunk on 24 feet, and shows about the same characteristics as the Let Her Go Gallagher, but the ore so far is not so high grade nor so abundant. On a number of other claims the assessment work is being done.

THE JUBILEE DISTRICT.—Under date of the 21st, Jones & Wells write from their camp on the western slope of Jubilee Mountain: "We have discontinued taking out ore from the surface and are now running the old tunnel in the Spilimichene claim as fast as three shifts can force it. Expect to have the ledge crosscut by spring, and at a depth of 200 feet. We are in hopes then of being in a position to ask no odds of any smelting company."

IDAHO.

BIG CLEANUP.—*World*, Feb. 1: The Elkhorn mine is developing into an astonisher of the first magnitude. Hugh Turner came to town last Saturday with another long purse full of the yellow metal. The mill, a five-stamp, ran 14 days—not days of 24 hours, as it did not run nights—and the result is $6000. The cleanup before this, two weeks ago, was $6000 for a 19 days' run. In speaking of the run of a quartz-mill, a day is always understood to be a day of 24 hours—day and night. Six thousand dollars for a seven-days' run is magnificent with only a five-stamp mill. The Elkhorn is getting richer and richer, and now equals the records it made in early days.

NEW DISTRICT.—Idaho *Avalanche*, Feb. 2: We understand that a new mining district and a gold-bearing lode has been discovered somewhere in this county, about 20 miles from Silver City, which promises in the early spring to make some excitement. Ore broken from the croppings of one of the lodes assays over $100 per ton. We will probably receive a few samples of ore from this new district in a short time, when we can tell more about it. The district will probably be called the Spur mining district.

ORO FINO.—The Oro Fino mine is said to be looking better than it has at any time since passing into the possession of the Oro Fino Limited, of London, England. The levels are now being opened up in good shape, and fine ore in sight in various places.

MONTANA.

MEN EMPLOYED.—Butte *Inter-Mountain*, Jan. 30: Some idea of the mining industry of Butte can be gained by the knowledge of the number of men employed underground by some of the leading mines of the camp. A partial list of them is as follows: Anaconda 320, Mountain Con. 190, High Ore 160, Wake-Up-Jim 160, Moulton 35, Lexington 80, Alice 50, St. Lawrence 200, West Colusa and Colusa 100, Mountain View 60, Modoc 70, Bluebird 70, Gagnon 60, Parrott 60, Gray Rock 30, West Gray Rock 15, Amy and Silversmith 15, Magna Charta 30, Union Con. 10, Fraction 7, Moose 20, Original 16, Speculator 25, Black Rock 12, Silver Bow 12, Gambetta 14, Burlington 25, Nettie 25, Volunteer 30, Pacific 30. Even the above gives but a small idea of the men at work underground in the camp. Besides these mines there are upward of 200 properties being worked under lease and otherwise.

ROCHESTER DISTRICT.—E. Mueller was in from Rochester yesterday, bringing the product of his ten-stamp mill for shipment. Mr. Mueller has half a dozen claims, which are situated about a mile and a half from Rochester. The principal ones are the Watseka and the Emma, both located on the same vein. On both these properties Mr. Mueller has sunk to the depth of nearly 200 feet. The vein is from 2 to 4 feet in width, and the rock carries gold and silver in about equal proportions to the value of $25 a ton. He has invested $20,000 in development and machinery and is just beginning to reap the benefit of his work.

GRANITE MOUNTAIN.—Phillipsburg *Mail*, Feb. 2: The output for the week ending Jan. 30th was 35 bars of bullion, containing 56,928.12 ounces of silver and 58.04 ounces gold.

WEST GRANITE.—It takes time to stope, sack and ship ore. The old days of small carloads are rapidly passing away. At one time 10 tons was figured on as a large load; now 20 tons and over loom up, and 40,000 pounds weight is disposed to trespass on the springs.

OREGON.

RYE VALLEY MINES.—Bedrock *Democrat*, Jan. 28: We understand that Harry B. Franz, one of Baker City's pioneer prospectors, has recently visited the old camp of Rye valley and relocated several abandoned mines, from which he has obtained some very rich ore. It has been a matter of record for many years that rich quartz veins abounded in that vicinity, and at various times numerous locations there have been worked and the ore yielded handsomely. But for the past ten years the camp has received little or no attention. Mr. Franz has succeeded in getting some of Baker City's most prominent business men interested with him in his locations, and they will doubtless develop their properties at once.

BAKER CO. MINES.—Brodrock *Democrat*, Jan. 28: The Oregon G. and S. Cons. Mining Co. at Cracker creek, under the superintendency of C. M. Donaldson, is being worked by 30 miners, and a fine body of ore is in sight. The management is making every preparation to work the E. & E. mines on an extensive scale with the opening of spring. The Columbia, H. Stevenson, superintendent, is also being worked by a large force, and that force would be increased if experienced miners could be obtained. This company is also putting itself in readiness for opening out on a grand scale in the spring. The Gray Eagle, owned by Murphy, Young & Co., is showing up a rich and extensive body of ore and gives every evidence of being an immense bonanza. J. B. Cabell, one of the owners of the celebrated La Bellevue mine at Granite, is in the city and reports everything satisfactory at the mine. The ledge of the La Bellevue is widening out and becoming richer as development work progresses. The pulverizer and concentrator are kept running night and day, and there is enough ore in sight to keep them running for months to come. The Monumental mill is expected to commence crushing this week on ore from the Monumental mine, which is said to be showing a fine body of ore. The mill will also be run on the custom plan and will doubtless prove of great benefit to the mine-owners in the near vicinity. A rich strike is reported from Rock creek, west of Baker City, made by Chas. Casebeer, the ore lassaying $44,600 to the ton. Lorenzo Durkee is in receipt of the following assays made from ore from the Gera mine at Cracker creek: 8.40 oz. silver; 11.60 oz. gold; value of gold, $232. Total, $240.40 per ton. Silver, 6.05 oz.; value of gold, $100.04. Total, $106.09 per ton. Mr. Durkee intends doing extensive development work on the property in the spring. We understand that Hoffman & White, contractors on tunnel work on the Hurricane mine, recently purchased by George Thompson, have uncovered a very rich vein of ore right at the commencement of their contract. The mine will no doubt develop into a very valuable property. The different owners of mining property at Granite are pushing development work this winter, and upon the arrival of spring these properties will be ready for inspection by capitalists. Edward Hardy of this city is negotiating for the purchase of the extension of the Big Aleck mine in Pocahontas district. The sale of the Graham and Tabor & Tracy mines in Cable Cove district is being negotiated with an Eastern syndicate, and with a very fair prospect of success. J. S. Sharp is busily engaged working his Pocahontas mining property, and is meeting with great encouragement.

NEW MEXICO.

DEVELOPMENT WORK.—Silver City *Enterprise*, Feb. 2: The Carlisle smelter has closed down. Uncle Ben Hobson has struck some very rich ore on his Black Hawk property. Since the resumption of smelting at the Flagler works last Saturday, the daily product of ingot copper has aggregated four tons per diem of 24 hours. This copper is regarded in Baltimore as next to Lake, and careful assays show a fineness of 98 per cent. The Carlisle mine at a depth of 500 feet has reserves in sight sufficient to run the mill for three years to come without sinking or drifting a foot.

PINOS ALTOS.—The main shaft on the Minnesota is now 95 feet in depth. The crevice of pay mineral averages 14 inches, and mills $40 per ton. The daily output with the labor of three men now approximates two tons.

MOUNTAIN KEY.—This week's run will be the largest in the history of the mine and mill. The estimated value of the week will exceed $5000 in gold. Ore from 300 level west crosscut on Aztec averages $35 in gold and $5 in silver. The arrival of Hon. R. C. Kerens and party of St. Louis, to-day or to-morrow, will settle the location of a mill for the Pacific Gold M. Co. The mill will contain 20 stamps with power for 40. On the Esperanza, rich sulphides of silver and free gold are occasionally met with. This property is rapidly proving to be a valuable mining claim. The Juniper is one of three claims, on what is popularly known as the Mino Grande lode, one of the great veins of the Pinos Altos system. The assays just completed show a fine and extremely well defined body of ore. The Aztec Co. started up the Bremen mill last Tuesday. The company was compelled to suspend operations owing to the execrable condition of the roads. Now that the weather is settled, the facilities for transportation will be increased and ten days' supply of ore will be kept constantly on hand.

BURROS.—The Emma mine in the White Quartz camp of the Burros mining district, at 22 feet in depth shows a vein of quartz 14 inches in width which has a milling value of $20 per ton.

UTAH.

REVIEW.—Salt Lake *Tribune*, Feb. 2: The week has been dull, but the work in the mines is going forward at a steady rate, and the receipt of ores has been good. The receipts for the week ending the 30th, inclusive, were to the value of $150,306.72 in aggregate, of which $107,841.72 was in ore and $42,461 in bullion. For the previous week the receipts were $32,750 in bullion and $45,769 in ore, an aggregate of $78,519. The Ontario product for the week was of bullion 21,897 55 fine ounces; from ore sales, $37,140.90; an approximate total of $59,028.44. Ontario dividend No. 152, of 50 cents a share (75,000), was paid in New York on the 31st. The Daly output for the week was in ore sales, $8985.23; no bullion. Daly dividend No. 23, of 25c per share (37,500), was paid in this city and New York on the 30th. Horn Silver is working on in a cautious way. No special developments or output are reported. Fine bar receipts in this city for the week were to the value of $20,999; base bullion, $7200. The Hanauer smelter produced during the week bullion valued at $14,275. Ore receipts for the week were to the value of $46,291.72 by Wells, Fargo & Co., and $61,550 by McCornick & Co. Homestake stock, 75 shares, sold in New York on the 22d at $13.50.

WOODSIDE.—Park *Record*, Feb. 2: It is now about five months since Messrs. Wilmans and Drake and associates obtained a year's lease on the Woodside property, owned by Hon. E. P. Ferry. The ore chute, which lays very flat, has been followed into the hill until a depth of 75 feet under the surface has been reached. The vein is dipping to the northwest and it is from 5 to 10 feet thick. Over 1000 feet of drifting on the course of the vein, not counting the stoping, has been done. About 50 men, the usual force, are employed and the big average of ore shipments is kept up as well as the condition of the roads permits. So far the character of the ore has been very uniform. It is a carbonate of fine quality for smelting, averaging 47 ounces silver, 45 per cent lead and $1.50 in gold, to the ton. Up to date about 8,000,000 pounds or 4000 tons have been sent to the smelters, via the Mackintosh sampler, and nearly 2000 tons of concentrating ore are on the dump. The product of the mine thus far has been some $150,000, and at this rate the leasers will have taken out at least $400,000 worth of ore by the time their lease expires next August.

PROGRESS OF THE TUNNELS.—The Anchor drain is now in about 5800 feet and there are only 800 feet yet to run. A splendid rate of progress is being made considering that so much water is encountered in the face. However, it is expected that within two months the tunnel will reach the end. The Ontario big drain tunnel from the east has reached a distance of over 700 feet and the work is being pushed as rapidly as possible.

SCIENTIFIC PROGRESS.

The Rare Metals—Some of the Mysteries of Chemical Science.

Chemists have found about 71 different forms of matter, which they call elements, and are apparently simple forms of matter incapable of further subdivision. We say about 71 different forms, because some of these so-called elements have been but little studied, and resemble each other so closely that they may be proved to be identical, or to be mixtures of still simpler forms. The question of the true nature of the elements has been frequently discussed in these columns, but is not connected with the present subject. Of these 71 elements, 56 are metals and 15 metalloids. It is rather difficult to exactly define a metal; but their general appearance is familiar to every one, and a special article upon this question will be found in the *Science News* for March, 1887. Only about 30 elements are at all common, and not more than 20 are met with in daily life. Sixteen of these are of a metallic nature, leaving 40 different metals which are rarely seen outside of a laboratory or mineralogical cabinet, but which in their chemical relations are of considerable interest.

Beginning with that group of elements containing the familiar substances sodium and potassium, we find three other metals closely allied to them—lithium, rubidium and cæsium. Lithium is more abundant than the other two, and is found in considerable quantity in many mineral spring waters, including those at Saratoga. It is the lightest solid element known, having a specific gravity of 0 59, or about one-half that of water. Cæsium and rubidium were also first discovered in mineral water by Bunsen and Kirchoff in 1860. There were only two or three grains of the metals to a ton of water, and their detection would have been impossible, except for the spectroscope, which showed the blue line of cæsium and the red one of rubidium, when even this minute quantity was present. The metals themselves present no especial peculiarity of appearance, and could hardly be distinguished by sight from a piece of sodium or potassium. In the calcium and magnesium group we find barium and strontium, which, while not very rare, have but few practical uses. Strontium is largely used for making red fire, while barium gives a green hue to the flame. Cadmium is a metal resembling zinc, and is important only as being a constituent of the fusible alloys used for safety plugs in steam boilers, automatic sprinklers, etc.

Aluminum is no longer an uncommon metal; but there is a long list of similar metals which are quite rare, and of little or no practical importance. They resemble each other very closely, and it is by no means certain that they are all distinct elements. The elements yttrium, urbium, terbium, phillipium, ytterbium and samarium are very slightly differentiated, and are compared by Dr. Crookes to the refuse of the universe, "heaped away in some cosmical lumber-room;" while the deceptive nature of another supposed element is expressed by its name, decipium. Gallium and germanium were discovered by French and German chemists respectively; while scandium is remarkable as agreeing in its properties with a theoretical element which was required to fill a vacant place in the "periodic system" of the elements, but was, until quite recently, unknown. Glucinium is found in the emerald beryl, and some of its salts have a sweetish taste. Zirconium is the base of the rare minerals zircon and hyacinth, and thorium is remarkable for its specific gravity (9.4) and the highest atomic weight (232) of any element. Cerium is used to a small extent in medicine, and lanthanum and didymium closely resemble it.

The name "lanthanum" means "to lie concealed," and was given on account of the difficulty of its detection; and didymium closely resembles it, as the meaning ("twinned") of its name implies. Indium was discovered by the blue line which it gives in the spectroscope, and uranium is only used for the purpose of coloring glass and porcelain. Thallium is a metal resembling lead, and gives a green line in the spectroscope, by which it was first discovered. Titanium is related to tin, and is an undesirable constituent of certain iron ores. It also imparts a yellow color to glass and porcelain. Tungsten is a valuable addition to steel; and tungstate of soda applied to wood or clothing renders them uninflammable. Niobium and tantalum resemble each other very closely, but are of little importance. Molybdenum belongs to the iron group, which also includes nickel, cobalt and manganese. Vanadium is allied to antimony and nitrogen, and has been found to possess a remarkable oxidizing power. It is extensively used for the production of aniline black in dyeing and calico-printing establishments.

About one per cent of vanadate of ammonia added to an infusion of nutgalls makes a very superior black ink, which, however, will partially fade in time. We come last to the rare metals of the platinum group, of which iridium is the most useful, as, on account of its excessive hardness, it is used for the points of gold pens and stylographs, the knife-edges of balances, etc. Osmium is one of the most poisonous substances known; while palladium is remarkable for the readiness with which it combines with hydrogen, apparently forming an alloy, and indicating the metallic nature of that gas. It has lately been used as a substitute for steel in certain parts of watches, to avoid the effect of magnetism on the works. Ruthenium and rhodium are of no special interest. There are probably many other metals in existence which remain to be discovered. We are familiar with but a small portion of the crust of the earth, and know nothing of what there may be at a little distance below it. In the "periodic system" of the elements there are several gaps yet remaining to be filled, and elements possessing the required properties may some time be discovered. Whatever new elements may be found will undoubtedly occur in very small quantities; but at present there seems to be no limitation to the number of "rare metals" ready to indicate their presence in the spectroscope, beakers, or crucibles of the chemist who patiently searches for them.—*Popular Science News.*

STUDYING THE PHENOMENA OF CYCLONES.—The electrical character of cyclones and kindred phenomena has led the Signal Office of the War Department at Washington to issue a circular requesting information from parties in various localities, in answer to the following questions: "Were thunder and lightning observed, and if so, in what portion of the horizon, at what time of the day, and whether violent or otherwise? Was lightning or any manifestation of electricity seen in the funnel-shaped tornado cloud as it approached, or in the dark, heavy clouds surrounding it to the north and west? Note the deflection of a magnetic needle before and after the storm. Is there any reason to suppose that the clouds approaching from opposite directions preceding the first appearance of the funnel-shaped cloud were oppositely electrified? Note if the motion of the approaching cloud appears to be accelerated at the moment of, or immediately following, any electric discharge. What portion of the tornado cloud presents the lightest color? Did the upper portion of the cloud at any time present a glaring appearance like the colors of a brilliant sunset? Were 'balls of fire' observed to occupy the tornado cloud at any stage of its progressive movement? What effect had the storm upon small vegetation and the foliage of trees? In the event of death or injury to any person or animal, observe very carefully whether the effect resulted from the electrical discharge or the force of wind. Did you notice any peculiar odor in the atmosphere during the passage of the storm? Can the roaring, which always accompanies the tornado cloud in its passage over the country, be readily distinguished from ordinary thunder? Is thunder ever distinctly heard as emanating directly from the tornado cloud? How were the telegraph wires affected?"

RAPID VEGETATION ON VOLCANIC ROCK.—The rapidity with which volcanic rock becomes covered with vegetation is illustrated in the report of Dr. Treub, the director of the Botanical Garden at Buitenzyig, Java, on the reappearance of vegetation upon the Island of Krakatoa, which partly sank and was wholly overwhelmed by the ashes and pumicestone from its volcano during the violent outbreak of 1883 Three years after this date Dr. Treub (June 26, 1886) visited the island, and as he approached it, he found that it was covered with vegetation to the very summit of the mountain. The plants could not have grown from the roots or seeds of those existing before the great eruption, for the toughest organism must have been destroyed by the excessive volcanic heat. The whole island was covered with a layer of ashes and pumicestone from 3 to 24 feet thick. Nor could the vegetation, Dr. Treub thinks, have been introduced by man, for the island is uninhabited and difficult of access. It must have been by means of seeds carried thither by birds, by the wind, or by the currents of the sea, that the new vegetation arose. It consists for the most part of ferns, of which 11 different varieties were found, and of single specimens of blossoming herbs, such as are found on coral reefs, that have lately risen above the level of the sea. Dr. Treub has, however, found that the ferns were not the first living plants that had found nourishment on the destroyed island. Almost everywhere there were signs that the ashes and pumicestone had been covered by a thin layer of algæ, which rendered the surface of the soil soft and capable of absorbing water. These microscopic algæ prepared the way for the ferns, the latter, in their turn, for the blossoming herbs.

SPECTACLES FOR SPECIAL USE IN SURGERY.—Spectacles (to be used in surgical operations), lit by means of a small electric lamp, are a new invention. The lamp is arranged to send a beam of cool light on the part to be examined; meanwhile the rims of the spectacles exclude the outside light from the observer's eyes. The current is conveyed to the lamp by wires connected to the small terminals.

AN ASTEROID DISCOVERED.—The director of the Lick Observatory is notified by telegraph of the discovery of an asteroid at Nice, on January 28th. At 12 hours 48 minutes Greenwich time its position was R. A. 9 hours 40 minutes 11 seconds; and dec. north 11 degrees 46 minutes 36 seconds. Its motions were minus 44 seconds and north 10 minutes. Its magnitude was 13.

L. J. ROSE of Los Angeles has just imported 25 English skylarks. His agent had great trouble in filling the order. Mr. Rose has imported the birds to kill the scalebugs.

MECHANICAL PROGRESS.

Improved Foundry Practice.

From the attention that the subject is everywhere receiving, says Philadelphia *Iron*, it is safe to say that foundry practice within a few years will be raised to the dignity of one of the scientific arts, so marked and substantial have been the contributions to our knowledge of the chemical question involved therein. The latest of these relates to the use of ferro-silicon, and the advantages that may be derived therefrom.

Prof. Thomas Turner of Birmingham, England, lately reported the results of a series of tests, which exhibited the fact very clearly that silicon is a useful, rather than a damaging, element when present in cast iron in *proper quantities*, and that, by the use of ferro-silicon, pig irons and scrap, quite useless for foundry purposes, may be made to yield satisfactory results. Prof. Turner enunciates the doctrine now very generally accepted that "the tendency of combined carbon is to increase hardness and brittleness, while graphitic carbon makes iron soft, malleable and tough." He adds the further declaration that "too much of either form is a disadvantage; the strength depends on the proportion."

To be able so to regulate the proportion between combined and graphitic carbon as to produce a foundry mixture that will result in the production of the proper qualities, is the problem of foundry practice conducted on scientific principles; and Prof. Turner has shown in his able paper that "by a judicious use of silicon this proportioning can be accomplished exactly according to the wish of the founder, an increase of silicon changing combined carbon to graphitic, and vice versa. When the founder understands its use, he may soften and toughen, or harden and strengthen his iron to suit his requirements." It is important, however, that he should understand how to use this agent intelligently, or the resulting product will be weakened instead of being strengthened. This will happen, for example, if silicon be introduced into a metal in which the carbon is already graphitic, in which case "more silicon may weaken it and make it brittle."

It has been the practice for a number of years among foundrymen in the United States to use the high silicon irons made from the lean ores of Ohio and Kentucky as softeners to correct the hardness of the metal made from the refractory ores of Lake Superior and Northern New York and the South. The result has been satisfactory in practice, but it has only lately been definitely ascertained that the effect produced is due to the action of silicon. Now that the fact is known and accepted, the practice based upon it should be susceptible of being reduced to conditions of great certainty.

Messrs. W. T. Keep and Edward Orton, Jr., have made a valuable contribution to our knowledge of the action of silicon upon irons, in a paper on "Ferro-silicon, and the Economy of its Use," presented at the Buffalo meeting of the Institute of Mining Engineers. They set forth in this paper that during the past two years, as the process by which silicon affects the desirable results above described have become better understood, the demand for high silicon iron has increased. Foreign irons containing as much as 10 per cent of silicon were imported last year under the name of ferro-silicon; and, as a consequence of this demand, American makers are now producing ferro-silicon containing from 7 to 14 per cent of silicon, and in other respects of high quality.

These investigators have supplemented the scientific results obtained by Prof. Turner, by investigating the question whether the use of irons containing such a high percentage of silicon is as economical as when the percentage is lower. To this end, they present a comparison of the foreign and American ferro-silicons; they investigate and answer the inquiry whether the silicon in the pig is retained in the iron when remelted; and the further inquiry, whether the silicon in the pig is imparted to other irons during remelting, without loss of silicon.

Without entering into the details of these investigations, we shall only give the general conclusions arrived at, which are as follows:

1. Pig irons of any grade may be melted and cast without excessive loss in silicon or excessive change in chemical composition.

2. Ferro-silicons lose in remelting a little more silicon than do the softeners containing less silicon; but the difference is so small that commercial distinction is not possible.

3. In alloying silicon irons with scrap or pig iron deficient in silicon, the silicon is practically all retained in the mixture, and no economy in silicon results from the use of one class of American silicon iron over another.

4. American ferro-silicon, so far as we have investigated, is more economical than the imported, and probably, in most cases, softens to a greater extent.

The investigations of Messrs. Keep and Orton have demonstrated satisfactorily that it is entirely practicable and as cheap, if not cheaper, for the founder to produce the grade of casting he desires "by compounding suitable irons, than by purchasing irons in which the combination is already what he desires."

INCREASED APPLICATION OF STEEL FOR WATER AND OTHER PIPES.—Steel for the manufacture of pipes seems destined to come into extensive employment. Mr. Jas. Riley of the Steel Company of Scotland has been making efforts of a more or less tentative character to secure the adoption of the metal for this purpose, and to overcome the objections which have been raised to its use. The only technical difficulty was that of welding the tubes, and that he has overcome; but it is not so easy to fight down the prejudices against steel for tubes. Several home and substantial contracts for steel tubes have, however, been placed during the past year, and it is under contemplation in the west of Scotland to make provision for executing such contracts at a more rapid rate than is now possible. Estimates and tenders have been made within the past year or two for several very large quantities of these tubes, requiring from 100,000 to 150,000 tons of steel; but, as was the case on the introduction of steel for ship construction, the progress is very slow. When the strength of steel is contrasted with that of cast iron, of which those large water-mains are usually constructed, it will be at once apparent that a great reduction can be made in the thickness and consequent weight of the metal required for the purpose. For conveyance abroad, too, the question of freight is a consideration. As an indication of this, it may be mentioned that in a contract now in course of execution, the material for which is supplied by one of the steel concerns in Scotland, for 20 miles of water-main for Mexico, the sheets are not more than one-tenth of an inch in thickness. The fear of corrosion is not shared in by the engineers of this scheme. This main for Mexico is riveted—for such thin sheets cannot well be welded—and the connections are the same as those used in the Tay Bridge pipe.—*American Manufacturer.*

ELECTRICALLY DEPOSITED COPPER WIRE AND TUBES.—Steam pipes of copper are now, it is stated, made by electro deposition from sulphate of copper solution by the following process: The pipe is formed of an iron core in the depositing bath, and the deposited copper is pressed by a moving tool as it is deposited, so as to give a fibrous strength to the crystalline copper. After the pipe is thus formed it is subjected to hot steam, which expands the copper shell, or pipe, clear off the iron core, thus separating the two. These pipes have no joint, and are said to be very strong, tests showing that they break with strains of from 27 to 41 tons per square inch. It is further stated in foreign technical journals that Mr. Elmore, the inventor of this process, has more recently succeeded in adapting his system of tube-making to the manufacture of wire rods in the following manner: By an ingenious device the electrically deposited tube is cut, spirally, into a square wire rod, which rod is then drawn, in the usual manner, to the required gauge. By this means, the conductivity of the electro-deposited copper, which is one of its chief merits, on account of its absolute purity, is not deteriorated as in the case where copper is melted. This process, which has now been carried to a commercial success, is one of the most interesting of the many developments of applied electricity which has recently been made.

METALLIC MAGNESIUM.—Owing to its rarity, and its consequently high price, metallic magnesium almost ranked as a precious metal until lately, but it is now obtained by an improved process, and some German works are able to produce pure metallic magnesium at 25 frs. per kg. in its raw state and 50 to 65 frs. per kg. in the form of wire, bars or powder. According to recent experiments, this metal can support a tractile strain of 32 2 kg. per square millimeter, but before it can be worked it has always to be heated, like zinc; yet, at a temperature of 40 degrees centigrade, it can be rolled into sheets of only 1.0 of a millimeter in thickness. When in a compact mass this metal may be submitted to a high temperature without combustion taking place, but it is difficult to weld it, as the surface of the metal is never entirely free from a film of oxide. Magnesium has to be heated before it can be worked in the lathe, and when it has to be cast the molds have also to be heated. Its alloys seem to be of little practical value, as they are very brittle, and as regards electrotype precipitates, have only been obtained on magnesium with silver or copper. Magnesium in a powdered state has been employed successfully for obtaining instantaneous photographs, and a mixture of powdered magnesium with the nitrate or sulphite of carbon produces a highly explosive compound. Its principal use is, however, to produce a rapid and intense light.

NAIL MANUFACTURE.—A number of nail manufacturers belonging to the Western Cut Nail Association met in Wheeling on Tuesday, to consider the state of the nail trade and take measures to counteract the demoralization of prices. A dispatch says the result will probably be an association of the leading mills in the West, with a view of establishing a uniform rate for the product, and to put a check to the cut-throat business now practiced. A harmonious agreement was reached at the meeting. It provides for a guarantee fund as a pledge of good faith from each mill, and will go into operation at a very early day.—*American Manufacturer.*

ARE IRON CROSSTIES A FAILURE?—It is said that the iron crosstie with which the Pennsylvania Railroad Company has been experimenting on its tracks at Jersey City have proved failures and will be replaced with white oak ties.

GOOD HEALTH.

Investigations in Cigarette Smoking.

The *Medical News*, of a recent date, published a paper by Dr. Wm. L. Dudley, professor of chemistry in the Vanderbilt university, giving the results of recent careful analytical experiments made by him in his laboratory with the smoke of an ordinary cigarette. Mice were used upon which to employ his tests. It is not needful that we should give the professor's description of his modus operandi by means of air tubes, an aspirator, a glass jar, etc., the results of his experimentation being the chief object of interest in which the reader is concerned. Suffice it to say, then, that in each of his several chemical tests by the gradual combustion of a single cigarette, the mouse that was the recipient of the resultant smoke died in the course of the operation, being literally poisoned to death by inhaling the carbonic oxide evolved from the "noxious weed." The blood of the dead creature being subjected to spectroscopic examination, it was found that the veinous fluid had been so completely altered and vitiated that death was the inevitable effect. The tests were thoroughly scientific and conclusive. The fact was demonstrated, beyond the chance of doubt or question, that carbonic oxide is the chief constituent of cigarette smoke, if not all tobacco smoke, and that its inhalation into the air passage and lungs must of necessity be exceedingly deleterious, as much so to men and boys as to mice. Prof. Dudley refers to published assertions that the adulteration of tobacco with opium and flavoring drugs and the alleged presence of arsenic in the paper are the chief causes of the evil effects of cigarette smoking, but pronounces them "unsatisfactory and insufficient" as explanations. His chemical tests, he insists, have demonstrated positively the actual cause of the mischief, namely, the cigarette smoker's absorption of the carbonic oxide and other gases, "causing deoxidation of the blood, and thereby impairing its power to build up the wasting tissues of the body." The cigarette habit has of late years become very common in this country. It is one of those many European importations which do our people more harm than good. Many of our young men, and some who are neither young nor inexperienced, are literally burning out of themselves the best element of their manhood, by sucking into their systems] the poison of physical and mental degeneracy through the filthy cigarette. Cigar smoking and pipe smoking are bad enough and pernicious enough in all conscience, but cigarette smoking is absolutely suicidal.

The Yellow Fever Microbe.

A writer in the *Herald of Health* tells how the yellow fever microbes live, propagate, and act. We condense from that journal as follows: Dr. Clifton made the examination and report. The yellow fever microbe has much the appearance of two or three joints of sugar-cane. They have also been compared in appearance to a dumb-bell. They have been isolated and placed in a proper liquid for preservation and examination. The vessel which contains them is, of course, sealed up from the atmosphere. The seal of the vessel is quickly unsealed, a needle inserted, and a drop of the liquid dropped on a microscopic slide and quickly covered with the usual tiny film of glass. While in the liquid they were dormant, after being thus placed for about 45 minutes the microbes have fully aroused from their Rip Van Winkle sleep, and now you see what curious things they are. As I said before, they resemble three joints of sugar-cane, but the joints are not straight, but at opposite angles. Take this fellow, for instance, and you see a joint drops off, leaving him with two joints. Presently another joint joins on the dropped joint, and by this time a third joint appears on No. 1. Now look at No. 2 and there is a third joint. Now a joint drops from No. 1, and by the time it gains another joint No. 2 drops a joint, and this, with the joint from No. 2, join together, and there is microbe No. 3. Another joint grows on Nos. 1 and 2, and one drops from No. 3, and these, jointing together, make microbe No. 4, and so they go on until the little drop of gelatine is a working, seething mass of microbes. Now, these microbes are in the blood of a yellow fever patient, and there is where they live. They get in a blood corpuscle and eat out all the red part, as a darky eats out the red meat of a watermelon, and the blood is then a drop of clear fluid. To give you an idea of how many can crowd into a corpuscle of blood, let me say that it takes 3200 corpuscles to make an inch. Well, you can string just 150,000 microbes across the diameter of one corpuscle, consequently you can guess billions after billions of microbes in a drop of blood. The theory is that these microbes eat up one's blood so fast as to take it away from him in a very short time. Some men can stand the letting of more blood than others, consequently some men recover from yellow fever.

DIPHTHERIA CURE.—Dr. Deriker of St. Petersburg, who is the head physician of the Children's Hospital, and has treated no less than 2000 cases of diphtheria, and tried all remedies, both internal and external, has found the following a certain cure for the disease: As soon as the white spots appear on the tonsils he gives a laxative, usually senna tea. When the purgative effect has ceased, he gives cold drinks acidulated with lemons, limes or hydrochloric acid, and every two hours a gargle composed of lime-water and milk. Hot milk was also given as a drink, and the throat well rubbed with spirits of turpentine. The Academy of Medicine in France offered a large sum of money for a successful cure for diphtheria, and this is said to have been it. Equal parts of liquid tar and turpentine are put in an iron pan and burned in the patient's room. The dense resinous smoke gives immediate relief. The fibrinous matter soon becomes detached and is coughed up.—*Ex.*

TREATMENT FOR ASPHYXIATION.—A practical man, conversant with cases in which asphyxiation resulted from inhaling carbonic acid gas, gives some valuable hints for their recovery by simple remedies always at hand. Fresh air to restore consciousness is the first important step. Then he gave apples, apple juice, or vinegar, to neutralize the gas and remove it from the stomach by eructations. Eggs broken into vinegar, mixed and swallowed, made a very effective drink. After removing the gas from the stomach, the patient was further relieved by a cup of strong, hot coffee, which speedily restored him to normal vigor. On two similar occasions, where a physician was called, he administered injections of carbonate of ammonia, and the man was ill for eight or ten days from the effects of the medicine. A little common sense is often better than physic.

NITRO-GLYCERINE IN MEDICINE.—Nitro-glycerine bids fair, say the doctors, to become an important remedy for diseases of the kidneys, and experiments are now making in cases of Bright's disease. Nitro-glycerine of a pure quality, possessing all the explosive powers of the substance, is prepared in alcohol (which removes the explosive qualities) in the proportion of one part of the nitro-glycerine to 99 of alcohol, and is then prepared with sugar or milk in tablets. Thus prepared, it is called "trinitrin."

FUR BEARING ANIMALS OF SIBERIA.—An enormous number of animals are killed in Siberia yearly for their fur. At the last summer Fair of Irbit, which is a market for only a part of the furs exported from Siberia, no less than 3,180,000 skins of squirrels were offered for sale. Of other varieties there were 11,000 blue fox, 140,000 marmot, 30,000 polecat, 10,000 badger, 1,300,000 hare and 2000 fox.

A NOVEL CHAIR.—The Rev. Dr. William M. Taylor of New York has in his study a chair which he uses instead of riding horseback. It is moved by working two handles, and gives the rider, or the sitter, about the same motion as that of a galloping horse, only a little more violent. Dr. Taylor finds the exercise of this chair very beneficial after a long pull at his desk.

USEFUL INFORMATION.

Remarkable Qualities of the Hemp Plant.

The common hemp plant is said to posess some most remarkable properties in its effect upon the human system. Mohammedans, Hindoos, and others, whose religion forbids them the use of alcohol, find in the hemp plant a substitute which, though not so pleasant to the taste, produces an exhilarating effect on the system, which, in some respects, is more pleasant and equally desirable to one seeking for alcoholic stimulus, and yet far less injurious in its habitual use. It is taken in various ways. Mixed with tobacco, it is smoked in the hookah, and, to those unaccustomed to it, smells abominably. It is also taken in decoction, and in a solid form in sweetmeats. In ordinary doses it acts as a gentle and pleasant stimulant, exciting none of the brutal coarseness produced by alcoholic excess. In larger quantities, it appears to banish all sense of fear.

It is often taken by the East Indian sepoy before entering into battle, and Mohametan fanatics willingly brave death under its influence.

On account of this property the Afghans of Western Asia are reported to have made much use of it in their recent war with the English, and the success of many of the fierce onslaughts made by small parties of Afghans on the European soldiery, it is said, was attributable to the effects of the drink prepared from this plant.

When taken in excessive quantities it is said to produce a form of madness characterized by a reckless passion to destroy everything that comes in the maniac's way. It is related of an English officer at Delhi that, desiring to try the effect of hemp on himself, he took an overdose, inadvertently, and, bare-headed, on a scorching summer's day, rushed down the road armed with a large knife and fiercely attacked a large bullock, which was the first living thing which he encountered. He was quickly secured and disarmed, and, under the care of the doctor, who shaved his head and applied ice, was soon brought to his senses again.

HOW NATURE FORMS TRUE INK.—In Algeria there is a small stream which the chemistry of nature has converted into true ink. It is formed by the union of two rivulets, one of which is very strongly impregnated with iron, while the other, meandering through a peat marsh, imbibes gallic acid, another ingredient in the formation of ink. Letters and manuscript matters are satisfactorily written with this singular natural compound of iron and gallic acid.

Mixture for Writing on Glass.

The preparation for writing on glass called "diamond ink," says the *American Druggist*, is to be used with a common pen, and at once etches a rough surface on the parts of the glass it comes in contact with. It proves to be a very useful article for labeling bottles which are to contain liquids that will destroy common labels.

At the request of Professor Maisch an analysis was made, which proved it to be prepared ammonium fluoride, barium sulphate, and sulphuric acid. The barium sulphate seems to act as an absorbing medium, and when the semi-fluid mass is used, it makes a white mark, and prevents the spreading of the watery liquid; it also seems to make the acid etch a rougher surface.

It is made by mixing barium sulphate three parts, ammonium fluoride one part, and sulphuric acid a quantity sufficient for decomposing the ammonium fluoride and making the mixture of a semi-fluid consistency.

The sample examined was contained in a glass bottle holding nearly two fluid drachms, and which was thickly coated on the outside with asphaltum, on the inside with a thick stratum of beeswax, and was stoppered with a rubber stopper.

It is claimed by the manufacturer that the mixture contains no hydrofluoric acid and does not corrode a pen; but of course it does corrode a pen, and hydrofluoric acid is the one thing that does the etching. Any one making this mixture and wishing to keep it in a glass, may coat the bottle inside with paraffine, beeswax, or rubber. It should be prepared in a leaden dish, and is preferably kept in a gutta-percha or leaden bottle.

A NEW CEMENT.—London *Industries* describes a new cement which has recently been devised, and which is said to harden very quickly, and has been found to be of great strength. That journal says that this cement, by which many stone buildings in Paris have lately been renovated, is likely to prove useful also in repairing the foundations of machinery. The powder which forms the basis of the cement is composed of two parts oxide of zinc, two of crushed hard limestone, and one of pulverized grit, together with a certain proportion of ochre as a coloring agent. The liquid with which this powder is to be mixed consists of a saturated solution of six parts of zinc in commercial muriatic acid, to which is added one part of sal-ammoniac; this solution is diluted with two-thirds of its volume of water. A mixture of one pound of the powder to 2½ pints of the liquid forms a cement which hardens very quickly and is of great strength.

OUR WOOL IMPORTS.—For the ten months ending October 31, 1888, the value of the imports of manufactures of wool was 11 per cent more than for the same time last year. The increase was chiefly in women's and children's dress goods and miscellaneous merchandise. Though there was a slight falling off in the value of cloths, there was an increase in the quantity. There was an increase in the quantity of yarn of nearly 29 per cent. Clothing wools have been freely imported, and more of them have been retained for home consumption instead of being exported to Canada, etc. The export of wool is in some years a matter of considerable moment. In 1887 it amounted to 6,214,410 pounds clothing wool alone, over 3000 pounds of which were sent to Nova Scotia and neighboring provinces, 935,000 pounds to England, and 1,773,000 pounds to Belgium.

BRASS ALLOY.—A very good brass is made of 16 pounds of copper, 8 pounds of zinc, and one-half pound of lead. The lead should be added after the copper and zinc have been melted together. These proportions of the different metals make the best brass that can be made with zinc and copper. For very light castings the lead should be omitted, as it makes the alloy less fluid, but in heavy castings it makes them more solid and clean.

THE METRIC SYSTEM, in a single sentence: Measure all lengths in *meters*, all capacities in *liters*, all weights in *grams*, using decimal fractions only, and saying *deci* for tenth, *centi* for hundreds, *milli* for thousandths, *deka* for ten, *hekto* for hundred, *kilo* for thousand, and *myria* for ten thousand.

BOSTON'S DIVIDENDS.—Boston's monthly dividends are rapidly increasing. In the early portion of 1888 they amounted to $12 500,000 per month, $1,500,000 more than those distributed in Philadelphia. On an even distribution this would give every Bostonian $30 and every Philadelphian $11.

THE FINGER-RING COMPASS.—The old style of finger-rings with a setting containing a small compass is now being brought into use by electrical engineers. Held near a line wire, the movement of the compass shows at once whether a current is passing.

THE SOUTHERN NEGRO AND COTTON.—Cotton has long since ceased to be the product of the negro, as remarked by the New Orleans *Times-Democrat*. When the war ceased, nine-tenths of it was raised by the colored race; to-day, three-fifths come from white farms. The white States and white districts have become the cotton centers of the South. The negro parishes of Carroll, Tensas and Madison, the finest country in the world, where the yield is greatest and the staple the finest, produce far smaller crops than they bore 30 years ago, while the white counties of Texas have increased their production four and five fold. This fact attracted the particular attention of Prof. Hilgard, who prepared the census report on cotton, and he notes the singular coincidence that the bulk of the crop of Mississippi is raised in the hills, where the yield per acre is small, instead of in the bottoms, where every condition is favorable. The fact did not seem to strike him that the true reason lay in the fact that in the hills the cotton was raised by the whites; in the bottoms by the negroes.

YIELD OF TWO COMSTOCK MINES.—According to the Virginia City *Chronicle*, the largest single bullion shipment ever made from the Comstock lode was December 31, 1877. It included 133 bars from the Con. Virginia mine and 129 from the California. The aggregate weight was 32,818 pounds, valued at $1,099,099.71. The total combined yield of the Con. Virginia and California mines in 1887 was $32,658,869. The total bullion yield of the State in that year was $51,580,290. The total combined bullion yield of the Con. Virginia and California mines to July, 1878, was $100,011,285. At the close of the year 1878, the two mines paid out of this yield a total of $76,731,000 in dividends to shareholders. Since the consolidation of the two mines under the present title, the total sum disbursed in dividends was $2,440,800, footing up a total of nearly $80,000,000 paid in dividends out of that ground now known as the Con. California and Virginia.

BLACK HILLS ANTIMONY.—In the First National bank may be seen a huge specimen of the ore of antimony, taken from a mine near Pactola, in this county, and some 12 miles from Rapid City. The mine has never been developed, but enough work has been done to make it very probable that a large body of ore is located there. The specimen, upon assay, showed over 48 per cent of pure antimony, and $12 per ton in gold and silver. The mine has been located for years, but has never been developed; but the time is about here when this and many other minerals heretofore neglected will pay for working and shipment of the product.—*Deadwood Pioneer.*

THE DEBRIS COMMISSION.—A member of the U. S. Mining Debris Commission says: "It is the intention of the Commission, at the proper time, to make a personal examination of the entire field embraced within the scope of the investigation. This examination, however, will not be made until spring, due notice of which will be given to all parties interested. In the meantime we should be pleased to receive any papers, etc., which any one may desire to present."

A MINERAL PALACE.—Pueblo has decided to erect a Mineral Palace. The building will be about 300 feet long and 200 feet wide, constructed of heavy timbers entirely concealed outside and inside by minerals, especially iron, coal, copper, galena, coke and manufactures of iron and steel. Within the building it is hoped to have specimens from every silver and gold mine of any importance in the United States and Mexico.

DEMAND FOR IRON AND STEEL.—Three sources of demand are springing up, out of which iron and steel makers will profit during the present year. First, the locomotives; second, the demand for agricultural implements, mainly for distribution throughout the West; and third, the demand for machinery, engine and shop and mill equipments for steam-users throughout the United States.

GOLD IN JAPAN.—Mr. Sato of Sendai, Miyagiken, who is engaged in mining and has been at Hokkaido since about 1870, has discovered gold at Meekawamura, Shibata-gori, Miyagiken. Recently he came up to the capital with the mineral he had discovered, that it might be tried by a mineralogist. The gold is said to be of good quality.

ALASKA MINES.—The Indian who occasioned all of the hostility at the Yukon Portage last year when the miners were trying to get to the Upper Yukon placer mines gave himself up to the authorities at Sitka. He says his tribe will murder the first party of miners that go into the Yukon region this summer if he is hanged or confined in prison.

THE need of a geological survey in this Territory is imperative, and an appropriation by the General Government for the purpose would result in the advancement and development of our mineral resources, and in a few years' time place us on an equal footing with Colorado.—*Silver City (N. M.) Enterprise.*

GOLD has been discovered on City creek, ten miles from San Bernardino, the ore of which assays quite high per ton. One-eighth of one claim was sold for $5000. There is great excitement and crowds are going to the new mines.

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SAN FRANCISCO
Saturday Morning, Feb. 9, 1889.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Tramway and Mill at the Dorer Mine; Pneumatic Locomotive Built by the Clayton Air Compress Works, New York, 91. A Partial View of the City and Harbor of Astoria, Oregon, 93. Methods of Boring Artesian Wells, 99.

EDITORIALS.—Pneumatic Locomotive for Mines; Proxies in Mining Company Elections; A Mine Tramway, 91. Passing Events; Titles to Mineral Lands; Tin; Petroleum; A Belt Across the South American Continent, 98. Artesian Wells; Los Burros Mines, Monterey County, 99.

MISCELLANEOUS.—California Forestry; Portable Buildings; Where the Bullion Goes; Engine Tests for the Charleston; The Forests of Alaska, 92. A Flourishing Northern City; Utah Asphaltum; Water Prospects, 93. Mixture for Writing on Glass, 97.

SCIENTIFIC PROGRESS.—The Rare Metals—Some of the Mysteries of Chemical Science; Studying the Phenomena of Cyclones; Rapid Vegetation on Volcanic Rock; Spectacles for Special Use in Surgery; An Asteroid Discovered, 96.

MECHANICAL PROGRESS.—Improved Foundry Practice; Increased Application of Steel for Water and Other Pipes; Electrically Deposited Copper Wire and Tubes; Metallic Magnesium; Nail Manufacture; Are Iron Crossties a Failure, 96.

GOOD HEALTH. — Investigations in Cigarette Smoking; The Yellow Fever Microbe; Diphtheria Cure; Treatment for Asphyxiation; Nitro-Glycerine in Medicine; Fur-Bearing Animals of Siberia; A Novel Chair, 97.

USEFUL INFORMATION.—Remarkable Qualities of the Hemp Plant; How Nature Forms True Ink; Mixture for Writing on Glass; A New Cement; Our Wool Imports; Brass Alloy; Boston's Dividends; The Finger-Ring Compass, 97.

COTTON AND WOOL.—The Cotton States; Cotton Production in China; Cotton Culture in Australia; The Southern Negro and Cotton; The Wool Growers; Washing Wool; What Free Wool will Do; A British Columbia Woolen Mill; The World's Wool Product, 101.

FLOUR MILL NOTES.—The Future Center of the Wheat Supply; Corn and Wheat; Japanese Buckwheat; The "Flour Trust;" Mills and Batteries Combine; Double Representation all Right; Wheat in the Argentine Republic; Tar Weed in the Wheat Fields, 101.

MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 94-5.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 106.

Business Announcements.

[NEW THIS ISSUE.]

Quicksilver—Parrott & Co.

☞ *See Advertising Columns.*

Passing Events.

Two of the dynamos on the Sutro tunnel level are now giving power to the Nevada mill on the surface, and the electricians are sanguine that the whole plant will soon be at work. The power now obtained is a little less than half required to run the 40-stamp mill.

The electric railroad at San Jose has not proved a success, and the newspapers demand that it be removed and a road put in that will accommodate the people. Thus far the electricians appear to have been experimenting.

The daily ore yield of the Comstock mines is now 800 tons. If there were sufficient water to operate the river stamp-mills to their full capacity, the daily average ore yield of the lode would be above 1200 tons. The monthly bullion yield of the lode, with the present ore-crushing facilities, is above $500,000 monthly. Last year at this time it was above $750,000.

There is trouble with the boiler-makers at one of our local foundries over their refusal to put together boiler plates made in Scotland for the boiler of the steamer Australia, of this port. The men have gone on strike, though others have been put in their place.

Titles to Mineral Lands.

There ought to be some method by which the present system of obtaining patents to mineral lands should be simplified. Under present conditions, it looks as if the numerous surveyors, clerks and other officials were designed mainly to make life a burden to the man who applies for a quartz claim patent. Even with the efficient services of lawyers in Washington, and although the applications pass the scrutiny of the Surveyor-General's office and the local Land Office, and no contest by any other claimant is made, yet for three or four years, fine points of error will be discovered in Washington, each of which involves annoyances, expense and months of further delay. It is not so much the fault of the officials as the absurd intricacy of the laws they are trying to comply with.

And yet it is often urged that a poor man having a mine for sale should apply for a patent to perfect his title. The fact is, that by the existing laws a poor man is practically debarred from obtaining a patent to a quartz claim. However, if he be not adverse to perjuring himself, he may often manage, by filing a homestead, to secure a patent to about eight times as much mineral land, and this at a mere fraction of the trouble and expense incident to obtaining a quartz patent. But laws involving such possibilities are manifestly unjust and subversive of public morality.

Why the matter cannot be made as simple as in the case of homestead patents, it is difficult to see. It shows the remarkable vitality of the mining industry, that it has been able for so long to withstand the present system of obtaining title. Had the same been the case with homestead laws, such indignation would have been aroused all over the land that the objectionable laws would have been changed years ago. To the bad features of the system may in part be charged the tendency to take up mineral land as agricultural, since title can be more easily obtained in this way.

While Congress is tinkering with the mining laws, the best thing it can do is to immediately overhaul this subject of perfecting title to mineral lands, and so arrange the laws that a man can get his title in less than five or six years and without spending half what the mine is worth.

Petroleum in California.

The product of crude petroleum in California during the year 1888 is estimated at 300,000 barrels of 42 gallons each, this being a considerable increase on the product of any preceding year. Of the above quantity, the Pacific Coast Oil Co. extracted from their wells, located for the most part in the San Fernando district, Los Angeles county, about 50 per cent; the Mission Transfer Co. extracted from their wells in the Santa Paula district, Ventura county, about 40 per cent, the balance coming from the wells of the Puente Co., Los Angeles county.

The past has been a prosperous year with our large oil-producing companies who have had a ready market for their products at improved prices. Owing to the growth of our population, and the many new uses to which these earth oils are being put, their consumption, especially that of the crude article, is increasing at a very rapid rate, this increment having amounted during the past four years to 70 or 80 per cent.

The crude material is coming to be used largely for the manufacture of gas, also as a fuel, as well as for various other purposes. The San Francisco Gas Co. now consumes 100 barrels daily, and would double the quantity, enlarging and adapting their works to that end, could they be insured a steady and adequate supply. The Spring Valley Water Co., in their pumping works at Belmont, the Spreckels sugar refinery at Watsonville, the California wire factory, the extensive new pottery at Alameda, and many other large industrial establishments in this city and elsewhere, now make use of petroleum as a fuel.

In this country, and more especially in the southern part of the State, where so little fire is required, the gasoline stove is coming into common use, greatly increasing the demand for naphtha, the consumption of which has doubled annually for several years past. The Pacific Coast Oil Company manufacture now 35 per cent of the naphtha consumed on the coast, and will hereafter make a still larger proportion of this article.

Although no new refineries have been erected or new pipe lines laid down during the past year, many new wells have been bored, the above company making it a point to have three at least all the while in progress. While some of these wells prove failures, they continue, as a whole, to yield the average complement of oil common in this State.

The cost of plant for drilling these wells in California amounts to about $3000 each, this including engine, boiler, derrick, tools, etc. The cost of sinking per foot varies here over a wide margin, according to circumstances, the average being about $10, nearly three times as much as in Pennsylvania.

Tin.

Mr. E. N. Robinson, general superintendent of the San Jacinto Tin Co., reports that an English company has purchased the property and reorganized in London, England, under the name of San Jacinto Syndicate, Limited. The stock capital is $1,500,000. The syndicate bought all the property known as Rancho Sobriento de San Jacinto near Riverside, in San Bernardino county, California. Under the management of the new company the tin mines on the ranch will be thoroughly developed. In his report made in July, 1869, Mr. E. N. Robinson stated that there were 53 tin ledges on the Temescal range. Taking this as correct, then the San Jacinto Syndicate can, after developing the principal mines, supply the entire coast with all the tin consumed, for the supply of ore is said to be inexhaustible, while the quality of the tin turned out is of the very best.

The consumption of tin, both pig and plate, on this coast shows a remarkable growth. In 1878 the imports at this port were as follows: Pig, 625,080 pounds; tin plate, 95,277. Last year the imports were: 1,719,853 pounds in pig, and 32,203,125 pounds in plates. The increased requirements is due chiefly to the expansion of the canned-fruit industry and salmon industry, although the growth in population has also contributed somewhat to the increased consumption. Last year there was put up on this coast over 60,000,000 cans of our salmon, and over 45,000,000 2½-pound cans of fruit and vegetables. This year it is safe to affirm that an equal quantity, if not more, canned salmon will be packed, and a large increased quantity of fruits be canned, owing to the large growing and profitable trade for them east of the Rocky mountains.

Prices for both pig and plate ruled high throughout the year, that is, averaged higher than in 1887. Unlike 1887, 1888 closed weak at a lower range of values, while 1887 closed strong and higher, particularly for pig, which advanced from 24 in January, 1887, to 30 and 35 in December; 1888 just reversed the order—opening at 30 and 35 and closing at 23½ and 25.

BOX FOR QUICKSILVER AND AMALGAM.—George E. Mills of this city, while at the North Star gold-mill, Trinity county, recently, devised a new kind of sluice-box to catch and save the quicksilver and amalgam that had been running off over the copper plates from the battery. The device is placed at the end of the copper plates or blanket sluices. It has been working for three months past, during which time it has considerably added to the mine product, and has well satisfied the owners. It can be utilized in gravel as well as quartz mines, and the inventor says will save the finest gold and quicksilver. Mr. Mills is about to obtain a patent for his device.

THE SIERRA LUMBER CASE.—Notice of a motion for a new trial has been filed in the Sierra Lumber case. The grounds which will be urged are the misconduct of the jury, the excessive damages which, it is alleged, were given under the influence of passion and prejudice, and the insufficiency of the evidence to warrant the verdict.

THE Board of City Hall Commissioners have acceded to the demand of the Stone-Cutters' Union, and have ordered that all stone used in the construction of the plinth courses of the McAllister St. wings shall be dressed on the grounds instead of at the quarry.

A Belt of Steel Across the South American Continent.

This is an era of great undertakings by land and sea, says the Philadelphia *Record*. One of the latest is the railroad project to connect Recifa (Pernambuco), the most eastern seaport of Brazil, with Valparaiso, Chili, the nearest harbor on the west coast of South America to Australia and New Zealand. The voyage from Lisbon to Recifa is made by steamers in nine days, and Valparaiso could be reached by the proposed railroad route from Recifa in five days, making the time from Europe to the Pacific Coast 14 days. In obliquely cutting South America the road would traverse the fertile provinces of Brazil, Paraguay, the Argentine Republic and Chili. In both Brazil and the Argentine Republic use could be made of skeletons of railroads already constructed. The estimated cost of the undertaking is $150,000,000. A syndicate has been formed in Rio to obtain grants of land and money from the countries interested.

It need not be said that, on more grounds than one, this project, as well as all other projects for the development of South America, if accomplished, would be of great importance to the people of the United States. With the progress of that vast region in agriculture and commerce, its trade with this country would immensely increase if the American people should take advantage of their opportunities. But this is not to the United States the most important consideration involved in the development of Brazil and other countries of South America.

Some of our English cotemporaries think the project an impracticable one. A London paper says: "The fact is, it could not be built at all, and if built the territory traversed could supply no freight for it to carry, or passengers for it to convey; about 15 days' provisions would have to be carried on each train, and the natural obstacles are such that this short cut of 2500 miles would require perhaps a week more time than the water trip between its termini."

The experience of this country in building continental roads is quite opposed to the English objection. The building of such roads at this age of the world, as experience has fully shown, serves to open up a country and make business for itself. If railroads should penetrate these South American countries they would be sure to make their cheap and fertile lands available for remunerative cultivation, and thereby a large immigration would undoubtedly be attracted thither from Europe. There is already a mighty stream of immigration pouring into Paraguay, a portion of which would follow along the line of such a road as fast as it would be built and lay the foundation of new towns and provinces which would soon convert that now neglected and barbarous region into flourishing, civilized, agricultural communities. It would be but a repetition of our own experience in a precisely similar work. When a continental road was first proposed, the idea was scouted as chimerical and the Government had to step in and help it out at a cost of many millions. Since then and within the short period of less than 25 years, no less than three other continental roads have been built in competition and one or two others are in serious contemplation, if not actually in process of construction.

SULPHUR AND BORAX.—Mr. H. Jackson writes us from Bakersfield, Kern county, as follows: "It may interest you to know that fine crude oil, and almost pure sulphur and borax, has been found on the east side of this county in large quantities. A company is about being formed to work it all into marketable products. This is a good place, and the mountains contain more mineral wealth than I ever dreamed of, everything else having apparently been passed over in the rush for gold, and gold only."

LOCOMOTIVE WORKS IN CHILI.—An Englishman, who formerly resided in this city, has extensive works a few miles from Valparaiso, in Chili, from which there have been turned out lately half a dozen locomotives for the State railways at a cost of about $21,000 each in gold. The steel used is imported from England and the pig iron for castings from Scotland, while the wood-working machinery was made in the United States.

Artesian Wells.

In the PRESS of Jan. 26th was published an article on "The Requisite and Qualifying Conditions of Artesian Wells." There are other features connected with this interesting subject, not then mentioned, and which we shall now endeavor to place before our readers in a brief form.

Distribution of Wells.

In the employment of several wells their distribution is a matter of some consequence. The normal direction of flow, when it is once set up, by virtue of the opening of an avenue of discharge, is along a line drawn from the outcropping edge of the bed down its slope to the wells. Now, it is clear that if several wells are arranged along this line, the first one will be better placed than those which stand in its lee. These will be, indeed, measurably supplied by lateral flowage under the law of equal pressures, but less direct and freely. If the wells are disposed in a cluster, those on the exterior will partially cut off the supply of the interior wells. A more fortunate disposition than either of these would be an arrangement in a line at right angles to the direction of flow.

A still more advantageous arrangement, subject to local modification, would be to dispose the wells in a curved line, convex toward the collecting tract, for when the draft of the wells has made itself felt upon the sheet of water flowing most directly from the collecting belt to them, the higher pressure which the flanking portions still suffer will cause a lateral inflow, and the curved disposal of the wells will be more favorable for receiving the ingathering currents than a rectilinear arrangement, being more nearly normal to the resultant pressure and flowage.

In respect to the degree of separation of the wells, it is obvious that so far as the mere question of the greatest reception is concerned, the farther they are apart the better, for they will affect each other less; but, of course, practical considerations put a limit to their dispersion.

Figs. 1 and 2 exhibit tabular sections of strata, showing disadvantageous arrangement of wells. Figs. 3 and 4 are tabular sections, showing proper and advantageous arrangement of wells.

Control of Flow.

It is clear, upon consideration, that perfect control may be obtained by putting down a tube to the densest portion of the upper confining bed, if, by some device, the space surrounding it may be closed up so that no water can rise outside of the tube. Formerly this was done by a very simple and ingenious device known as the seed bag, shown in Fig. 5. A long, stout leather bag is made in the form of a cylinder, open at both ends, and just the size of the well-bore. This is slipped on the lower end of the pipe, and the bottom of the bag securely fastened about the tube by wrapping it with marline. A thimble just above the tie will aid in preventing slipping. It is then filled with dried flaxseed and the upper end likewise closed around the tube. When thus adjusted it is lowered into the well to the point determined upon, and supported there until the seeds swell by absorbing water. This enlarges the bag so as to fit the bore tightly and shut off all water from rising outside the pipe, and so all is compelled to ascend through the tube to the surface, or at least as high as the pressure is competent to force it.

Fig. 5 shows the seed-bag; *a* is the delivery tube leading to the surface of the well and terminating below the seed-bag; *c* is a leather bag filled with dry flaxseed; *b*, marline wrappings to secure the end of the seed-bag.

A better and more convenient, but more expensive, packing takes advantage of the expansion of the rubber disks when pressed together, instead of the swelling of flaxseed. A series of thick, washer-like rings of rubber are fitted about a section of pipe, so adjusted between iron disks that, after being put down, they can be screwed together, and so caused to expand laterally and completely fill the bore.

The construction of the parts and their adjustment are indicated in the accompanying figures (6 and 7), which illustrate one of the forms in use.

In Fig. 6 the rubber packing is shown apart: *a*, section of delivery tube extending to the surface; *b*, a large thimble into which *k* screws; *e*, an iron washer; *c*, a set of rubber disks fitting on *k* between *b* and *d*; *k*, a section of pipe on which is turned a long screw, fitting in the thimble *b*; *d*, a disk forming the head of the screw *k*; *h*, a section of pipe extending about two feet below the packing; *i*, a spring to press against the walls and hold the pipe *h*, while the section *a* and thimble *b* are screwed upon *k*.

Fig. 7 is the rubber packing shown screwed together as it is in the well.

In a form employed in the oil regions the expansion of the rubber disks, or single cylindrical one, is accomplished by pressing a conical hollow wedge between the pipe and the rings, thus forcing them out against the walls of the well.

In this case the packing is supported by a perforated tube, an "anchor," reaching the bottom of the well. As the packing in an artesian well is often located near the top, the necessity for support from below excludes this form in most cases.

Detection of Flow.

It has been remarked that the water may rise from the bottom to some higher portion of the well, and there find escape by passing off laterally through the upper strata. In absence of control the water does not always rise and overflow. It is a matter of some practical moment, therefore, to know when a stream is struck which may yield a flow at the surface when put under proper control. Such a stream usually discovers itself by a rise of water in the well, but this is not always the case. It is ordinarily desirable to test the capacity of any stratum which gives any suitable indication before sinking to a lower one.

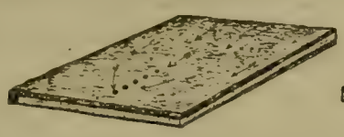
Negative and False Tests.

1. It is possible, in perfect honesty, to make both a negative and false test. Suppose that two porous beds *A* and *B* (Fig. 8 showing a negative test), separated by an impervious layer, are traversed, and the testing of the first has been neglected, either because it failed to give encouraging indications or for other reasons. It is now desired to test these. Suppose the seed-bag or rubber packing be placed above the upper one. Now, if both bear a water level equally high, the test will be made, and the result will indicate their combined capacity; or if both heads are at least as high as the surface at the well, the test may be accepted. But suppose that the bed *A* has been cut into by erosion, or been reached by crevices, or is otherwise defective, while the other, *B*, remains intact and bears an elevated fountain-head. Under these conditions the water may flow from *B* through the bore into *A*, and escape laterally through it, as illustrated in the figure. Now, in this case the result may be simply negative or positively false and misleading. If the lateral leakage through the stratum *A* effectually disposed of the flow from *B*, and there was no leakage in the upper portion of the well, the water in the test tube would stand during the test at essentially the same hight as before, and the result would be negative, failing to indicate a possibility that really existed. If, on the other hand, there was lateral leakage through the upper strata as well as through *A*, neither alone being quite competent to dispose of the flow from *B*, then the introduction of the test pipe would cut off the upper leakage, leaving the bed *A* unable to dispose of the entire flow. In this case there would be a rise of water in the tube, and, possibly, a flow. The mischievousness of a test of this sort lies in the fact that it appears to be a true test, because it shows some result, while in reality it is false and misleading. The true test in this case can only be made by placing the packing between the porous beds *A* and *B*.

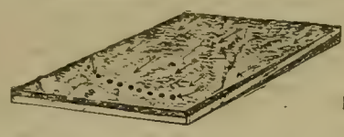
2. Take another instance where two porous beds, as *A* and *B* (Fig. 9—a partial and misleading test), have been traversed. Let the packing be placed between these. Then (1), if *A* equals *B* in productive capacity, water will stand at the same hight within and without the test-pipe *if there is no leakage in the upper beds*. (2) If the failure to flow was due to such leakage, then a flow will result from *B*, but the additional flow which might be secured from *A* is lost (see figure). (3) If *A* has a greater head than *B*, and if there is no loss above, the water in the test-pipe will actually be lower than that outside, as illustrated in Fig. 10. This may be said to be an *inverted test*, and is less misleading than the false and negative tests, since it plainly indicates an error of manipulation. (4) If, however, there is in this case considerable lateral waste in the upper strata, the valuable flow from *A* will be lost, just as before the test was made, while *B* may give a rise in the tube, or even a flow, which would foster the impression that a fair test had been made, while in reality the greater flow had been lost. (5) If *A* gives a feebler flow than *B*, but has an equal head, and is a possible means of escape for the flowage from *B*, then the packing has been placed at the right point and the test gives the best results.

Take another instance, as in Fig. 11. This is a section of strata and three wells, showing one correct and two erroneous tests. These wells are assumed to be independent of each other, and are placed together on the diagram merely for convenience. In this cut let *A* and *B* represent porous beds (Fig. 11), the lower of which is so conditioned as to drain the upper one by virtue of a lower outcrop. (1) First, if the drainage loss below is not complete, and if the packing is placed above *A*, as shown in Fig. 11, *I*, the result will be negative, if there is no leakage in the upper strata. (2) Should there be considerable loss there, it will be cut off by the tube and packing, and some rise in the tube will be the result in most cases. In either instance the result is misleading, particularly in the last, because the small rise of the water is apt to allay any suspicion as to the effectiveness of the test. The real fact, however, remains that the flow from the productive strata is mainly lost below. (3) Suppose that the packing is located between *A* and *B*, as in Fig. 11, *II*, it will then shut off the flow from *A*, while that in *B*, because of a larger outlet, will fail to flow. Now, if there is opportunity for lateral leakage in the upper strata, the water from *A* will rise in the well *outside* of the test-pipe and pass off into these open upper beds. (4) But if no such opportunity is afforded, it may rise to the surface and overflow outside of the test-pipe, while the water within the test-pipe will probably be found to be lower than before the test was made.

The proper method of testing wells known or suspected to present these conditions is to sink a simple bag of seed or other obstruction to a point in the impervious stratum between *A* and *B*, which, when it tightens in its place, will shut off all leakage in the upper strata, and the full capacity of the water-bed *A* will be tested.



FIGS. 1 and 2.—Tabular Sections of Strata, Showing Disadvantageous Arrangements of Wells.



FIGS. 3 and 4.—Tabular Sections of Strata, Showing Advantageous Arrangements of Wells.

FIG. 5.—Seed Bag.

FIG. 6.—Rubber Packing, apart.

FIG. 7.—Rubber Packing, together.

FIG. 8. Negative Test.

FIG. 9.—Partial and Misleading Test.

FIG. 10.—An Inverted Test.

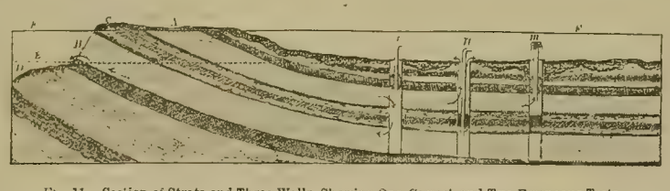


FIG. 11.—Section of Strata and Three Wells, Showing One Correct and Two Erroneous Tests.

Los Burros Mines, Monterey County.

A rich strike of gold-bearing quartz has been made in the Last Chance mine, Los Burros Mining District. This new mining camp is comparatively unknown in San Francisco, but it promises to become one of the richest mineral-producing districts in the State. Although the first discovery was made only a year and a half since, much development work has been done. It is situated in the southeastern part of Monterey county, on the western slope of the Coast Range of mountains, and about five miles from the ocean. The country is well watered and timber is abundant, especially redwood and pine. The course of the mineral belt extends from S. E. to N. W., and has been prospected from the ocean beach southeast for a distance of 15 miles, and how much farther it extends is as yet unknown.

The first discovery was made by Mr. W. D. Cruikshank. A shaft was sunk about 50 feet. The ore in this vein is remarkably rich and has an average width of about three feet (shows free gold all through the vein). About three months after the first discovery another lead was found about 75 feet northwest, which is as rich, if not richer, than the first. A tunnel was run on the lead for 150 feet, and from a small vein at the beginning it opened out to six feet. The quality of the ore is high grade, and few mines are found where it averages so well both for quality and quantity.

In March last a tunnel was begun to crosscut the ledge. Much hard rock was encountered, but finally the first ledge was cut at a distance of about 350 feet. The result exceeded the highest expectations of the proprietors. Drifting on the vein each way, it opened out to seven feet of solid ore and of high grade; the average width for 75 feet as far as prospected is six feet. The walls are clearly defined and are of talcose slate. Assays of this ore show $2000 rock. It carries a small percentage of silver. The tunnel is being continued on to cut the upper lead. This is of the greatest importance, as the last discovery is at a depth of 150 feet below the surface and clearly demonstrates the fact that we have mines in the Coast Range of California which are of greater value than has been supposed.

Many other discoveries of importance have been made. The Manchester shows rich rock, and although little development work has been done, the owners intend to prosecute work vigorously in the spring. The Pacific adjoins the Last Chance mine on the northeast, and is owned by a company of capitalists. Their intention is at present to run a long tunnel and tap their vein deep. The ore on the surface is good, and assays show as high as $1130 per ton. Prominent among the mines of camp is the Ajax, which lies about a mile to the southeast of the Last Chance. A tunnel has been run on this claim 240 feet.

The ledge was cut at a depth of 100 feet from the surface. The ore is remarkably fine and free gold is plentifully distributed throughout the vein. The latest strike in the camp is known as the Wild Bill, and is owned by Wm. Covington and M. J. Gilleran. It lies to the south of the Ajax, and runs parallel with it.

This strike has caused great excitement and miners and prospectors are flocking in to see it. The vein is uncovered for a distance of 100 feet, and is strong and permanent. The ore is decomposed quartz, and working tests show between $80 and $90 per ton. The owners are pushing the work rapidly on this claim, and are confident they have a mine that can soon be placed on a paying basis. There are a number of other claims on Alder and Willow creeks which deserve mention; one recently discovered, known as the Pop Sure, the property of Mr. J. E. Davis and Gus Peterson, which promises well. The Brewery claim is very rich. The lead is in solid slate formation and this is sprinkled with gold. Space forbids extended mention of the numerous rich prospects of this rising young camp. Enough has been shown, however, to overthrow the theories of so-called mining experts who have repeatedly made the statement that there are no mines in the Coast Range.

The miners there are confident, and not without reason, that they have a mining camp, for its age, second to none in the State.

Pig Iron on the Pacific Coast.

The Puget Sound Iron Co. at Irondale, Puget Sound, W. T., after an eight-months' closing down for general repairs, went into blast in last September, with a monthly output of 1000 tons of pig iron. The Oregon Iron & Steel Works at Oswego, Oregon, after remaining closed down for a series of years, went into blast about November 1st, with a monthly output of 1000 tons of pig iron, The latter works are reported to have put in new and improved machinery so as to operate to the best possible advantage. The Clipper Gap Iron Works in this State are out of blast. A large iron ore deposit is being developed in the southern part of this State, and another on Puget Sound. The company developing the latter, it is said, has contracted the output to a rolling-mill that is being built on the Sound. The ore used by the Puget Sound Iron Works comes from the Texada islands, and is said to turn out a superior quality of pig iron, the price for which is quoted in this market at $30 a ton. Since going into blast the company has sold to the Southern Pacific railroad 700 tons for making car-wheels. The Union Iron Works take about 100 tons a month, while other large iron works in this city take from 25 to 100 tons a month. The fine steam cylinders in use on the steam schooners are manufactured from this iron. The Oregon Iron & Steel Works have their output under contract to the iron works at Portland, Oregon, chiefly for the making of iron pipes.

The high market in this city for pig iron has no doubt had a stimulating effect on the production of pig iron on this coast. The high market is due to an advance abroad, and also to an advance in freights. The consumption on the Pacific Coast has increased at a rapid rate, due to more expensive structural improvements, railroad building, and also iron shipbuilding. The latter is in its infancy, but promises to assume large proportions in the near future. It is generally claimed among iron men that more mill machinery will be turned out this year than in any one year for five years past. If this shall prove correct, the demand for pig iron for this particular purpose will be quite large.

The high price of English coals in the primary markets and the high rates of freights cause a strong market for English coals, with no immediate prospect of a reduction in values. The same influences, or rather the high freights from England to this port, cause coke to rule high for prompt shipment, while the small supply here causes a strong and high market for spot. On this coast there are three coking establishments, two in Washington Territory and one in this State. That in this State is not running, but the two in Washington Territory are working. They are as follows: New Tacoma Co. of 30 ovens and a capacity of 90 tons a week, and the Wilkeson Co. of 50 ovens and a capacity of 150 tons a week. The coke is said to resemble that of Connelsville, Pennsylvania.

Legislative.

A bill of general interest which has passed both houses is Assembly Bill 118, entitled "An Act to provide for the proper sanitary condition of factories and workshops and the preservation of the health of the employes." Section 3 will be of importance to bakers and those engaged in basements.

Section 1 provides for the construction of outhouses used by employes.

SEC. 2. Every factory or workshop in which five or more persons are employed shall be so ventilated while work is carried on therein, that the air shall not become so exhausted as to be injurious to the health [of] the persons employed therein, and shall also be so ventilated as to render harmless, as far as practicable, all the gases, vapors, dust or other impurities generated in the course of the manufacturing process or handicraft carried on therein that may be injurious to health.

SEC. 3. No basement, cellar, underground department or other place which the [Commissioner] of the Bureau of Labor Statistics shall condemn as unhealthy and unsuitable shall be used as a workshop, factory or place of business in which any person or persons shall be employed.

SEC. 4. If in any factory or workshop any process or work is carried on by which dust, filaments or injurious gases are generated or produced that are liable to be inhaled by the persons employed therein, and it appears to the [Commissioner] of the Bureau of Labor Statistics that such inhalation could to a great extent be prevented by the use of some mechanical contrivance, he shall direct that such contrivance shall be provided, and within a reasonable time it shall be so provided and used.

SEC. 5. Every person, firm, or corporation employing females in any manufacturing, mechanical or mercantile establishments shall provide suitable seats for the use of the females so employed, and shall permit the use of such seats by them when they are not necessarily engaged in the active duties for which they are employed.

SEC. 6. Any person or corporation violating any of the provisions of this Act shall be punished by a fine of not less than $50 nor more than $100 for each offense.

SEC. 7. It shall be the duty of the [Commissioner] of the Bureau of Labor Statistics to enforce the provisions of this Act.

A bill has been introduced by Petrie making an appropriation for the care of the State Mineral Cabinet.

Hart's bill has been passed, making an appropriation for the purchase of an electric plant, pump and pipe necessary for utilizing the waters of American river for power purposes for the Folsom State Prison.

Campbell has submitted a bill fixing eight hours as a legal day's work on public buildings, and allowing extra compensation for overtime and holidays.

The Assembly Committee on Mining and Mining Interests presented two reports on the bill to appropriate $150,000 for the State Mining Bureau. The majority report, which is signed by Sims, Davis, Gardner and Coleman, recommends that the appropriation be made. The minority report, signed by La Grave, Mahler and Tulloch, gives certain reasons for opposing the amount named, and says: "We cannot recommend the bill in its entirety, and as a substitute for the amount named in the bill and its proposed disposal, we respectfully suggest that the appropriation be $70,000, and that $50,000 of that amount be used for geological surveys of the principal mining lodes of the State."

Coast Industrial Notes.

A GOOD many Eastern boilermakers have come to this city of late.

THE real estate agents of San Francisco are about to form an exchange.

A DOZEN new oil-wells have lately been bored in Los Angeles county.

THE water-pipe manufacturing industry of this city has been brisk of late.

ORDERS for three new electrical-power plants have lately been received by a local firm.

A FACTORY for the manufacture of wire cloth and wire nails is soon to be established at San Diego.

GLOVEMAKERS here have had one of the busiest seasons in their experience, the local trade being unusually good.

THE Southern Pacific Company is doing a great deal of bituminous rock work at various points along its line.

BEDS of good clay for making terra-cotta work have been found on the shore of Carquinez straits near Vallejo.

J. M. DENNETT of Dakota thinks of putting up a mill in Redding for the grinding of barley, the manufacture of flour, cornmeal, etc.

A COMPANY has been organized at San Luis Obispo to develop the coal mines at the head of San Jose valley, about 22 miles from Santa Margarita.

EX GOVERNOR PERKINS states that business is rather dull for steamers on the coast at present; in fact there are more steamers than there is work for.

A FLOWING oil well, 110 feet deep, has been struck on the Sunset Co.'s land, Kern county, about 25 miles from Bakersfield. The flow is about five barrels a day.

OAKLAND people are trying to get some one to put up a cannery there to take the place of the Lusk cannery, which went down with the fortunes of W. T. Coleman & Co.

THE Ben Lomond Land and Lumber Co. is a new Santa Clara county company. The names of the incorporators are J. B. Pierce, R. T. Pierce, H. M. Leonard, Wm. Cary and J. H. Pierce.

THE Portland *Oregonian* says: The Willamette Falls will furnish 200,000 horse-power for nine months of the year, while those at Minneapolis only furnish 120,000 horse-power for six months.

A PIANO, the framework of which, outside of the inner iron-string frame, will be entirely of California redwood, is now being made at a large local factory for exhibition in the California display in London.

WRIGHT & Co. launched recently at Fairhaven, Humboldt bay, the schooner Henry C. Wright, built at a cost of $20,000, and with special regard to the requirements of the trade with Mexico and Central America.

A DREDGER of the Bowers patent has been built in San Diego. A 250-horse power Westinghouse engine drives the pump. The first work of the Bowers dredger will probably be done in Glorietta bay, at Coronado.

NEW terra-cotta and pressed-brick works are to be established by local capitalists. These gentlemen have been looking about for a suitable location for their works on the shores of the bay, and have about decided on Vallejo.

IT is stated at Seattle that a railroad is to be at once built from Ship Harbor, on Fidalgo Island, northeastward for 30 miles along the Skegit river to tap the coal-fields, and that the Ship Harbor will be the headquarters of the down-sound shipping.

THE coast line of the Southern Pacific Company having been finished to Santa Margarita, some of the men who have been engaged in construction work will now proceed with the building of a depot, warehouse and other structures at that place.

A BILL introduced in Congress provides that no raft of timber or logs shall be brought into or taken out of any harbor or port of the United States, or brought into or upon any of the great lakes from any river, stream, port or place in Canada or any other foreign port.

THE Pacific Iron and Nail Works has begun the manufacture of wire and of wire nails. But one other concern on the coast—the California Wire Works, in San Francisco—makes the former product, and the Oakland establishment is the only producer on the coast of wire nails. The old glass works, at the foot of Filbert street, has been utilized for the new industry.

THE Los Gatos Packing Co. has incorporated. The capital stock is $100,000, divided into 2000 shares. The amount of capital stock already subscribed is $2500, which is taken by Samuel Templeton, Robt Walker, Michael Miller, Jas. E. Gordon and John W. Lyndon. The principal place of business is Los Gatos, which is the residence of all the directors.

THE contract for supplying 30 tons of flanged boiler plates for the Monadnock has been awarded to the Union Iron Works of San Francisco for $10,870. This is an assurance that work will soon begin in earnest on the Monadnock and at the Mare Island yard.

THE Riverside *Press* says: In southeastern Los Angeles county, in what is known as "Gospel Swamp," there is a tract of land of several thousand acres composed of decomposed vegetable matter, which is known as peat-land. This peat has been examined by a number of people and is believed to contain valuable fertilizing matter.

THE Santa Barbara *Press* says: A new oil steamer called the W. L. Hardison has been built for the Mission Transfer Company, and will run from Hueneme to this and other southern ports in the oil trade. She has a capacity of 38,000 barrels, and can deliver at the rate of 40,000 gallons an hour.

IN speaking with S. T. Gage of the Southern Pacific Company it was elicited that the Pacific Division of that corporation consumes 60,000 tons of coal a month. It would require 30 colliers to bring into port that amount of coal. By the Pacific Division is meant the lines from Oakland to El Paso, Ogden and Portland.

HARBOR WORK.—Contractors for the work of the improvement of the Humboldt bar are rushing the work of building the necessary cars, scows, wharves and sprons, and constructing a railroad to the quarry. A large number of men are at work. The transportation of materials to the scene of the improvements will commence in March.

THE Piedmont Cable Railroad Company made a contract with the Judson Iron Works a short time ago for the manufacture of a large quantity of rails to be laid on the new road. This contract has now been vacated, and the reason for it is, that it was discovered that the rails ordered infringed upon a patent. It will be necessary to send East for rails.

THE Colusa *Sun* says: Father Wallrath's brick kiln, burned for the purpose of erecting a convent, is almost entirely a failure. He first employed Warren Smith to burn the kiln, and when he could not do it he sent to Woodland for Mr. Kraft, one of the most experienced burners in the State. Some 40 or 50 cords of wood extra were also consumed. It is hard to understand why it was a failure.

THE Southern Pacific has just expended about $1,000 000 on an air brake equipment. Upward of 15,000 freight cars, running on both the Pacific and Atlantic systems of the company, have been equipped at a cost of $50 a car, or about $750,000. Over 500 passenger, mail and express cars have been equipped at the rate of $100 a car, or $50,000, and the equipment of 600 locomotives at $350 each, cost $210,000.

LUMBER IN TULARE COUNTY.—The books of the San Joaquin Lumber Company show that there was more lumber sold in Visalia during the past year than in any other town south of Stockton, in this valley, excepting Fresno. There are now about 400,000 feet in the yard. The company has purchased the "cut" of Comstock's mill for the coming season, the lumber to be delivered as desired at different points in Tulare county.

NEW CHOCOLATE MILLS.—A local company, which has had great success in the manufacture of chocolates and spices, will soon remove from its old works to newer and larger quarters. The new works will be provided with all the latest-improved machinery and will have a largely increased capacity. The chocolate and spice business of the city has grown wonderfully of late, and will soon form an industry to stand in the front rank of our local trades.

LUMBER COMPANY AT SUTTER CITY.—The Sutter City Lumber and Milling Co. has been incorporated with a capital stock of $50,000. The directors and officers are: W. F. Hoke, president; Wm. Ellington, secretary; H. H. Brittan, manager; J. C. DeWitt, Thos. Fox, Conrad Kloss, G. W. DeWitt, P. D. Gardemeyer and H. Best. The Farmers' Union bank is treasurer. H. H. Brittan will shortly secure stock and machinery. The sheds and buildings will be put up at once.

STATE PRODUCT IN 1888.—Statistics gathered by the San Francisco Board of Trade show the State's productions for the year to aggregate $92,940,138. The detailed value of these productions is as follows: Hops, $1,038,000; canned fruits and vegetables, $4,444,100; raisins, $1,601,250; prunes, $315,000; dried fruits, $1,950,000; nuts, $225,600; oranges, $1,210,000; dairy products—butter, cheese, and milk, $6,158,480; wine and brandy, $4,200,000; quicksilver, $1,350,000; honey and beeswax, $250,000; beans, $450,000; potatoes, $700,000; salmon, $250,000. The cereal crop, owing to the extremely hot weather, showed a shortage of 50 per cent in the crop. The products are as follows: Wheat, $24,000,000; barley, $6,000,000; rye, $50,000; oats, $1,100,000; corn, $3,000,000. Lumber—Ties and pine lumber, redwood stakes and shingles, $11,366,476. Cars of green fruit exported East, $2,000,000; green fruits, exclusive of canning, shipped East, $2,000,000. Gold and silver shipped, $12,000,000. Valuation of wool during the year, $4,917,763; hay crop, $2,000,000.

LOGGING AT TRUCKEE.—All the latter part of January was very favorable for logging around Truckee, and most of the mill-owners have taken advantage of the snow and cold weather to get to their mills a good lot of logs for summer use. George Schaffer has three six-horse teams and one eight-horse team going constantly, and in two weeks has put in the mill pond about 500,000 feet of logs. This is exceptional good work for winter. Logging is also being conducted at Ellen's mill, at Boca and at Camp 18. This will enable the mills to start up early in the spring, and the outlook for a prosperous and busy season is very bright.

ELEVATOR SYSTEM.—E. C. Michener, agent of Peavy & Co. of Minneapolis, has completed all arrangements for constructing a system of grain elevators in connection with the lines of the Oregon Railway and Navigation Company. A terminal elevator will be located at the lower end of the city, where river frontage has been secured for it, and also for storage buildings of 3,000,000 bushels capacity. This terminal elevator, which will be the first on the Pacific Coast, will have a capacity of unloading 300 cars in 20 hours. Its elevating capacity will be 50,000 bushels per hour and its facilities for sacking 50,000 per day. All wheat will be sacked for export at present.

ICE HARVEST.—The Truckee *Republican* of Jan. 26th says: The ice harvest is nearly completed. We are informed that work is concluded at Prosser creek, Martis creek, Boca, at the People's Co.'s works and at Floriston. The Tahoe Company will finish by Monday, and also the Rocky Run. The Essex has been putting in ice since Monday and the Mountain Ice Company commenced yesterday on its second crop. The crop is of fine quality and nearly double in quantity that of last year. The ice companies have had very favorable weather and the cost of putting up the ice has been less than usual. In fact it is a cheap crop and the companies ought to make money next year.

THE SALMON FISHERIES.—The salmon fisheries of Alaska are developing in a wonderful manner and that region is now regarded by the canners as the one from which supplies for the world's consumption must now be looked for. There have been organized since last season no less than 20 new companies. The salmon catch last year, as stated by one who is extensively interested in the business, amounted to 500,000 cases of two dozen cans containing one pound each, and was valued at over $2,500,000. This year, if all the canneries meet with measurable success, the catch will be double that of one year ago both in quantity and value. The Alaska canneries propose to become independent of occasional steamers for their supplies, and several of them have ordered of our shipbuilders small steamers. These steamers are built expressly for this traffic. They are to be fitted with bulkheads in the hold for containing the fish. The canneries being conveniently and centrally located, these steamers will steam to where the fishermen are operating and gather up the catch as it accumulates.

HALIBUT FISHING.—U. S. Fish Commissioner Abbot says: "The White of this city has been chartered by Louch & Johnson of Seattle for the halibut business of that place. The White has just sailed for the north. A halibut company has been organized at Seattle, and the men in it are now picking up suitable vessels for the business. The White is about an 80-ton vessel. Mr. Johnson of the company was here last week for more vessels. Another company for catching halibut has just been organized at Portland. The Henry Dennis sailed from Gloucester, Mass., a month ago, and is now coming around the Horn, preparatory to engaging in the halibut trade off the Washington Territory Coast. Other vessels, I do not doubt, will join her, as the Atlantic fisheries are fast playing out, and Eastern fishermen must henceforth operate largely here. I see by the Cape Ann *Advertiser* that halibut from the Grand banks are selling in cargo lots for from 13 to 18 cents per pound.

COTTON AND WOOL.

The Cotton States.

Thirteen cotton States in the Union in 1887-8, raised 456,090 bales, against 401,452 bales the previous season. Georgia led off with 133,877 bales; South Carolina, 111,003, while Texas, the largest State, produced only 544 bales. In 1886-7 she raised only 180 bales. Says the New Orleans *Times-Democrat*. In the Carolinas and Georgia, from one-fourth to one-fifth the cotton now raised is manufactured in the home mills. The industry is gradually extending from that section to the Southwest, where the bulk of the crop is now produced. The Alabama, Mississippi and Louisiana mills are increasing their output, and in the next half-dozen years must reach the status of the Georgia factories. Another cycle will carry the industry west of the Mississippi to Texas and Arkansas. The Southern Atlantic States, with a production of about 1,750,000 bales, consumed last season 344,042, or one-fifth their production, in their own mills. This is certainly a good showing for an industry originating almost wholly since the war, and indeed mainly during the last ten years.

It will be seen from the following that the cotton-growing States are also fast coming to the front as cotton manufacturing States, as well as are other manufacturing industries. The value of the cotton goods made in the South was $21,000,000 in 1880, and nearly $50,000,000 for 1888.

In 1880 there were 40 cotton-seed oil mills in the South. Now there are 160, with about $12,000,000 invested.

The value of the South's agricultural products for 1888 was about $800,000,000, against $571,000,000 in 1879.

The value of the South's live-stock is now $570,000,000, while in 1879 it was $391,400,000.

The production of grain rose from 431,074,630 bushels in 1880 to 626,305,000 bushels in 1887, an increase of nearly 200,000,000 bushels.

COTTON PRODUCTION IN CHINA.—The cotton production of China has always been a mysterious quantity, and early estimates of it, as well as that of India, made it of enormous proportions. Though even now there are no reliable statistics regarding the cotton yield of this empire, yet it has been pretty well ascertained that instead of being large the production is comparatively small and the quality inferior, like all native Asiatic cotton. For the year 1883 Mr. Ellison gave an estimate of 1,425,000 bales, as the annual yield of cotton in China, and his method of arriving at this was as follows, presuming upon a population of 330,000,000, using an average of 2½ pounds of cloth to each person:

	Pounds.
Total consumption of cotton fabrics	750,000,000
Goods and yarns imported	140,000,000
Raw cotton imported	40,000,000 = 180,000,000
Balance	570,000,000
Equal in bales of 400 pounds each	1,425,000

To this there should be added about 25,000 bales exported to foreign countries from the provinces of Kiangsu and Chekiang and others in the valley of the Yangtse-Kiang river. A limited export is made in native junks, of which no account is taken at the customs ports. If the annual production was taken at 1,500,000 bales, we should say that it would not be far out of the way. Cotton cultivation is almost entirely an internal industry, and only in the provinces referred to above is there a supply grown exceeding local wants.

COTTON CULTURE IN AUSTRALIA.—According to late information, efforts are being made at Queensland to develop the growth and manufacture of cotton, and a deputation of farmers recently waited on the Premier to request that a bonus of 5000*l.* be offered for the first 5000 yards of cotton goods manufactured in the colony from cotton grown there; also a grant of 5000 acres of land at the expiration of three years from the establishment of the first cotton factory. Sir Thomas M'Ilwraith received the proposal favorably, and promised to consult his colleagues upon it. Formerly, when cotton was grown in Queensland, 2,000,000 pounds were exported in one year, and it is contested that if farmers be encouraged to grow it, a great deal of land fit for no other purpose will be brought into cultivation. It is, however, admitted that there is no reason to expect success in growing cotton for exportation, and the object is to get factories established to consume the produce, relying on the ordinary import duty for protection.

THE SOUTHERN NEGRO AND COTTON.—Cotton has long since ceased to be the product of the negro, as remarked by the New Orleans *Times-Democrat*. When the war ceased, nine-tenths of it was raised by the colored race; to-day, three-fifths come from white farms. The white States and white districts have become the cotton centers of the South. The negro parishes of Carroll, Tensas and Madison, the finest country in the world, where the yield is greatest and the staple the finest, produce far smaller crops than they bore 30 years ago, while the white counties of Texas have increased their production four and five fold. This fact attracted the particular attention of Prof. Hilgard, who prepared the census report on cotton, and he notes the singular coincidence that the bulk of the crop of Mississippi is raised in the hills, where the yield per acre is small, instead of in the bottoms, where every condition is favorable. The fact did not seem to strike him that the true reason lay in the fact that in the hills the cotton was raised by the whites; in the bottoms by the negroes.

The Wool-Growers.

The wool-growers of Texas have recently been in council and have adopted resolutions urging Congress to so amend the present tariff as to prevent the importation of foreign wool under the names of ring waste, thread waste, yarn waste, etc., which are now used to evade tariff duty, declaring that it is largely due to these fraudulent importations of wool and improper classification, and the inequality of the tariff on woolen and worsted goods, that their industry has been so seriously checked in its development. The meeting decided to send a delegation to Washington to present to Congress the true needs of the wool industry of the South.

The convention seems to have lost its confidence in the Texas delegation in Congress, and in view of its opposition to the present tariff system and favorable consideration of free wool, they respectfully request S. J. Randall of Pennsylvania and William McKinley of Ohio to represent the Texas wool-growing industry when a revision of the tariff comes up in the House.

The wool-growers throughout the country appear to have their eyes fixed on Washington just at this time. The National Wool-Growers' Association met in convention at Washington on the 10th ult., elected their officers for the ensuing year and among other acts adopted resolutions declaring that while Congress maintains a general policy of protection, the wool-growers and wool manufacturers in the United States have the right to demand that the duties on wool and woolen and worsted goods shall be adjusted and maintained so as to secure to them the American market; protesting against the Senate Tariff bill so far as it affects wool; providing for a committee of seven to formulate such a schedule of tariff duties for wool as may be deemed just and necessary, and to present the same to the Finance Committee of the Senate and urge its adoption.

WASHING WOOL.—It is said that if a bale of wool should be placed for a considerable length of time in salt water the continued action of such water would in time completely dissolve the wool, while it would have no such effect on the bagging, whether made of cotton or jute. If we place wool in water with some caustic potash, and raise the water to the boiling point, the wool will soon be entirely dissolved. And yet, with a knowledge of these facts, many manufacturers and others will place their wool or woolen goods in the hands of ignorant persons, who freely use salt and soda ash and raise the water to the boiling point, and from this plunge the goods into cold water, unconscious of the evil results that must necessarily flow from such practice. Goods are in that way often deteriorated, and, although made from the best of wool, will not wear any better than the poorest shoddy. The washing of wool and woolen goods should be intrusted only to such persons as fully understand its peculiar nature. Only the finest and mildest quality of soap should be used in washing woolens. The process of washing wool, whether in the fleece or as manufactured goods, should be one of gentle persuasion. Soaps for wool-washing should be kept at a uniform heat and strength, which is best accomplished by using a thermometer instead of the hands, and the soap or alkali should be weighed, and not be thrown into the soap-tub by guess.

WHAT FREE WOOL WILL DO.—A gentleman writing from Buenos Ayres says: "If the United States Government changes the Custom-house tariff and opens the door to Argentine wools, we may look forward to a new era in the sheep-farming line. Furthermore, our relations with the States would become *Ipso facto* most important and a current of reciprocal trade would be established and of such a magnitude as to astonish our North American cousins. There would then be no need of Government subventions to start steamship communication with New York, and the mere repeal of the wool tariff would do more than all the ministers, commissioners, treaties and newspaper articles rolled together in opening up a brisk trade with this country."

A BRITISH COLUMBIA WOOLEN-MILL.—The Westminster woolen-mills, the only manufactory of its kind in British Columbia, has lately arranged to sell its entire make of blankets, for an unlimited period, to a wholesale firm in Victoria. The blankets turned out by the mills are principally light and dark grays, although some brown and white have also been made. It is the intention of the directors to add one or two more blanket machines next year. In tweeds these mills are making Oxford grays.

THE WORLD'S WOOL PRODUCT.—The total wool production of the world is estimated at 2,000,000,000 pounds. Australia is the heaviest producer, coming to the front with 455 570,000 pounds; then the United States, 307,388,000 pounds; the Argentine Republic, 283,047,000 pounds; Russia, 262,966,000; Great Britain, 135,000,000. All the other countries range each below 100,000,000 pounds.

FLOUR MILL NOTES.

The Future Center of the Wheat Supply.

Indications seem to point to the Pacific Coast as the future center of the wheat supply of the world. The area for wheat-growing in this region is immense, and the soil and climate well calculated to secure large and uniform crops; while its vicinity to the sea-coast, its two great central rivers, and the facility with which its valleys may be pierced with railroads, render it a country in every way most suitable for producing and moving a bulky crop like wheat. It is calculated that our two northern neighbors, with California, contain arable land enough to produce more than half the present wheat yield of the United States. When it is all improved, the center of the wheat market of this country will be shifted from Chicago to San Francisco, and the world will look with anxious eyes to this coast as the main source of the supply of the staff of life. But comparatively a small portion of the available wheat land of California has as yet been brought into cultivation, or at least not into thorough cultivation. Vast areas of our valley lands have never yet been turned over by the plow, and of that which has been sown, the small and uncertain crops which have been obtained are far less than what will be obtained, in the near future, when the mountain waters will be properly conducted into the valleys for winter irrigation.

We have the utmost confidence in the future glory and profit of our wine, our olive oil, our beet-root sugar, and of our small deciduous and citrus fruits; but with all the land favorable to such cultivation, fully employed, we will yet have sufficient to largely increase our present yield of grain—sufficient to even increase our present exports and feed the many millions who will soon cover our central valleys with a population as dense as is now seen in Southern Europe.

The future of the Pacific Coast will be phenomenal. Our climate, our soil and our facilities for the grandest and most complete irrigation system ever seen will continue for many, many decades to attract hither the enterprising and energetic people of Eastern and European communities. California will yet become the garden of the world and the busiest hive of industry on the face of the globe.

Corn and Wheat.

The corn crop of 1888 was by far the largest ever harvested in the United States. It will certainly exceed 2,015,000,000 bushels, an increase of not less than 550,000,000 or 600,000,000 bushels over last year's crop. This fact is full of significance as concerns the general business interests of this country. With such a yield of corn the farmers are sure to receive $200,000,000 more for their crops than in 1887, and that goes a long way toward insuring the prosperity of all classes and industries. An exchange in commenting upon the two crops—wheat and corn—says:

The high price of wheat and the fact that we have not enough of the latter to supply the demand from abroad make it very fortunate that we have an abundance of corn, and the consumption of that grain at home and its exportation to the Old World in place of wheat will probably be unprecedented. England alone will require much more wheat than we have for export, although it is hoped we may be able to spare about 85,000,000 bushels, and other European countries will need more than Russia, India and Australia together can supply. With a wheat crop of 512,000,000 bushels in 1885, we had a surplus of more than 150,000,000 bushels, and were the crop equally abundant in 1888, we could sell the whole at good prices; but Europe need not go hungry while our storehouses are overflowing with corn. The European palate has not the relish for maize which the exigencies of the situation make desirable, but the taste for the corn foods is constantly increasing, and, undoubtedly, the poor of the Old World would be benefited by its cultivation. However, it is thought by the farmers on remote prairies that it is more profitable to sell beef and pork than corn, and the surplus of the corn crop will be acceptable to foreign purchasers in the form of meat and other provisions which it can produce.

It will be well for the people of the United States to adopt the same policy as far as practicable, in all their dealings with other nations, and instead of exporting raw materials, endeavor to send abroad the manufactured product, fully prepared for the consumer's use. Our cotton crop, for example, would be worth double the money it now brings were it manufactured at home instead of being so largely exported in the raw state.

JAPANESE BUCKWHEAT.—We clip the following from a number of the Germantown (Pa.) *Telegraph* of three or four months ago, and from it infer that some of the Pennsylvania wheat-growers have been experimenting with some foreign variety of buckwheat: This new grain which has been subjected to the test of trial is perhaps coming more nearly to the recommendations of it than is ordinarily the case. We did not see the grain while growing, but from some stalks that were shown us of the seeded grain, we are compelled to say that it is very promising, being a very large berry. What the proportion of husk will be to flour or how the flour production of this variety will compare with the old varieties remains to be seen. The change of soil in the introduction of the variety may account for some increase in the size of the berry, but we should not expect to find so marked an improvement as is manifest. We have had reported to us the yield of 15 bushels from one peck of seed, and have seen mention of correspondingly large and even larger yields from this variety. If this is its natural production, it is sure to drive the old varieties out of use if its other qualities are fully equal to those of the old sorts. But in cases of this kind it is sometimes safe to "make haste slowly."

THE "FLOUR TRUST."—The reported "flour trust," the Northwestern millers declare, has not been formed, but it is admitted that at least 250 mills ceased operations January 1st, in conformity to resolutions adopted at a convention recently held in Milwaukee to the effect that the output of flour should be curtailed one-half. Mills scattered through the wheat belt representing a daily output of 75,000 barrels of flour are running at half their capacity or are closed entirely. The trouble is largely due to the artificial advance of last September, which forced cash winter wheat at St. Louis to $1.15 and spring wheat at Chicago to something like $2 in one day, cutting off shipments to Europe and reducing the domestic consumption. The shut-down will continue, it is said, until the flouring business is re-established on a paying basis. The decline in wheat since the Milwaukee meeting is about eight cents per bushel, but is still too high for export, either as wheat or flour.

MILLS AND BAKERIES COMBINE.—The time is not very far ahead, in all probability, when the system of mills and bakeries combined, which is prevalent in many parts of Europe, will become a common thing in this country. There are many reasons why it is both practicable and economical. As a baker, the miller knows just the grade of flour he desires to make and knows just what it costs him. The same motive-power needed to drive the mill will drive baking machinery, and where steam is used the necessary heat wanted can be furnished with little or no additional expense. There is no doubt but the miller-baker could furnish as good and often better bread for less money than the baker. Such combinations of business would necessarily be appropriate only in cities and large villages, and in such locations, if properly managed, they will, we think, be profitable to the projector as well as beneficial to the public.

DOUBLE REPRESENTATION ALL RIGHT.—At the millers' meeting recently held at Milwaukee, it was noticed that Dakota was present with a double representation. On that fact being brought to the attention of the chairman, that gentleman said: "Guess it's all right. They're going to have two States out there any way!" Dakota's double representation was allowed to stand.

WHEAT IN THE ARGENTINE REPUBLIC.—A few years ago the Argentine Republic did not raise wheat enough for home consumption. Last year it exported 7,000,000 bushels. Immense tracts of pasture are being converted into farm land, and the country is becoming a great grain-growing region.

TAR WEED IN THE WHEAT-FIELDS.—In many parts of Umatilla county, Oregon, the tar-weed has grown so rank as to ruin the wheat-fields. Near Adams all the fields will have to be resown.

A NEW FLOUR MILL has just been started at Fall River, Shasta county.

A PULVERIZER REPLACES A MILL.—The five-stamp mill on the Texas mine, owned by Hart & Fleming of Redding, Shasta county, has been taken down and in its place a Dodge pulverizer has been sent up by Parke & Lacy. This was not done because the stamps did not crush the ore, but because the ore "slimed" too much under the stamps, and it was found the pulverizer could reduce the rock without making slimes. A good many of these pulverizers are now being made and sold.

SENATOR LELAND STANFORD is reported as having announced his intention to have several of the buildings of the great Leland Stanford, Jr., University at Palo Alto, in Santa Clara county, open to receive pupils at the beginning of the next fall term. Four of the class-room buildings of gray sandstone with tiled roofs, are now nearly completed.

THE following bids have been sent in for the construction of an elevator in the New City Hall: A. J. McNichol & Co., $4500; W. T. Garratt & Co., hydraulic elevator, $5049; W. H. Burch & Co., four bids for different styles of elevators, $4830, $4695, $5555 and $3975.

IRON ORE FOR FLUX.—The Adelaide Copper Co. has built a road to the Buckner iron mine on Winnemucca mountain, Nev., and have let a contract for hauling three or four carloads of the ore to the depot for shipment to Golconda.

JOHN HAYS HAMMOND, M. E., has gone to Guatemala to report on some mining properties.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, Feb. 7, 1889.

General trade continues quiet, but more activity is looked for in the near future, as large wholesale houses are preparing to have their travelers "on the road." Among iron workers, business is still quiet, but all speak hopefully of the outlook. The money market is easy, with more disposition to place funds, particularly after assessment day. There is a lighter call for exchanges on New York, which causes a shading off in the rate of exchange on the East. The very easy money market at the Eastern money centers and growing ease abroad, no doubt, have some influence in weakening New York exchange. There is a fair call for funds from grain operators on Call, but from mining stock operators (brokers) the inquiry is still light, owing to the outside public having very little faith in the stability of the present range of values, notwithstanding the news from the mines listed on the two exchanges is of a very favorable character. That from the Comstock mines is confirmatory of crosscutting having been commenced in Crown Point, Belcher, Yellow Jacket, Union, Mexican and Con. Imperial. In all these mines it is claimed that the prospects warrant the assertion that ore of much value will be run into, and that in the immediate future. In Seg. Belcher, crosscutting, it is said, will be commenced soon, while in Overman, the work going on presages more active and important work to be commenced soon In Utah and Sierra prospecting work is said to be under way. A report, from a reliable source, says that in Con. Virginia, on the 1500-foot level (continuation of the Ophir 1465-foot level) running southwest from the Ophir line, a winze is being sunk which is in rich ore, thought to be the same as that found on the 1750 and 1650 levels. In the Middle mines the work going on is said to be of the most important character. The Alta group of mines is beginning to attract attention from operators, owing to the action of the stock and the character of the work in the mines. From the Tuscarora and Bodie mines the news is of a favorable character.

There can be no doubt but the movements now on foot to regulate by law the voting of stock by proxy at annual elections, is having a favorable effect. But aside from this the strong probability that laws now forgotten will be enforced, is also bearing fruit. One of these we reproduce as follows, from the civil code of California, Act of April 23, 1880: Section 1. * * * * * It shall be the duty of the superintendent, on the first Monday of each month, to file with the secretary an itemized account, *verified under oath*, showing all receipts and disbursements made by him for the previous month, and for what said disbursements were made. It shall also be the duty of the superintendent to file with the secretary a weekly statement, under oath, showing the number of men employed under him and for what purpose, and the rate of wages paid to each one. He shall attach to such account a full and complete report, the amount of ore extracted, from what part of the mine taken, the amount sent to the mill for reduction, its assay value, the amount of bullion received, the amount of bullion shipped to the office of the company or elsewhere, and the amount, if any, retained by the superintendent. It shall also be his duty to forward to the office of the company a full report, under oath, of all discoveries of ores or mineral-bearing quartz made in said mine, whether by boring, drifting, sinking or otherwise, together with the assay value thereof. All accounts, reports and correspondence from the superintendent shall be kept in some conspicuous place in the office of said company, and be open to the inspection of all stockholders.

The two dynamos in use at the Nevada mill are working splendidly since the placing of the two governors in position to regulate the water-wheel. The other four governors will be ready the coming week, and when in place, the other four dynamos can be run and the mill ready to drop 60 stamps. This will also allow the California mill to start up with the water now used by the Nevada mill.

SILVER—The market shaded off the past week in sympathy with a decline in London and also in New York. The supply here is still very light, and what becomes of the bullion is a source of surprise, even to those operating in it. The last steamer for China took out for Hong Kong in silver bullion $36,000, and in Mexican dollars $148,671, and for Bombay, in silver bullion, $186,900. It is asserted with considerable confidence that the output of bullion on the Comstock will be increased this month, and this, too, in the face of a light supply of water. This claim, no doubt, is based on the fact that the dynamos for the Nevada mill are a success. After the sailing of the China steamer the Anglo-Californian bank entered the market and bought all the bullion obtainable at 92¾ to 92⅞c, at which price the market closed.

QUICKSILVER—The market continues quiet, but firm. It is being claimed by some mining men that the electric amalgamation process will save a larger percentage of quicksilver than is now the case, which they contend will lessen the consumption.

LEAD—The market shows more life, due to the salmon canneries laying in their supplies. Considerable is going up North. In prices there are no changes to report.

COPPER—Although there are no changes to report, yet the feeling is weaker, and some concessions, it is claimed, are obtainable. The weakness of the market is no doubt due to the large increased stocks and the increasing output.

IRON—The market shows a slight shading in some kinds of foreign, with a weak tone, owing to some holders wishing to realize. To arrive, there is no change, the high freight being against buyers. The consumption with us shows signs of increasing. The East reports the market depressed under stronger selling competition.

TIN—The market exhibits more life, with salmon canners in the market. Considerable is going forward to Alaska. Prices are unchanged for both plate and pig.

ANTIMONY—Although no change in quotations are reported, yet there is a stronger feeling at full asking prices. The East is reported to be slightly higher in sympathy with an advance abroad, due to a scarcity of ore.

COAL—The market is weak for all descriptions. The yards are full, while the buying is confined to immediate wants. The output of the coast continues large, while for house purposes the consumption is lessening. Some foreign coals on spot are quoted less than to arrive. Scotch splint on spot is quotable at $9 a ton; West Hartley, $10; Cardiff, $9; Liverpool steam at $9, and Liverpool gas at $8.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Feb. 7, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42 9-16	93	$16 75	$3 77½	$21 70
Friday	42½	92 13-16	17 00	3 77½	21 90
Saturday	42⅜	92¾	16 70	3 77½	21 75
Monday	42½	92¾	16 70	3 77½	21 80
Tuesday	42⅜	92¾	16 70	3 77½	21 70
Wednesday	42½	92¾	16 70	3 77½	21 00

Quicksilver is firmer, at 60@62c. Borax—8⅞@9¼c for refined and 8@8½c for concentrated. Lake copper is dull, closing at $16.70 for Feb.; merchants' lots, $16 for March. In pig lead, single cars sold at $3.77½; small round lots, $3.75. Tin is unsettled, nominally closing at $21.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, $21.50@——; Billiton Tin, $22.50@——; Banca Tin, $22.25@22.50; Baltimore Copper, ——@——; Orford Copper, $16.00@16.25; P. S. C. Copper, ——@——; Foreign Lead, $4.75@5.00; Foreign Spelter, $5.95@6.00; Antimony, Hallett's, $11.25@11.37½; Cookson's, $13@13.25.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Feb. 7, 1889.

ANTIMONY	13 @	14
BORAX—Refined	7½@	7⅝
Powdered	7¼@	7⅜
Concentrated	6¾@	7⅛
COPPER—		
Bolt	26 @	27
Sheathing	28 @	—
Ingot	18 00 @19 00	
Fire Box Sheets	— @	26
IRON—Glengarnock ton	27 @	—
Eglinton, ton	26 @	—
American Soft, No. 1, ton	— @31 00	
Oregon Pig, ton	— @30 00	
Clay Lane White	— @24 50	
Shotts, No. 1	— @28 50	
Bar Iron (base price) ₰ lb	2¾@	3
Chrome iron ore, ₹ ton	00 @10 00	
LEAD—Pig	4½@	—
Bar	5 @	—
Sheet	8 @	—
Pipe	7 @	—
Shot, discount 10% on 500 bags Drop, ₰ bag	1 55 @	—
Buck, ₰ bag	1 75 @	—
Chilled, do	1 95 @	—
STEEL—English, lb	18 @	20
Canton tool	9½@	—
Black Diamond tool	10 @	16
Pick and Hammer	8 @	10
Machinery	4 @	5
Toe Calk	4½@	
TINPLATE—Coke, prompt shipment	4 85 @ 4 95	
Coke on spot	5 10 @ 5 15	
Charcoal, 14x20	6 75 @ 7 25	
do roofing, 14x20	5 50 @ 5 62	
Pig tin, ₰ lb	23 @	—
QUICKSILVER—By the flask	@42 50	
Flasks, new	1 05 @	—
Flasks, old	85 @	
COKE—English, ton, spot	20 00 @—	—
Do, do, to arrive	13 50 @—	—

PRICES OF COAL "TO ARRIVE."

	Per Ton.		Per Ton
Australian	$ 7 00 @ 7 50	Cardiff	9 50@10 00
Liverpool St'm	10 00 @10 50	Lehigh Lump.	16 00@17 00
West Hartley	11 00 @11 50	Cumberland bk	16 00@16 50
Scotch Splint	11 00 @11 25	Egg, hard	15 50@16 00

SCIENTIFIC AND INDUSTRIAL WORKS.—John Wiley & Sons have in preparation new books as follows: Manual of the Steam Engine; Steam Engine Design; Laboratory Guide in Chemical Analysis; A Technical Dictionary; Treatise on Masonry Construction; Elementary Text-Book of Chemistry; Thermo-Dynamics and Steam-Engine Experiments; Treatise on Hydraulics; Treatise on Physics; Kinematics or Practical Mechanism; Preparation of Organic Compounds; Flow of Water in Rivers and Other Channels; and other works. Among the important works published by this firm last year were Microscopical Physiography of the Rock-Making Minerals; Rocks and Soils; Stair-Building; Steam-Boiler Manual; Woolen and Worsted Manufacture; Masonry Dams; Mechanics of Engineering; Text-Book on Roofs and Bridges; Strains in Framed Structures; Field Engineering; Indicator Practice; Iron and Steel, Materials of Construction; Resistance of Materials, etc. Scientific and industrial works are now much more numerous than formerly, and nearly every branch of industry is represented in the titles. This firm make a specialty of books of this class and always get them up in very good typographical form. The authors are all men of mark in their line. Any of these works can be ordered through Dewey & Co., S. F.

ELECTRICAL SOCIETY.—The Electrical Society held its second meeting Wednesday night, and adopted a constitution and by-laws, founded on those of the Buffalo Society. It was decided that the society should be known as the California Electrical Society, and that its meetings be held on the first and third Monday of every month. The following officers were elected for the ensuing term: Prof. N. S. Keith, Pres.; O. Brooks, Vice-Pres; W. W. Wright, Sec.; C. R. Ryland, Jr., Treas.; P. B. Brown, S. H. Taylor and T. H. McDonald, Executive Committee. The society is already in a flourishing condition. There is some talk of making it a branch of the Mechanics' Institute.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING JAN. 29, 1889.

396,972.—LID-RAISER—J. S. Anderson, Crescent Bay, W. T.

396,799.—BIBB FILTER—N. Beauregard, S. F.

397,070.—ORE SEPARATOR—E. Derbec, S. F.

397,071.—WATER-WHEEL—E. Derbec, S. F.

396,866.—DRILL SUPPORT — George E. Foster, Pleasant Valley, Cal.

396,872.—VEHICLE WHEEL—H. F. Hicks, Ashland, Ogn.

396,881.—HAY-FORK—W. H. Lander, Pendleton, Ogn.

396,823.—SAW-SETTING MACHINE—Alex Logan, Monterey, Cal.

396,947.—HOT-AIR BLAST—W. O. Mills, S. F.

397,092.—VENTILATING RAILWAY CARS—Murray & Harrison, San Rafael, Cal.

396,948.—GUARD FOR FISH NETS—Jacob Myers, Eureka, Cal.

396,834.—SIFTER—J. T. Quinn, Riverside, Cal.

396,774. — PAINT-OIL — A. Sommer, Berkeley, Cal.

396,965.—ELEVATOR SAFETY-ATTACHMENT—P. B. Sullivan, Tuscarora, Nev.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CAN OPENER.—Thos. H. Gilham, Cortez, Nev. No. 396,555. Dated Jan. 22, 1889. This can-opener consists, essentially, in a fixed knife and a rotary piercing or gripping disk for engaging the can and forcing it against the fixed knife. It consists, further, in a vertically movable head carrying the knife and piercing-disk and a cam-lever for forcing the knife and disk to penetrate the can and for holding them when at work; also, in connection with said knife, disk and lever, it consists of a roller for the base of the can on which it may move freely.

GUARD FOR FISH NETS.—Jacob Meyers, Eureka, Humboldt county, Cal. No. 396,948. Dated Jan. 29, 1889. This guard is for the base or foot of the net, the object of which is to prevent the lead line from rolling up in and with the base or the foot of the net when the net is being dragged in. This guard consists, essentially, of a number of rigid or stiff pieces or bars, one end of which is secured to the lead line and the other end is secured to the net at a point above said lead line, thereby rendering the base or foot of the net incapable of rolling up. As the net approaches shoal-water the tendency is for the lead line to roll up in and with the foot of the net, forming in a short time a roll of material under which the larger fish escape; but by rendering the foot of the net stiff for a short distance this rolling up is effectually prevented and the net itself is allowed to bag outwardly to its full capacity, its lead line dragging closely along the bottom.

ELEVATOR SAFETY-ATTACHMENT.—Philip B. Sullivan, Tuscarora, Nev. No. 396,965. Dated Jan. 29, 1889. This safety attachment is intended for mining and elevator cages. Across the upper part of the cage extend two parallel shafts, which are journaled in the sides of the cage, the ends extending through and having locking dogs or cams fixed to their ends, so that when the shafts rotate in one direction the cams will engage the guides to prevent the cage falling. When the shafts are rotated in the opposite direction the dogs are held out of contact with the guide and the cage can be lowered or hoisted. Springs are coiled around the two shafts so when at liberty to act they will rotate the shafts and throw the cams or dogs into contact with the guides. Chains connected with the hoisting rope are coiled around the shafts, so when the weight is on the rope and chains, the shafts are turned so the dogs are held out of contact with the guides, but in case of breakage the springs rotate the shafts and the guides are engaged. The mechanism is also so arranged that if, while the cable is intact and the cage is descending, it may be found necessary to check the cage without notifying the engineer, it is instantly done, by releasing the clutch mechanism, a lever being provided for the purpose.

ADJUSTING AND SUPPORTING DEVICE FOR DRILLS.—Geo. E. Foster, Pleasant Valley, El Dorado Co., Cal. No. 396,866. Dated Jan. 29, 1889. This invention relates to a mechanism for supporting drills, which are worked from a column to which they are fixed. It consists of an independent rack extending along the outside of the column, parallel with its axis and movable around its periphery, and, in combination therewith of a clamp to which the drill apparatus is fixed, said clamp being provided with a pinion to engage the rack and a pawl-and-ratchet mechanism for adjusting the drill to the proper position, and a clamping bolt or screw for holding it when adjusted. By this device the drill may be adjusted easily and accurately, and no lifting or difficult work is necessary, the whole thing being easily handled by one man.

SAW-SETTING MACHINE.—Alexander Logan, Monterey. No. 396,823. Dated Jan. 29, 1889. In this machine the blow on the set-punch is delivered by a hammer which is operated by a rotating cam. The connection between the hammer and cam is an adjustable one, so that by having a series of cams differently timed the blows of the hammer are rendered more or less frequent. The same shaft which operates the cams operates a feeding device which engages the saw-teeth and carries them forward to the set punch. It follows, therefore, when a saw with a given number of teeth to the inch is being set the hammer connection is adjusted to the proper cam of the series, so as to time the hammer blows according to the teeth of the saw and the speed of its feed. When a saw with more or less teeth to the inch is being set the hammer adjustment is again made as required. The saw blade is guided and held in position by a wheel engaging its back edge and carried by a spring-controlled carriage which keeps the wheel up to the blade at all points of its length, no matter what may be its width. A smaller flanged wheel is used to hold and guide small saws, such as band saws. The set-punch, the anvil, the saw-supporting table, and all the guide wheels are made easily adjustable, so as to accommodate any saw, and the whole machine is, in fact, adjustable and complete for every purpose of saw setting.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

PARKE & LACY CO., Feb. 2. Object, manufacturing and dealing in all kinds of machinery. Capital stock, $400,000. Directors, Lyman C. Parke, Benjamin T. Lacy, Arthur F. Price, John O. Harron and M. S. Norton.

COLLEY MILL AND LUMBER CO, Feb. 2. Directors, C. J. Colley, G. W. Bothwell, J. Neatbrode, J. Newhouse and C. D. Scott.

GOLDEN GATE SALMON CO., Feb. 4. Object, to carry on a fish-canning business on the Pacific Coast. Capital stock, $100,000. Directors, John R. Daggett, Geo, Tasheira, C. P. Overton, Thos. Jennings and C. S. Baseford.

MT. DIABLO WINE CO., Feb. 5. Object, to produce and sell wines in Contra Costa county and elsewhere. Capital stock, $250,000. Directors, R. M. Hamilton, Alexander Hamilton, E. Simon, J. Newman and Moses Samuel.

Meetings and Elections.

CALIFORNIA POWDER WORKS, Feb. 4. Directors—Gardner T. Lawton, J. B. Haggin, N. Luning, M. A. de Laveaga, B. Peyton. Officers were elected as follows: President, Gardner T. Lawton; secretary, John F. Lohse; superintendent at Santa Cruz, B. Peyton.

PACIFIC ROLLING-MILL, Feb. 5. Directors—Wm. Alvord, N. Luning, James G. Fair, Edward Coleman and Charles S. Neal. The following officers were elected: Wm. Alvord, president; L. B. Benchley, general manager; Patrick Noble, superintendent, and C. M. Keeney, secretary and treasurer.

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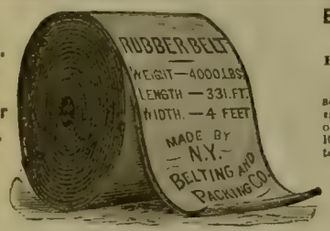

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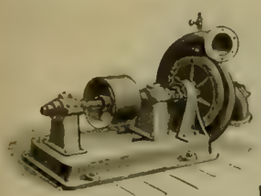

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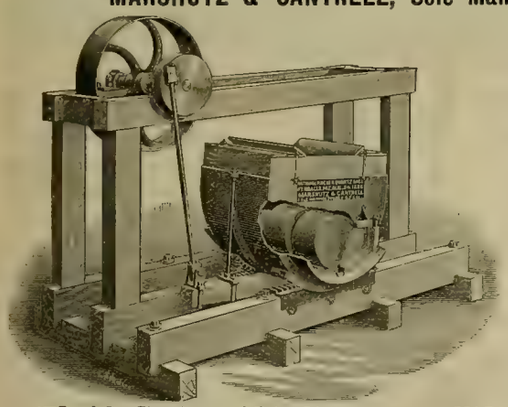

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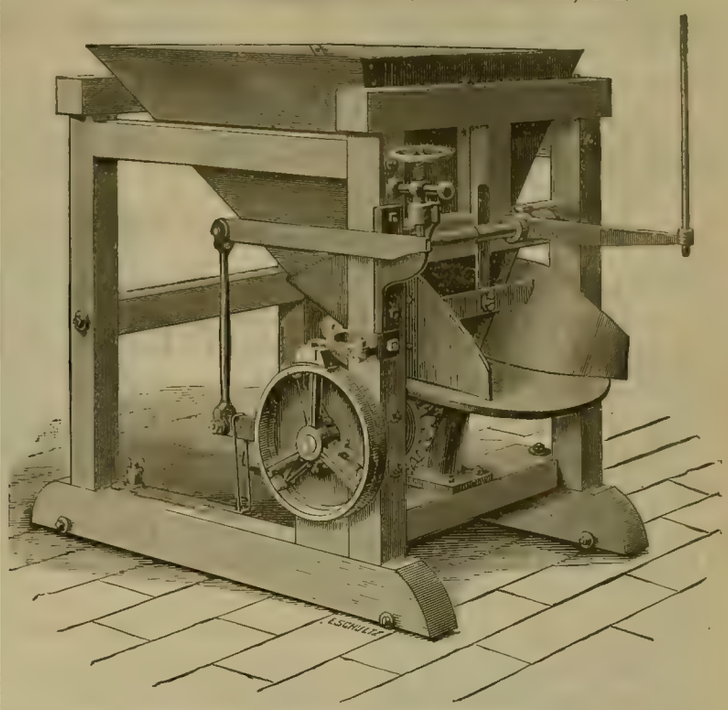

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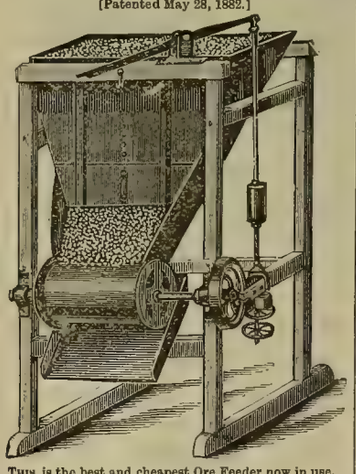

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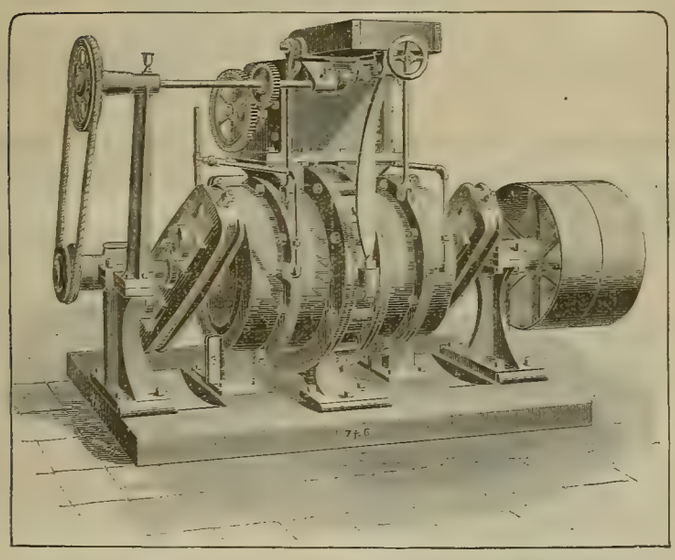
This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; is in successful operation and we guarantee its work as represented.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

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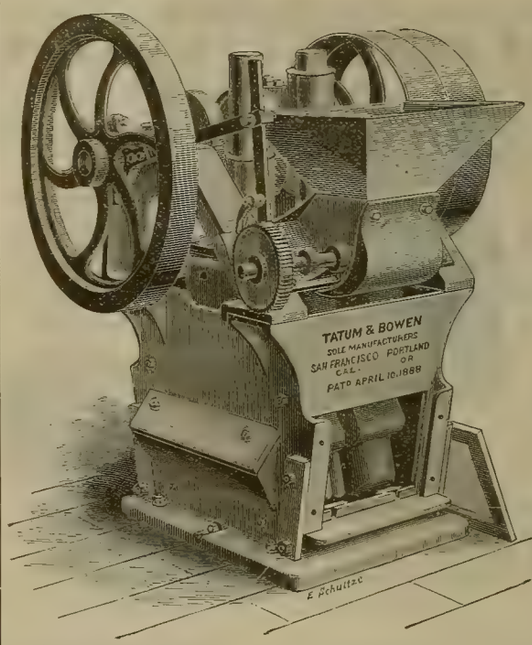

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PERFECTED DOUBLE Economic Quartz Mill.

Attached to each Mill is an effective

Automatic Ore Feeder.

THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

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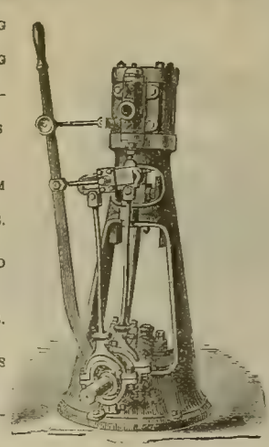

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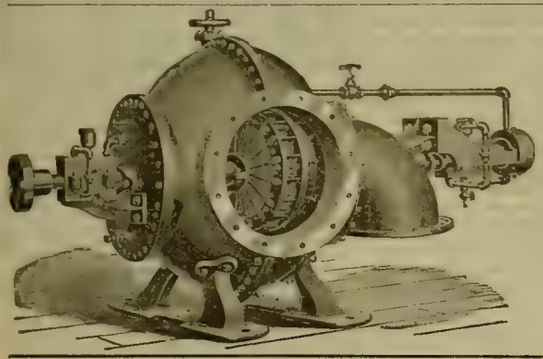

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

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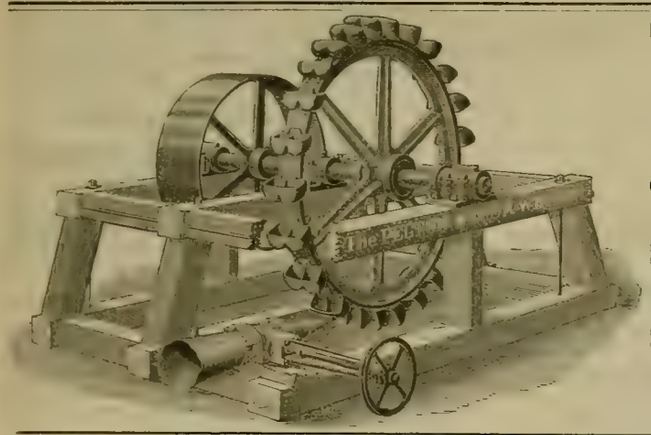

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Over 600 in use on the Pacific Coast alone, aggregating upwards of 50,000 Horse Power.

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Power from these Wheels can be transmitted long distances with small loss, and it is now being extensively used in this way in all parts of the country for producing both light and power.

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ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Best & Belcher M Co	Nevada	42	25	Jan 10	Feb 15	Mar 7	L Osborn	309 Montgomery St
Ballanore S M Co	Nevada	4	25	Feb 4	Mar 8	Mar 26	A R Grim	402 Montgomery St
Concordia M C	Nevada	2	50	Nov 12	Jan 24	Feb 12	G G Higgins	121 Montgomery St
California Slate Co	California	3	30	Dec 13	Jan 19	Feb 18	J O Hansome	10 California St
Con Pacific M Co	California	16	15	Feb 5	Mar 11	Apr 2	F E Luty	330 Pine St
Gould & Curry M Co	Nevada	64	20	Jan 10	Feb 14	Mar 7	A K Durbrow	309 Montgomery St
Gray Eagle M Co	California	11	03	Jan 23	Feb 26	Mar 19	O H Bogart	327 Pine St
Julia Con M Co	Nevada	23	10	Jan 30	Mar 7	Mar 28	J Stadfeldt Jr	309 Montgomery St
Martin White M Co	Nevada	22	25	Jan 19	Mar 6	Mar 26	A B Cooper	325 Montgomery St
Mayflower M Co	California	24	50	Jan 14	Feb 18	Mar 11	J Morizio	328 Montgomery St
Nevada Queen M Co	Nevada	4	50	Dec 21	Jan 28	Feb 25	H Deas	309 Montgomery St
North Belle Isle M Co	Nevada	56	50	Jan 3	Feb 6	Feb 27	J W Pew	310 Pine St
Overman M Co	Nevada	59	25	Jan 15	Feb 19	Mar 12	G D Edwards	414 California St
Occidental Con M Co	Nevada	3	25	Dec 27	Jan 31	Feb 25	A K Durbrow	309 Montgomery St
Puget Sound Iron Co	Wash Ter	13	1.00	Dec 29	Feb 2	Feb 25	A Halsey	328 Montgomery St
Peer M Co	Arizona	7	10	Jan 28	Mar 5	Mar 28	A Waterman	309 Montgomery St
Piedmont M Co	Nevada	1	05	Jan 28	Mar 6	Mar 27	J J Scoville	309 Montgomery St
Russell Reduction & M Co	California	4	05	Dec 15	Jan 21	Feb 12	J Morizio	328 Montgomery St
Savage M Co	Nevada	72	50	Jan 7	Feb 11	Mar 4	E B Holmes	309 Montgomery St
Superior M Co	Nevada	24	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
S F Natural Gas & Oil Co	California	1	25	Jan 3	Feb 4	Feb 28	J Scoville	309 Montgomery St
St Louis M Co	Nevada	2	05	Jan 14	Feb 18	Mar 16	W E Dean	309 Montgomery St
Scorpion M Co	Nevada	4	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
Union Con M Co	Nevada	37	25	Jan 4	Feb 8	Mar 1	J M Buffington	303 California St

MEETINGS TO BE HELD.

NAME OF COMPANY	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Alabama, Humboldt & Bailey M Co		W H Watson	302 Montgomery St	Annua'	Feb 11
Holmes M Co	Nevada	C F Elliott	309 Montgomery St	Annual	Feb 11
Lucky Hill Con M Co		F D Block	Baldwin Hotel	Annual	Feb 14
Spring Valley G M Co	California	H Pichoir	320 Sansome St	Special	Feb 26
Watt Blue Gravel M Co	California	G A Berton	313 Montgomery St	Annual	Feb 18

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	60	Jan 10
Caledonia M C	Nevada	A S Cheminaut	328 Montgomery St	05	Nov 26
Candelaria Con M Co	Mexico	C T Givens	221 Market St	50	Nov 12
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Idaho M Co	California		Grass Valley	7.50	Feb 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Dec 10

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 17.		WEEK ENDING Jan. 24.		WEEK ENDING Jan. 31.		WEEK ENDING Feb. 7.	
Alpha	2.25	2.65	2.15	2.50	1.95	2.30	1.90	2.20
Alta	2.65	2.80	2.45	2.80	2.25	2.40	2.00	2.35
Andes	1.05	1.20	1.00	1.15	1.05	1.15	1.05	1.10
Argenta	....	.10	.10	.15	.10	.15	....	....
Belcher	4.80	5¼	4.60	5.25	3.25	4.80	3.50	4.55
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	5.25	6.00	5¼	6.75	5¼	6¼	5.50	6¼
Bullion	1.25	1.55	1.15	1.45	1.15	1.20	1.10	1.25
Baltimore	....	....	.35	.40	....	.35	.20	.30
Belle Isle	.40	.45	....	.45	....	.40	....	.40
Bodie Con	1.50	1.75	....	....	1.55	1.80	1.60	1.75
Benton	3.25	6¼	4.00	6.25	3.30	3.50	3.00	3.50
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	....	.55	....	.55	.50	.55	.50	.60
Con. Va. & Cal	8¾	9¼	8.50	9.00	7¾	8.50	8.00	8¾
Challenge	4.50	6.25	4.50	4.90	4.25	4.50	4.30	5.00
Champion	....	....	....	....	....	....	....	....
Chollar	2.70	4.10	3.10	3.80	3.15	3.35	3.15	3.50
Confidence	13¼	14¾	13	13¾	12¾	13	13	15¼
Con. Imperial	.75	.85	.75	.85	.70	.75	.70	.80
Caledonia	.40	.45	....	.40	....	....	.40	.45
Con. Pacific	....	....	....	....	....	.05	....	....
Crown Point	5.25	6¼	5¼	6.00	4.90	5.50	4.75	5¼
Crocker	.80	.95	.95	1.05	.85	1.10	.90	1.10
Central	....	....	....	....	....	....	....	....
Dudley	....	....	....	....	....	.15	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	....	....	2.50	....	2.25	....	....
Exchequer	1.00	1.35	1.05	1.20	1.00	1.15	1.05	1.15
Grand Prize	.75	1.05	.95	1.10	1.10	1.25	1.05	1.15
Gould & Curry	2.75	3.15	2.75	3.20	2.70	2.90	2.70	2.85
Hale & Norcross	4.85	5¼	5.00	5.25	4.85	5.00	4.85	4.95
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	.50	....	....	....	....
Iowa	....	....	.35	.40	....	.35	....	....
Julia	.35	.40	....	.35	....	.35	....	....
Justice	2.10	2.45	1.95	2.30	1.95	2.10	2.00	2.05
Kenbuck	2.25	2.45	2.05	2.10	2.00	2.10	2.05	2.25
Lady Wash	.55	.65	....	.55	.45	.50	....	.45
Martin White	....	....	....	....	....	....	....	....
Mono	1.10	1.25	1.10	1.15	1.20	1.25	....	1.20
Mexican	3.25	3.90	3.35	4.00	3.30	3.60	3.40	3.50
Mt. Diablo	2.50	2.60	....	2.75	....	2.25	....	....
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.45	1.70	1.50	1.65	1.55	1.65	1.50	1.60
North Belle Isle	2.45	2.70	2.50	2.60	2.40	2.50	2.25	3.00
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.75	3.20	2.95	3.15	3.35	3.70	3.15	3.35
North G. & O	....	....	....	....	....	....	....	....
Occidental	1.50	1.60	1.50	1.65	1.05	1.55	1.65	1.75
Ophir	5¼	6¼	5¼	6¼	5¼	5¼	5.25	6¼
Overman	1.55	1.70	1.25	1.55	1.25	1.40	1.25	1.45
Potosi	2.25	3.20	2.25	2.90	2.35	2.45	2.35	2.55
Peerless	1.10	1.35	1.35	1.45	1.20	1.35	1.05	1.15
Peer	.35	.40	.35	.40	....	.40	....	.35
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.70	3.20	2.75	3.20	2.85	3.20	2.90	3.10
S. B. & M	3.15	3.45	2.90	3.30	2.75	2.95	2.85	3.35
Sierra Nevada	3.00	3.65	3.00	3.50	2.95	3.05	3.05	3.35
Silver Hill	.85	.95	.75	.90	.75	.80	.75	.90
Silver King	1.25	1.40	1.25	1.40	1.00	1.30	1.25	1.30
Scorpion	.50	.55	.45	.55	.45	.50	.45	.60
Syndicate	....	.10	....	....	....	....	....	.10
Union Con	2.70	3.20	2.75	3.15	2.60	2.75	2.70	3.30
Utah	1.20	1.50	1.25	1.40	....	1.25	1.40	1.50
Yellow Jacket	4.40	5¼	4.50	5.00	4.10	4.75	4.40	4.60
....	....	....	....	....	....	....	....	....

Sales at San Francisco Stock Exchange.

THURSDAY, Feb. 7.

100	Alpha	2.05	
150	Argenta	.10c	
75	Belcher	3.65	
350	B. & Belcher	5¼	
200	Baltimore	.35c	
100	Chollar	3.00	
100	Con Va & Cal	8¾	
200	Con. Imperial	.75c	
50	Crown Point	5¼	
20	Commonwealth	6¼	
30	Confidence	14¾	
200	Crocker	.85c	
50	Exchequer	1.05	
950	Grand Prize	1.10	
100	Gould & Curry	2.70	
365	Hale & Nor	4.65	
200	Justice	2.00	
350	Julia	.30c	
300	Lady Wash	.50c	
270	Mexican	3.65	
100	Mono	1.15	
100	Nev. Queen	3.10	
100	N. Belle is	2.80	
100	Navajo	1.45	
400	New York	.40c	
100	Opha	.5¼	
250	Potosi	2.35	
100	Peerless	1.00	
240	Savage	2 80	
450	Sierra Nevada	3.20	
250	S. B. & M	3.15	
100	Silver Hill	.75c	
100	Scorpion	.55c	
100	Utan	1.35	
300	Union	3.15	
50	W Comstock	.45c	
50	Yellow Jacket	4.40	

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

A. F. JEWETT—Tulare Co.
F. B. LOGAN—Southern California.
H. G. PARSONS—Southern California.
GEO WILSON—Sacramento Co.
W. W. THEOBALDS—San Diego Co.
J. C. HOAG—San Francisco.
CHAS. F. BLACKBURN—Idaho.
FRANK S. CHAPIN—Colusa Co.

A BIG cave has been struck in the Copper Queen mine, Arizona. The cave is reported to be of mammoth dimensions, but no outsider is allowed to explore it.

Mining Share Market.

Mining stocks continue dull, notwithstanding all the leading Comstock mines have good showings of ore. The mills are gradually increasing the number of stamps with the continuance of the warm weather, which increases the volume of water in the Carson river by melting the snow on the foothills and on the southern slopes of the peaks along the crest of the Sierras.

The following companies have cash on hand, according to the monthly statements placed on file:

Alpha, $19,520.35; Alta, $63,414.21; Andes, $14,624.60; Best and Belcher, $1564.68; Bodie, $38,419.73; Bullion, $32,642.59; Benton, $95,901.87; Bulwer, $2528.25; Caledonia, $14,016.84; Con. Cal. and Virginia, $96,778.03, and unsold bullion amounting to $55,958.13; Confidence, $83,453.35; Con. Imperial, $18,833.71; Crocker, $448.75; Del Monte, $2060.52; Dudley, $178.91; Diana, $4482.35; Exchequer, $10.146.40; Found Treasure, $246 31; Hale and Norcross, $10,591.65; Independence, $2645.71 Justice, $9994.03, and $7949 in unsold bullion; Julia, $214.93; Lady Washington, $24,239.80; Locomotive, $1646.45; Mexican, $3727.89; Mono, $15,385.01; Navajo, $43,249.10, and unsold bullion amounting to $14,696.76; Occidental, $11,547.71, and balance due on assessment to collect, $1744; Ophir, $15,230.41; Overman, $1055.93; Sierra Nevada, $3554.13; Silver Hill, $12,836.59; Syndicate, $8870.71; Standard, $3064.83; Utah, $6704.16; Weldon, $1119.84.

The following companies have an indebtedness:

Belcher, $7914.15; Belle Isle, $2145.76; Challenge, $2174.12; Chollar, $313.48, with an offset in unsold bullion amounting to $26,750 45; Commonwealth, $36,432.83; Con. New York, $5375.01; Crown Point, $17,699.41; Grand Prize, $35,834.07; Gould and Curry, $9923.92; Holmes,$3253.73; Kentuck, $954.31; Nevada Queen, $32,060.90; North Belle Isle, $48,187.93; North Commonwealth, $8980.32; Peer, $7174.28; Peerless, $4482.17; Potosi, $21,162.63; Savage, $57,974.93; Scorpion, $228; Seg. Belcher, $9740.54; Summit, $119.03; Union, $3296.42.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Hanauer, Feb. 2, $2050; Bluebird, 2, $16,064; Justice, 6, $3266; Hanauer, 1, $2750; Con. Cal. and Virginia, 2, $63,251; Hanauer, 3, $1690; Queen of the Hills, 3, $1050; Bluebird, 3, $33,776; Confidence, 6, $25,219; Hale and Norcross, 6, $4641; Mt. Diablo, 6, $5636; total for January, $33,987; Alta, 2, $21,000.

Sampling Works for Sale.

The works are situated at Daggett, Cal., in the Calico Mining District, and on side-track of the Atlantic & Pacific Railroad. They contain a first-class Engine and Boiler with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPY & CHILDS, 123 California street, San Francisco.

Easy Binder.

Dewey's patent elastic binder, for periodicals, music and other printed sheets, is the handiest, best and cheapest of all economical and practical file binders. Newspapers are quickly placed in it and held neatly, as in a cloth-bound book. It is durable and so simple a child can use it. Price, size of Mining and Scientific Press, Rural Press, Watchman, Fraternal Record, Masonic Record, Harper's Weekly, and Scientific American, 75 cents; postage, 10 cents. Postpaid to subscribers of this paper, 50 cents. Send for illustrated circular. Agents wanted.

FOR SALE.

SECOND-HAND IRON PLANER,

Screw-Cutting Lathes from 12 to 30 inch swing, Punch Presses, Patent Attachment for Wood Lathes for Turning Tapers, Handles, etc. BEDROCK PRICES. Address: I. A. HEALD, 115 First St., San Francisco.

QUICKSILVER

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PARROTT & CO.,
306 California St., San Francisco, Cal.

About Obtaining Patents.

Patents are Virtually Contracts.

The Patent Law provides that in case a patent which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, in order that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. If, by this "preliminary examination," the improvement is found to have been previously invented, our client will receive, for the small sum of $5 for the examination, a verbal or written report showing definitely wherein his invention has been anticipated, thereby saving him further expense and perhaps much time, anxiety, etc.

To avoid all needless delay, however and secure patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with $15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately and forwarded to the inventor for his signature. When he receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of $20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give up a case so long as there is a chance of obtaining a patent. The Agency charge, including drawings, rarely exceeds $40, and for this we do all we can without appealing the case.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are more satisfactory to the Patent Office than the old cumbersome system of storing up an immense bulk of countless models.

Drawings or sketches, sufficient to illustrate the invention clearly, with a description that will enable us to make a full set of perfect drawings for the Patent Office, is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had it been skillfully, completely and artistically portrayed. In all cases prepared by us the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken to have the invention fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

Advantages to Inventors on the Pacific Coast.

The firm of DEWEY & Co. has edited and published the MINING AND SCIENTIFIC PRESS continuously since 1860, a period of 26 years. Few agents, who are still engaged in the business, have had so long-extended practice in patent soliciting. The members of the firm give personal attention to the applications intrusted to their care; and their familiarity with inventions and with local affairs in the Pacific States and Territories, enables them to understand the wants of inventors on this coast more readily and thoroughly, as we believe, than any other agents in America. Thus there is saved a great deal of the time which ordinarily—when distant agents are employed—is wasted in preliminary writing back and forth.

This happy combination of long business experience together, and wide connections, has placed our firm in a position unquestionably most fortunate for affording inventors prompt and reliable advice, and the best facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation best calculated to widely inform the class of readers especially interested in the subject of his invention.

Caveats.

A Caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the caveator to receive notice, for a period of one year, of any application for a patent subsequently filed, which is adjudged to be novel and is likely to interfere with the invention described in the caveat, and the caveator is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from $10 to $20. The Government fee is $10 additional.

To enable us to prepare caveat papers, we require only a sketch and description of the invention.

Rejected Applications.

Inventors who have rejected cases (prepared either by themselves or for them by other agents) and desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

Inventors doing business with us will be notified of the state of their application in the Patent Office whenever it is possible for us to furnish such information.

DEWEY & CO.,

Patent Solicitors, Office of SCIENTIFIC PRESS, 252 Market St. Elevator entrance, No. 12 Front St., S. F.

GEO. H. STRONG. W. B. EWER. A. T. DEWEY.

STOCKHOLDERS' MEETING.

OFFICE OF

The Superior Mill and Mining Company.

A SPECIAL MEETING of the stockholders of the Superior Mill and Mining Company will be held at the office of the company, Room 11, 303 California Street, San Francisco, California, on Wednesday, February 20, 1889, at 1 o'clock P. M., for the purpose of taking into consideration the increasing of the capital stock of said company from ten million (10,000,000) dollars, divided into one hundred thousand (100,000) shares of the par value of one hundred (100) dollars per share, to fifteen million (15,000,000) dollars, divided into one hundred and fifty thousand (150,000) shares of the par value of one hundred (100) dollars each. Transfer books will close on Monday, February 18, 1889, at 3 o'clock P. M. By order of the Board of Directors.

J. M BUFFINGTON, Secretary.

OFFICE—Room 11, No. 303 California Street, San Francisco, California.

EXTENSIVE GOLD MINE FOR SALE.

To be sold at public auction by the undersigned, at the Merchants' Exchange, in the City of Halifax, on Thursday the Fourteenth day of March next, at twelve o'clock noon, that extensive, valuable and well-equipped Gold Mine known as the Dufferin Gold Mine, situate on the Atlantic coast, about ninety miles east of said city. Daily mail from Halifax. Telegraph office at Salmon river, four miles from the works. Salmon river harbor never freezes, and is safe and easy of access. The mine embraces 342 areas, each 150x250 feet, all in one block. The entire area measures fifteen hundred feet in width across, and eight thousand five hundred and fifty feet along the lodes. The leases have nearly fourteen years to run, and can at any time be renewed for a period of twenty-one years, upon payment of two dollars per area. Within this area is a belt of veins dipping on each side of an anticlinal. They have been found by tests made on the surface to extend upwards of 4,000 feet. The ore has been partially removed to a depth of 200 feet over a distance of about 700 feet, and to a depth averaging about 70 feet over an additional 1,000 feet in length or thereabouts. The veins are of various width, the largest averaging about ten feet of solid quartz.

This mine was discovered in the Autumn of 1880, but was not worked to any extent until the Autumn of 1881. It has yielded up to the end of November, 31,012 ounces of gold from 64,503 tons of quartz, according to the sworn returns made to the Mines Office. The gold can be produced at a cost which will leave a very handsome margin of profit.

The mine is operated by machinery worked by water power, the power being transmitted by a line of wire rope running from the water wheel to the mine—a distance of about 4,750 feet—and lying parallel to the outcrop of said veins, at a distance therefrom of about fifty feet. The Salmon river crosses the property twice. It supplies the hoisting and pumping power, and the same water is afterwards used to drive the crusher. The latter has thirty-eight stamps, and there is ample water power to operate three times that number. Sixty stamps can be operated with present machinery. Of the 120 horse-power existing for pumping and hoisting only about twenty-five is used. There are about 700 acres of well timbered and well watered land owned with the mine. This partly covers the areas, and where it does not immediately adjoins them. It is also provided with a steam plant to operate hoisting gear and pumps in case of accident to the transmission power, a sawmill, sufficient for the requirements of the property, a tramway from the mine to the crusher for carrying quartz, and stables, offices, and boarding-houses, sufficient to accommodate a large number of employees.

The mine is owned and has been operated by a partnership, and owing to the death of one of the principal owners it has to be sold to enable his estate to be settled. A good title will be given.

Terms, ten per cent cash, balance within thirty days from day of sale. The deposit to be forfeited in case the purchaser fails to complete the purchase within that time. Further particulars can be had on reference to N. H. MEAGHER, Q. C., Bedford Row, Halifax, or to JAMES DUGGAN & SONS, Auctioneers, Bedford Row.

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One 10x13 inch Clayton Belt Air Compressor.
Three 3-inch Sergeant Drills.
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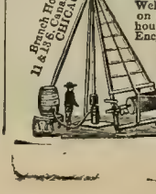
One Set Sharpening Tools.
About 1500 pounds Drill Steel.
One Tustin Pulverizer, with new wearing parts, such as Rolls, Grates, etc.

The above are in first-class condition and will be sold cheap. For price apply to the
PAYMASTER MINING CO.,
Yuma, Arizona Territory.

THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Lefler, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide. Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No. 1, 32 ft.; No. 2, 94 ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.



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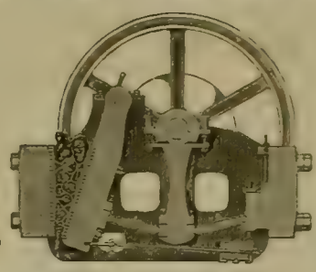

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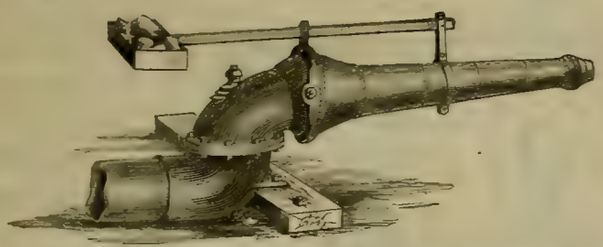

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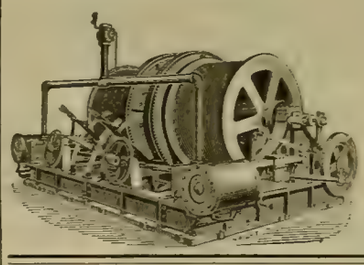

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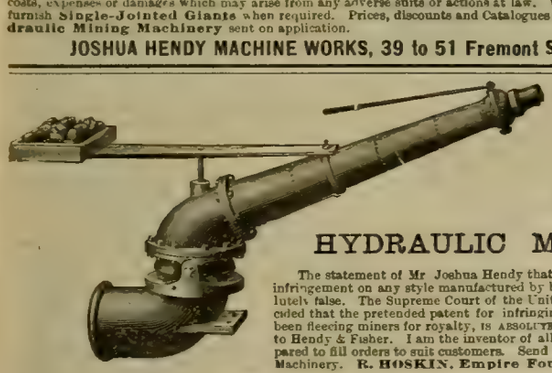

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The statement of Mr Joshua Hendy that ANY STYLE of machine is an infringement on any style manufactured by him, he knows to be absolutely false. The Supreme Court of the United States on March 19th decided that the pretended patent for infringing, which he has for years been fleecing miners for royalty, is ABSOLUTELY VOID, with costs of suit to Hendy & Fisher. I am the inventor of all styles in use, and am prepared to fill orders to suit customers. Send for list of prices of Hydraulic Machinery. R. HOSKIN, Empire Foundry, Marysville, Cal.

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Will report on the condition and value of any mining property on the Pacific Coast. Rare Chemicals made to order. Instructions given in Assaying and Practical Chemistry.

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ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Best & Belcher M Co	Nevada	42	25	Jan 10	Feb 15	Mar 7	L Osborn	309 Montgomery St
Baltimore S M Co	Nevada	4	25	Feb 4	Mar 8	Mar 26	A R Grim	402 Montgomery St
Concordia M C	Nevada	2	50	Nov 12	Jan 24	Feb 12	G O Higgins	121 Montgomery St
California Slate Co	California	3	30	Dec 13	Jan 19	Feb 18	J O Hansome	10 California St
Con Pacific M Co	California	10	15	Feb 5	Mar 11	Apr 2	F E Luty	330 Pine St
Gould & Curry M Co	Nevada	61	30	Jan 10	Feb 14	Mar 7	A K Durbrow	309 Montgomery St
Gray Eagle M Co	California	11	03	Jan 23	Feb 26	Mar 19	O H Bogart	327 Pine St
Julia Con M Co	Nevada	23	10	Jan 30	Mar 7	Mar 28	J Steadfeldt Jr	309 Montgomery St
Martin White M Co	Nevada	22	25	Jan 19	Mar 6	Mar 26	A B Cooper	325 Montgomery St
Mayflower M Co	California	4	50	Jan 14	Feb 18	Mar 11	J Morizio	328 Montgomery St
Nevada Queen M Co	Nevada	4	50	Dec 21	Jan 28	Feb 25	H Deas	309 Montgomery St
North Belle Isle M Co	Nevada	16	50	Jan 3	Feb 6	Feb 27	J W Pew	310 Pine St
Overman M Co	Nevada	39	25	Jan 15	Feb 19	Mar 12	G D Edwards	414 California St
Occidental Con M Co	Nevada	3	25	Dec 27	Jan 31	Feb 25	A K Durbrow	309 Montgomery St
Puget Sound Iron Co	Wash Ter	13	1.00	Dec 29	Feb 2	Feb 25	A Halsey	328 Montgomery St
Peer M Co	Arizona	7	10	Jan 28	Mar 5	Mar 28	A Waterman	309 Montgomery St
Piedmont M Co	Nevada	1	05	Jan 28	Mar 6	Mar 27	J J Scoville	309 Montgomery St
Russell Reduction & M Co	California	4	05	Dec 15	Jan 21	Feb 12	J Morizio	328 Montgomery St
Savage M Co	Nevada	72	50	Jan 7	Feb 11	Mar 4	B Holmes	309 Montgomery St
Superior M Co	Nevada	24	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
S F Natural Gas & Oil Co	California	1	25	Jan 3	Feb 4	Feb 28	J Scoville	309 Montgomery St
St Louis M Co	Nevada	2	05	Jan 14	Feb 18	Mar 16	W E Dean	309 Montgomery St
Scorpion M Co	Nevada	24	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
Union Con M Co	Nevada	37	25	Jan 4	Feb 8	Mar 1	J M Buffington	303 California St

MEETINGS TO BE HELD.

NAME OF COMPANY	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Alabama, Humboldt & Bailey M Co		W H Watson	302 Montgomery St	Annual	Feb 11
Holmes M Co	Nevada	C E Elliott	309 Montgomery St	Annual	Feb 12
Lucky Hill Con M Co		F D Block	Baldwin Hotel	Annual	Feb 14
Spring Valley G M Co	California	H Pichoir	320 Sansome St	Special	Feb 26
Watt Blue Gravel M Co	California	G A Berton	313 Montgomery St	Annual	Feb 18

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Jan 10
Caledonia M Co		A S Cheminant	328 Montgomery St	08	Nov 26
Candelaria Con M Co	Mexico	C T Givens	221 Market St	50	Nov 12
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Idaho M Co	California		Grass Valley	7.50	Feb 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Dec 10

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 17.		WEEK ENDING Jan. 24.		WEEK ENDING Jan. 31.		WEEK ENDING Feb. 7.	
Alpha	2.25	2.65	2.15	2.50	1.95	2.30	1.90	2.20
Alta	2.85	2.90	2.45	2.80	2.25	2.40	2.00	2.35
Andes	1.05	1.20	1.00	1.15	1.05	1.15	1.05	1.10
Argenta	....	.10	.10	.15	.10	.15	....	.10
Belcher	4.80	5⅜	4.60	5.25	3.25	4.80	3.50	4.55
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	5.25	6.00	5⅝	6.75	5⅜	6¼	5.50	6⅝
Bullion	1.25	1.50	1.15	1.45	1.15	1.20	1.10	1.25
Baltimore	....	....	.35	.40	....	.35	.20	.30
Belle Isle	.40	.45	....	.45	....	....	....	.40
Bodie Con	1.50	1.75	....	....	1.55	1.80	1.60	1.75
Benton	3.25	6¼	4.00	6.25	3.30	3.50	3.00	3.50
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	....	.55	....	.55	.50	.55	.50	.60
Con. Va. & Cal	8⅜	9⅛	8.50	9.00	7⅝	8.50	8.00	8⅝
Challenge	4.50	6.25	4.50	4.90	4.25	4.50	4.30	5.00
Champion	....	....	....	....	....	....	....	....
Chollar	2.70	4.10	3.10	3.80	3.15	3.35	3.15	3.50
Confidence	131	141	13	135	132	13	13	153
Con. Imperial	.75	.85	.75	.85	.70	.75	.70	.80
Caledonia	.40	.45	....	.40	....	....	.40	.45
Con. Pacific	....	....	....	....	....	.05	....	....
Crown Point	5.25	6¼	5⅜	6.00	4.90	5.50	4.75	5⅜
Crocker	.80	.95	.95	1.05	.85	1.10	.90	1.10
Central	....	....	....	....	....	....	....	....
Dudley	....	....	....	....	....	.15	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	....	....	....	2.50	....	2.25	....
Exchequer	1.00	1.35	1.05	1.20	1.00	1.15	1.05	1.15
Grand Prize	.75	1.05	.95	1.10	1.10	1.25	1.05	1.15
Gould & Curry	2.75	3.15	2.75	3.00	2.70	3.00	2.70	2.85
Hale & Norcross	4.85	5⅜	5.00	5.25	4.85	5.00	4.85	4.95
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	.50	....	....	....	....
Iowa	....	....	.35	.40	....	.35	....	....
Julia	.35	....	.40	.35	....	....	....	....
Justice	2.10	2.45	1.95	2.30	1.95	2.10	2.00	2.05
Kentuck	2.25	2.80	2.05	2.10	2.00	2.10	2.05	2.25
Lady Wash	.55	.65	....	.55	.45	.50	....	.45
Martin White	....	....	....	....	....	....	....	....
Mono	1.10	1.25	1.10	1.15	1.20	1.25	....	1.20
Mexican	3.25	3.45	3.35	4.00	3.30	3.60	3.40	3.50
Mt. Diablo	2.50	2.60	....	2.75	....	2.25	....	....
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.45	1.70	1.50	1.65	1.55	1.65	1.50	1.60
North Belle Isle	2.45	2.70	2.50	2.60	2.40	2.50	2.25	3.00
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.75	3.20	2.95	3.15	3.35	3.70	3.15	3.35
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.50	1.60	1.50	1.65	1.05	1.65	1.65	1.75
Ophir	5⅛	6¼	5⅜	6¼	5⅜	5⅝	5.25	6⅜
Overman	1.55	1.70	1.25	1.55	1.25	1.40	1.25	1.45
Potosi	2.25	3.20	2.25	2.90	2.25	2.45	2.35	2.55
Peerless	1.10	1.35	1.35	1.45	1.20	1.35	1.05	1.15
Peer	.35	.40	.35	.40	....	.40	....	.35
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.70	3.20	2.75	3.20	2.85	3.20	2.90	3.10
S. B. & M	3.15	3.45	2.90	3.30	2.75	2.95	2.85	3.35
Sierra Nevada	3.00	3.65	3.00	3.50	2.95	3.05	3.05	3.35
Silver Hill	.85	.95	.75	.90	.75	.80	.75	.80
Silver King	1.25	1.40	1.25	1.40	1.00	1.30	1.25	1.30
Scorpion	.50	.55	.45	.55	.45	.50	.45	.60
Syndicate	....	.10	....	....	....	....	....	.10
Union Con	2.70	3.20	2.75	3.15	2.60	2.75	2.70	3.30
Utah	1.20	1.50	1.25	1.40	....	1.25	1.40	1.50
Yellow Jacket	4.40	5⅜	4.50	5.00	4.10	4.75	4.40	4.60
....	....	....	....	....	....	....	....	....

Sales at San Francisco Stock Exchange.

THURSDAY, Feb. 7.

100	Alpha	2.05	
150	Argenta	.10c	
75	Belcher	3.65	
350	B. & Belcher	5⅛	
200	Baltimore	.35c	
100	Chollar	3.00	
100	Con Va & Cal	8⅛	
200	Con. Imperial	.75c	
50	Crown Point	5⅛	
20	Commonwealth	5⅛	
30	Confidence	1.40	
200	Crocker	.85c	
50	Exchequer	1.05	
950	Grand Prize	1.10	
191	Gould & Curry	2.70	
365	Hale & Nor	4.65	
200	Justice	2.10	
350	Julia	.30c	
300	Lady Wash	.50c	
270	Mexican	3.65	
100	Mono	1.15	
100	Nev. Queen	3.10	
100	N. Belle Is	2.80	
100	Navajo	1.45	
400	New York	.40c	
150	Ophir	5⅝	
250	Potosi	2.35	
100	Peerless	1.00	
240	Savage	2.80	
450	Sierra Nevada	3.20	
250	S. B. & M	3.15	
100	Silver Hill	.75c	
100	Scorpion	.55c	
100	Utah	1.35	
300	Union	3.15	
50	W Comstock	.45c	
50	Yellow Jacket	4.40	

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

A. F. JEWETT—Tulare Co.
F. B. LOGAN—Southern California.
H. G. PARSONS—Southern California.
GEO WILSON—Sacramento Co.
W. W. THEOBALDS—San Diego Co.
J. C. HOAG—San Francisco.
CHAS. F. BLACKBURN—Idaho.
FRANK S. CHAPIN—Colusa Co.

A BIG cave has been struck in the Copper Queen mine, Arizona. The cave is reported to be of mammoth dimensions, but no outsider is allowed to explore it.

Mining Share Market.

Mining stocks continue dull, notwithstanding all the leading Comstock mines have good showings of ore. The mills are gradually increasing the number of stamps with the continuance of the warm weather, which increases the volume of water in the Carson river by melting the snow on the foothills and on the southern slopes of the peaks along the crest of the Sierras.

The following companies have cash on hand, according to the monthly statements placed on file:

Alpha, $19,520.35; Alta, $63,414.21; Andes, $14,624.60; Best and Belcher, $1564.68; Bodie, $38,419.73; Bullion, $32,642.59; Benton, $95,901.87; Bulwer, $2528.25; Caledonia, $14,016.84; Con. Cal. and Virginia, $96,778.03, and unsold bullion amounting to $55,958.13; Confidence, $83,453.35; Con. Imperial, $18,833.71; Crocker, $448.75; Del Monte, $2060.52; Dudley, $178.91; Diana, $4482.35; Exchequer, $10,146.40; Found Treasure, $246 31; Hale and Norcross, $10,591.65; Independence, $2645.71 Justice, $9994.03, and $7949 in unsold bullion; Julia, $214.93; Lady Washington, $24,239.80; Locomotive, $1646.45; Mexican, $3727.89; Mono, $15,385.01; Navajo, $43,249.10, and unsold bullion amounting to $14,696.76; Occidental, $11,547.71, and balance due on assessment to collect, $1744; Ophir, $15,230.41; Overman, $1055.93; Sierra Nevada, $3554.13; Silver Hill, $12,836.59; Syndicate, $8870.71; Standard, $3064.83; Utah, $6704.16; Weldon, $1119 84.

The following companies have an indebtedness:

Belcher, $7914.15; Belle Isle, $2145.76; Challenge, $2174.12; Chollar, $313.48, with an offset in unsold bullion amounting to $26,750 45; Commonwealth, $36,432.83; Con. New York, $5375.01; Crown Point, $17,699.41; Grand Prize, $35,834.07; Gould and Curry, $9923.92; Holmes, $3253.73; Kentuck, $954.31; Nevada Queen, $32,060.90; North Belle Isle, $48,187.93; North Commonwealth, $8980.32; Peer, $7174.28; Peerless, $4482.17; Potosi, $21,162.63; Savage, $57,974.93; Scorpion, $228; Seg. Belcher, $9740.54; Summit, $119.03; Union, $3296.42.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Hanauer, Feb. 2, $2050; Bluebird, 2, $16,064; Justice, 6, $3266; Hanauer, 1, $2750; Con. Cal. and Virginia, 2, $63,251; Hanauer, 3, $1690; Queen of the Hills, 3, $1050; Bluebird, 3, $33,776; Confidence, 6, $25,219; Hale and Norcross, 6, $4641; Mt. Diablo, 6, $5636; total for January, $33,987; Alta, 2, $21,000.

Sampling Works for Sale.

The works are situated at Daggett, Cal., in the Calico Mining District, and on side-track of the Atlantic & Pacific Railroad. They contain a first-class Engine and Boiler with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPY & CHILDS, 123 California street, San Francisco.

Easy Binder.

Dewey's patent elastic binder, for periodicals, music and other printed sheets, is the handiest, best and cheapest of all economical and practical file binders. Newspapers are quickly placed in it and held neatly, as in a cloth-bound book. It is durable and so simple a child can use it. Price, size of Mining and Scientific Press, Rural Press, Watchman, Fraternal Record, Masonic Record, Harper's Weekly, and Scientific American, 75 cents; postage, 10 cents. Postpaid to subscribers of this paper, 50 cents. Send for illustrated circular. Agents wanted.

FOR SALE.

SECOND-HAND IRON PLANER,

Screw-Cutting Lathes from 12 to 30 inch swing, Punch Presses, Patent Attachment for Wood Lathes for Turning Tapers, Handles, etc. BEDROCK PRICES. Address: I. A. HEALD, 115 First St., San Francisco.

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About Obtaining Patents.

Patents are Virtually Contracts.

The Patent Law provides that in case a patent which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, in order that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. If, by this "preliminary examination," the improvement is found to have been previously invented, our client will receive, for the small sum of $5 for the examination, a verbal or written report showing definitely wherein his invention has been anticipated, thereby saving him further expense and perhaps much time, anxiety, etc.

To avoid all needless delay, however and secure patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with $15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately and forwarded to the inventor for his signature. When he receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigo ously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of $20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give up a case so long as there is a chance of obtaining a patent. The Agency charge, including drawings, rarely exceeds $40, and for this we do all we can without appealing the case.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are more satisfactory to the Patent Office than the old cumbersome system of storing up an immense bulk of countless models.

Drawings or sketches, sufficient to illustrate the invention clearly, with a description that will enable us to make a full set of perfect drawings for the Patent Office, is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had it been skillfully, completely and artistically portrayed. In all cases prepared by us the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken to have the invention fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

Advantages to Inventors on the Pacific Coast.

The firm of DEWEY & Co. has edited and published the MINING AND SCIENTIFIC PRESS continuously since 1860, a period of 26 years. Few agents, who are still engaged in the business, have had so long-extended practice in patent soliciting. The members of the firm give personal attention to the applications intrusted to their care; and their familiarity with inventions and with local affairs in the Pacific States and Territories, enables them to understand the wants of inventors on this coast more readily and thoroughly, as we believe, than any other agents in America. Thus there is saved a great deal of the time which ordinarily —when distant agents are employed—is wasted in preliminary writing back and forth.

This happy combination of long business experience together, and wide connections, has placed our firm in a position unquestionably most fortunate for affording inventors prompt and reliable advice, and the best facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation best calculated to widely inform the class of readers especially interested in the subject of his invention.

Caveats.

A Caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the caveator to receive notice, for a period of one year, of any application for a patent subsequently filed, which is adjudged to be novel and is likely to interfere with the invention described in the caveat, and the caveator is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from $10 to $20. The Government fee is $10 additional.

To enable us to prepare caveat papers, we require only a sketch and description of the invention.

Rejected Applications.

Inventors who have rejected cases (prepared either by themselves or for them by other agents) and desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

Inventors doing business with us will be notified of the state of their application in the Patent Office whenever it is possible for us to furnish such information.

DEWEY & CO.,

Patent Solicitors, Office of SCIENTIFIC PRESS, 252 Market St., Elevator entrance, No. 12 Front St., S. F.

GEO. H. STRONG. W. B. EWER. A. T. DEWEY.

STOCKHOLDERS' MEETING.

OFFICE OF

The Superior Mill and Mining Company.

A SPECIAL MEETING of the stockholders of the Superior Mill and Mining Company will be held at the office of the company, Room 11, 303 California Street, San Francisco, California, on Wednesday, February 20, 1889, at 1 o'clock P. M., for the purpose of taking into consideration the increasing of the capital stock of said company from ten million (10,000,000) dollars, divided into one hundred thousand (100,000) shares of the par value of one hundred (100) dollars per share, to fifteen million (15,000,000) dollars, divided into one hundred and fifty thousand (150,000) shares of the par value of one hundred (100) dollars each. Transfer books will close on Monday, February 18, 1889, at 3 o'clock P. M. By order of the Board of Directors.

J. M BUFFINGTON, Secretary.

OFFICE—Room 11, No. 303 California Street, San Francisco, California.

EXTENSIVE GOLD MINE FOR SALE.

To be sold at public auction by the undersigned, at the Merchants' Exchange, in the City of Halifax, on Thursday the Fourteenth day of March next, at twelve o'clock noon, that extensive, valuable and well-equipped GOLD MINE known as the Dufferin GOLD MINE, situate on the Atlantic coast, about ninety miles east of said city. Daily mail from Halifax. Telegraph office at Salmon river, four miles from the works. Salmon river harbor never freezes, and is safe and easy of access. The mine embraces 342 areas, each 150x250 feet, all in one block. The entire area measures fifteen hundred feet in width across, and eight thousand five hundred and fifty feet along the lodes. The leases have nearly fourteen years to run, and can at any time be renewed for a period of twenty-one years, upon payment of two dollars per area. Within this area is a belt of veins dipping on each side of an anticlinal. They have been found by tests made on the surface to extend upwards of 4,000 feet. The ore has been partially removed to a depth of 200 feet over a distance of about 700 feet, and to a depth averaging about 70 feet over an additional 1,000 feet in length or thereabouts. The veins are of various width, the largest averaging about ten feet of solid quartz.

This mine was discovered in the Autumn of 1880, but was not worked to any extent until the Autumn of 1881. It has yielded up to the end of November, 31,012 ounces of gold from 64,508 tons of quartz, according to the sworn returns made to the Mines Office. The gold can be produced at a cost which will leave a very handsome margin of profit.

The mine is operated by machinery worked by water power, the power being transmitted by a line of wire rope running from the water wheel to the mine—a distance of about 4,750 feet—and lying parallel to the outcrop of said veins, at a distance therefrom of about fifty feet. The Salmon river crosses the property twice. It supplies the hoisting and pumping power, and the same water is afterwards used to drive the crusher. The latter has thirty-eight stamps, and there is ample water power to operate three times that number. Sixty stamps can be operated with present machinery. Of the 120 horse-power existing for pumping and hoisting only about twenty-five is used. There are about 700 acres of well timbered and well watered land owned with the mine. This partly covers the areas, and where it does not immediately adjoins them. It is also provided with a steam plant to operate hoisting gear and pumps in case of accident to the transmission power, a sawmill, sufficient for the requirements of the property, a tramway from the mine to the crusher for carrying quartz, and stables, offices, and boarding-houses, sufficient to accommodate a large number of employees.

The mine is owned and has been operated by a partnership, and owing to the death of one of the principal owners it has to be sold to enable his estate to be settled. A good title will be given.

Terms, ten per cent cash, balance within thirty days from day of sale. The deposit to be forfeited in case the purchaser fails to complete the purchase within that time. Further particulars can be had on reference to N. H. MEAGHER, Q. C., Bedford Row, Halifax, or to JAMES DUGGAN & SONS, Auctioneers, Bedford Row.

HORACE D. RANLETT,

Ores, Mining, and Commission,

420 Montgomery St., S. F.

BUSINESS MANAGER OF

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NEWTON COPPER MINE, Amador Co

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Twenty years experience, in California, purchasing Ores and dealing in Mines.

Special attention given to management and sales of mines and purchase and shipment of copper produce

FOR SALE.

One 10x13 inch Clayton Belt Air Compressor.
Three 3-inch Sergeant Drills.
Three 5-ft. Double Screw Drifting Columns with Arms.
One 4-ft. Single Screw Stoping Bar.
One Set Sharpening Tools.
About 1500 pounds Drill Steel.
One Tustin Pulverizer, with new wearing parts, such as Rolls, Grates, etc.

The above are in first-class condition and will be sold cheap. For price apply to the
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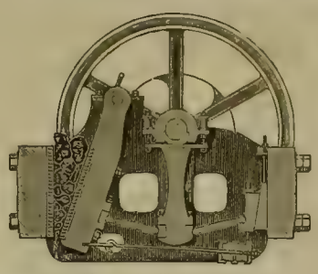

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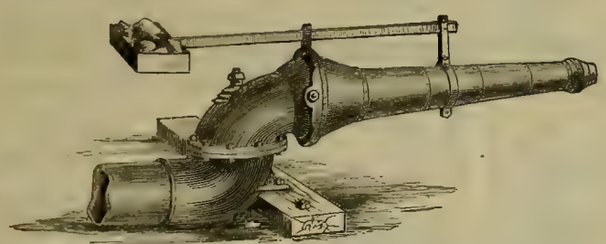

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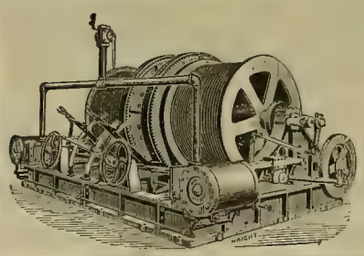

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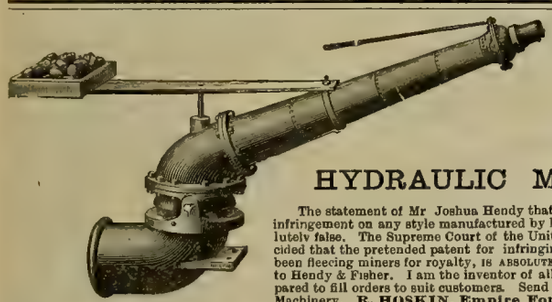

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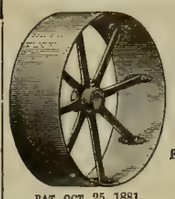

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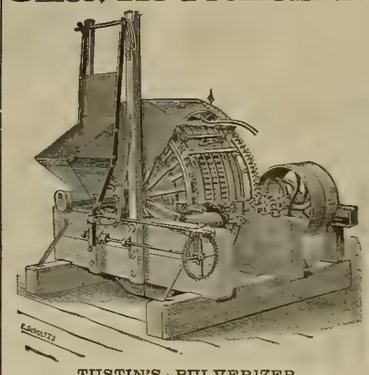

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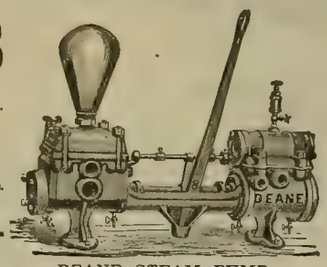

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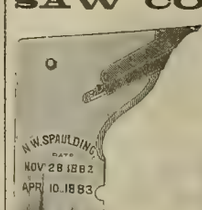

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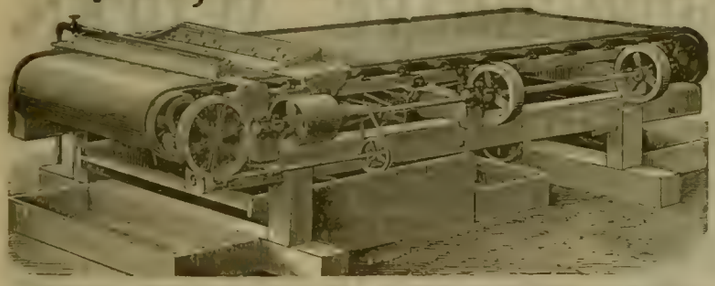

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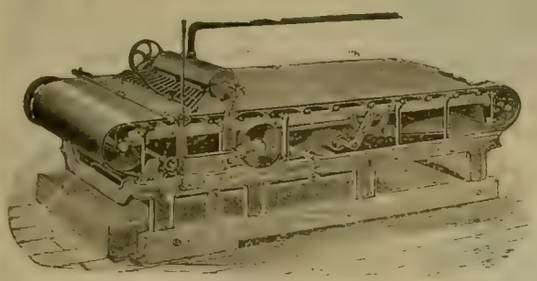

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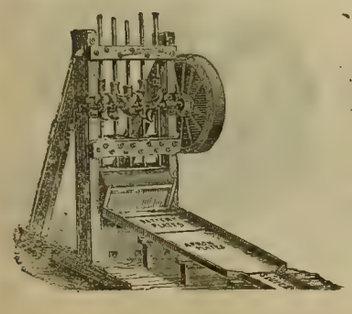

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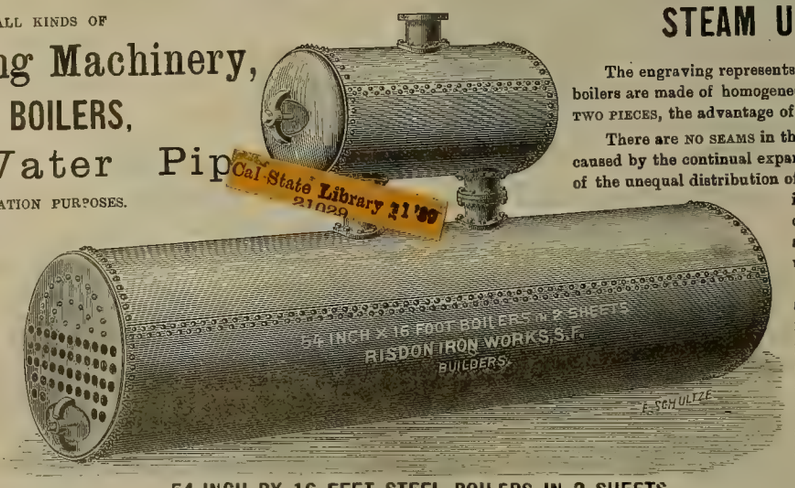

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There are NO SEAMS in the fire to leak, nor loose rivets to contend with, caused by the continual expansion and contraction of the plate on account of the unequal distribution of the heat under the boiler, the bottom presenting a smooth, even surface which can be easily cleaned. We place a manhole at the back end above the tubes, and one in the front end under the tubes.

The FRONT MANHOLE gives free access to the sheet over the fire, THE VITAL PART OF EVERY BOILER. This point is often overlooked by purchasers, and boilers are supplied with a small hand hole, and the remaining space filled with tubes which allows absolutely no access for cleaning, and in a short time tubes and sediment are one solid mass, and instead of gain in efficiency by a few feet of tube surface, the result is a positive loss.

SPECIFICATION OF BOILER AND FIXTURES:

1 Boiler, 54 inches diameter by 16 feet, with 46 3½ inch tubes; Shell, 5 16; Heads, 7-16.
1 Steam Drum, 36 inches diameter by 72 inches long.
1 Breeching.
1 Smokestack, 30 inches by 60 feet, Nos. 12 and 14 Iron.
300 feet galvanized strand for Guys.
1 C. I. Front, complete.
1 Foundation Plate for front.
1 Set Grate Bars for coal or wood.
1 Back Bar Bearer.
1 Ash Cleaning Door and Frame.
1 Back Arch Plate.
1 Set Binder Braces and Bolts for Brickwork.
1 Stand for back end of Boiler.
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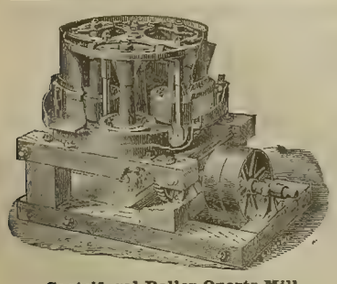

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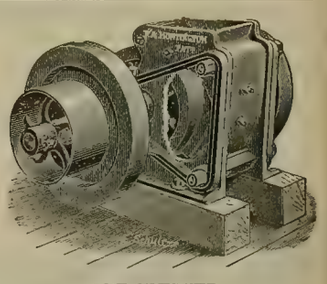


ORE CRUSHER

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, FEBRUARY 16, 1889.

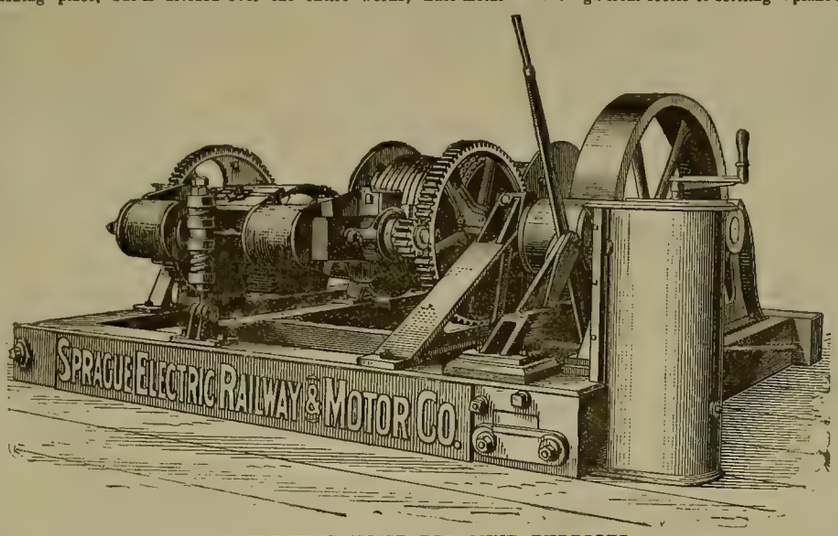
VOLUME LVIII.
Number 7.

Trough-Lixiviation Works.

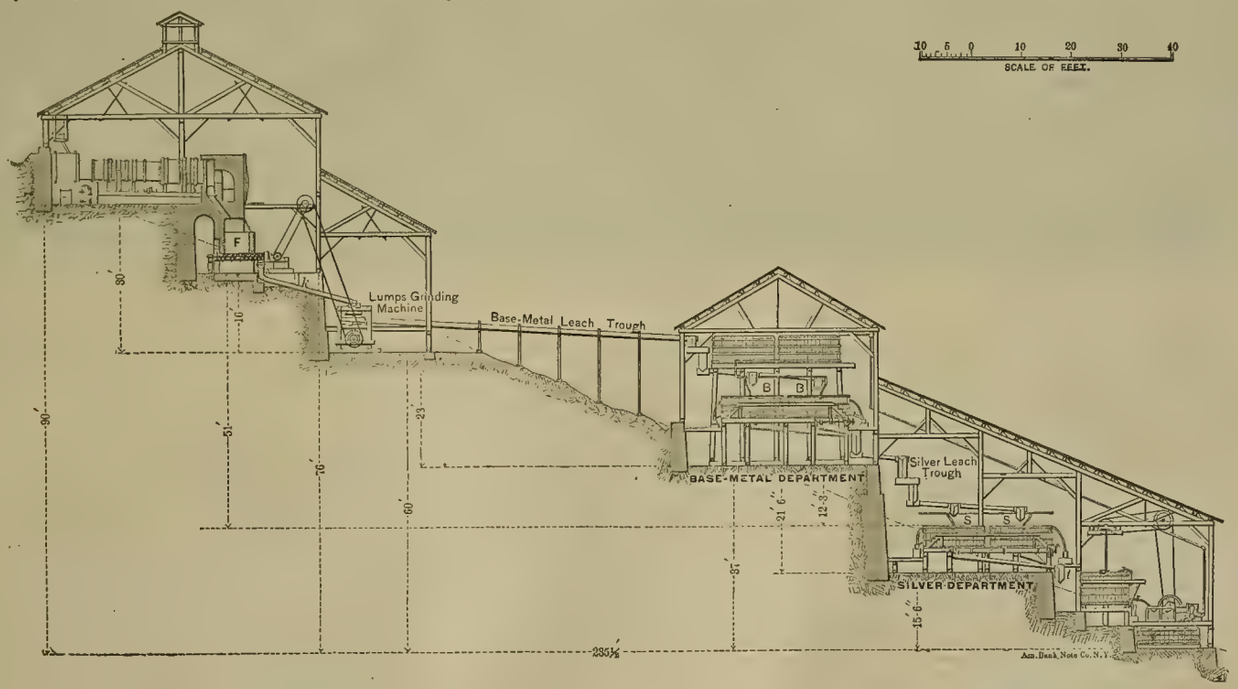
The accompanying cut shows Ottokar Hoffmann's complete trough-lixiviation plant, in connection with a Howell furnace. The leaching works are not in the same building as the battery and furnaces, but some distance down the slope of the site, in order to gain grade. Hot-ore feeder, ore-cooling apparatus and grinding machine are in the furnace building. The ore, after passing through the furnace, drops into the bin, *F*, from which it is removed after some hours by the conveyer, and drops through the cooler. From here the water carries it through trough *k* to the grinding machine. After passing through the grinder the pulp enters the base-metal leach-trough, which conveys it down to the base-metal department and drops into the settling-tanks *B*. While the ore passes through the trough, the base metals are extracted. From here the ore is sluiced out with sodium hyposulphite solution into the silver-leach trough and conveyed to the settling-tanks, *S*, in the silver department. The extraction of the silver chloride being performed in the trough, the sand drops into these tanks as tailings. The silver solution flows into the precipitating tanks and the tailings are sluiced out into tailing-trough *t*. The leaching troughs have ⅝-inch fall per foot, with the exception of trough *k*, in the furnace building, which has more (about 2¾ inches per foot) because the material to be moved in it is coarse. This trough is not triangular like the others, but has a round bottom in order to give the water a better opportunity to move larger lumps.

One of the objections used against trough lixiviation has been, that a mill with this system will require more fall than an ordinary mill. Though this is true, Mr. Hoffmann says he cannot see why this should be an obstacle to the new system. The additional grade is not needed as a sudden drop in one particular place, but is divided over the entire works; and by erecting the leaching works further down the site, no unusual steep slope is required. As a precaution against a total destruction of the works by fire, it is even advisable not to bring all the departments under one roof, especially in this case, where the transfer of the ore from one department to the other is performed automatically and without expense.

In order to illustrate that the extra grade required does not offer any difficulties in the construction of the buildings, and that the trough system does not require any unusually steep slope, or unusually large excavations, the plant is represented with excessively long troughs: Base-metal leach-trough from cooler to settling-tank *E* in the base-metal department, 293 feet, and silver-leach trough from tank *A* (base-metal department) to tank *E'* in silver department, 344 feet; in all, 637 feet. It can be seen at a glance that the plant can be erected without any difficulties, and that no unusually large excavations are required. The slope of the site as represented is 22°.



AN ELECTRIC HOIST FOR MINE PURPOSES.



CONTINUOUS TROUGH-LIXIVIATING WORKS, CONSTRUCTED BY OTTOKAR HOFFMANN.

THE decrease in the public debt in January amounted to $12,216,284.75.

An Electric Mine Hoist.

The Roaring Fork Electric Light and Power Co. has supplied power for some time from its plant to Sprague motors used at two mines at Aspen, Col., for hoisting purposes. The first electric hoist was started by the Aspen Milling and Smelting Co. last July, and the second was started in October, at the Regent mine, two miles from the dynamo. These hoists have been running continuously ever since, and giving satisfaction to all parties. The power of Grand river at the Falls of Roaring Fork is the generating source, which, by the use of Pelton wheels and a special dynamo installation of the Sprague type, is converted into electric energy and transmitted over miles of wire to the motors. It is essential that well-governed wheels should be used, as in this case, where water is the source of power. There are many places in California and elsewhere on this coast where this system could be of the greatest convenience and save money also.

We give herewith an engraving of this electric hoisting machine. It consists of an ordinary drum mounted on a shaft carrying a friction-wheel; another shaft, parallel to this one, carries a paper-faced friction-pulley, which bears against an iron-faced friction-wheel. For reducing the speed intermediate gears mesh into pinions on each end of the armature shaft close to the axle-boxes of the motor.

The motor used is similar to those which have given such great satisfaction in the street railway equipments by the Sprague Company, in the East, having on one side a flexible support, and being pivoted on the other side around the intermediate shaft.

(*Concluded on page 114.*)

CORRESPONDENCE.

We admit unindorsed, opinions of correspondents.—EDS.

Washington Territory Mines.

Ruby City Camp.

EDITORS PRESS:—In your issue of November 24, 1888, there appeared an item written by "Observer," Spokane Falls, W. T., from which I quote as follows: "Speaking of the mines of Ruby City, a good deal of work has been done on them. The Arlington mine on the surface averages 18 ounces silver. When $30,000 was paid for it by Portland capitalists and Prof. Clayton reported hundreds of thousands in sight, a tunnel boss from the Oregon Pacific road was put in charge of the property, who ran a tunnel 450 feet to gain a depth of 100 feet, at an expense of $15,000, while a shaft representing the same development could have been sunk for $1200. At 200 feet their ore body, 4½ feet wide, averages $15 per ton silver and is worthless. The First Thought, on the same hill, shows a good streak of pay ore and may survive the working test. The War Eagle and Idaho are losing propositions. The Fourth of July has had but little development work done."

Now, gentlemen, allow me, through the columns of your paper, to give the facts in this case. This being a new mining camp, I consider the above a slur and great injustice to this thriving camp. In the first place, the Portland capitalist did not pay $30,000 for the Arlington mine. Second, Prof. Clayton did not report hundreds of thousands in sight, as his printed report is now in my office. His report was made by request of this present company, and is based on facts, which are proved such, since the development made shows the average per ton on surface was about $84 in silver and traces of gold. The width of ledge on the surface is about six feet, between two well-defined walls.

The "tunnel boss" from the Oregon Pacific is another mistake. Not intentionally, but for want of true information. J. B. Tonkin, who was selected by the Portland company to superintend the Arlington mine, is an old, experienced California miner and millman, and has served as superintendent at various mines throughout the northern portion of California. He is considered as a first-class miner; he had also served in charge of tunnel works under gentlemen of Portland—E. J. Jeffrey, D. P. Thompson, John Bays and S. S. Cook—with good results and general satisfaction. At the construction of the California & Oregon road by the S. P. C., said Tonkin was in their employ as foreman in construction of tunnels from Delta to Ashland, Oregon. "Observer" is also wrong in his statement of tunnel work in the Arlington mine. A shaft was first sunk in the ledge to a depth of 105 feet, when the flow of water was so great the work of sinking was stopped, and a force of men commenced to run a tunnel to tap the ledge at a depth of 210 feet from the surface. This was commenced Dec. 7, 1887, and continued in hard granite and syenite for 418 feet, when the ledge was cut. The inclination of ledge from surface diverges 10 degrees from the vertical line, giving the mine a splendid chance for stoping, easy to timber, with an average ledge of five feet in width. This rock, taken weekly with an average of the entire face across the ledge, gives assays from $58 in silver to $204, and as high as $27 in gold. There is no question about the quantity or quality; it is the proper kind of machinery for the working of this ore that caused the delay in not putting a plant here in the summer of 1888. This company has now shipped 10 tons to Spokane Falls, a distance of 162 miles, to be taken to some part of Utah, to be treated by the Russell process. If satisfactory returns are made, the company will immediately purchase a plant and erect it this spring. This shows that "Observer" was never at the Arlington mine, or his judgment on mining must be very weak to say the tunnel cost $15,000, when a shaft could have been sunk for $1200. Such is not the case. As it is well known among mining men when there is a chance to run an adit it answers for a drainage as well as a passageway for removing of all the ore. This is the principal thing to take an advantage of in a hilly country where such mining privilege prevails. The suggestions of Prof. Clayton have been carried out to a dot as recommended in his report of sinking the shaft and then running a crosscut; also extending tunnels each way in the ledge, this being the only practical method in mining. A connection by raise was made to bottom of shaft, which gives fine ventilation for working below. The company also erected a large ore-house for the storage of all first-grade ores, which is now about filled.

The First Thought and Idaho, mentioned by "Observer," are good properties. They have high-grade ore in all three of them, including the War Eagle, which is owned and operated by St. Paul capitalists with successful results. The Fourth of July is now engaged in sinking a shaft next to the hanging-wall. This ledge is about 26 feet wide on the surface, producing considerable native silver at a depth of 40 feet. The calculations are that several plants will be erected here this summer, as there never were any better prospects found on the Pacific Coast than the outcroppings show in this camp. Time and money are needed to make it second to none. Three railroads are heading in this direction, and when completed, freights and fare will be cheap.

This camp is situated northwest of Spokane Falls 162 miles and about 40 miles from the British line. Wood is plenty and there is an abundance of water for mill purposes. The winters are rather cold, but the snow is only about three feet at an altitude of 4800. There is grass in abundance, with fine stock ranges. I hope "Observer" will read this with interest, and acknowledge the misstatement he made in regard to our healthy, prosperous and struggling camp. MINER.

Ruby City, W. T., Feb. 2d.

Reforming the Ballot.

A bill is now before the Legislatures of California and Missouri embodying the salient features of the Saxton electoral-reform measure which recently engaged the attention of the law-makers of New York. Nine bills have been introduced in the Indiana Legislature looking toward reform in election laws and methods of voting. Indeed, nearly all the Legislatures of the Northern States which are now in session are considering measures of this class. Never before has the movement in favor of reform in the ballot been so extensive or so powerful in this country.

In nearly every instance the electoral method that is sought to be adopted is a modification of what is known as the Australian method. The principal features of this method we have already given our readers. So far as present legislation is concerned, this scheme is no longer an experiment. As we have pointed out, it has been tried in England and Canada, as well as Australia, and has worked well. Nor is it wholly unknown to the United States. Massachusetts enacted a law of this sort about a year ago, which goes into effect at the next State election. Two cities of this country—Milwaukee and Louisville—have already held elections under an Act of this kind.

As we have just said, this scheme is no longer tentative. Wherever it has been tried it has given satisfaction. Wherever it has been in operation it has removed the most serious frauds and abuses that have clung to the system it superseded.

The measure now before the Legislature at Sacramento meets with much opposition from the politicians. They say it is not adapted to the institutions of our country. The test to which it has been submitted in the two American cities silences that objection. That test proves that this method of voting can be made serviceable in this country.

But we are told that our present law is good enough if its provisions were enforced. The fearful depravity and corruption at the last election in the city of San Francisco alone is a sufficient reply to this objection. Under the new scheme things cannot be worse, and may be better; let us therefore give it a fair trial.

The Government Irrigation Work.

Senator Stewart of Nevada seems to be the leader in irrigation matters at Washington. In another paragraph in this issue mention is made of his measure concerning streams which flow from one State into another. The telegraph also brings an outline of new propositions relative to the Government surveys looking to irrigation of arid lands. It seems Senator Stewart has offered an amendment to be inserted in the Sundry Civil bill, increasing the appropriation for surveys of sites for irrigating reservoirs in arid regions, and estimating the cost of construction thereof from $250,000 to $350,000. The amendment provides that when surveys and estimates for necessary hydraulic works have been completed for any section of land by said system of hydraulic works, the lands to be irrigated under such system shall be subject to entry under the Homestead law, provided no patent shall issue for any such entry until the construction of hydraulic works shall progress sufficiently to furnish water for the reclamation of the lands to be patented, or so much thereof as may be susceptible of irrigation. Any assignment, transfer or alienation of lands so entered prior to the issuance of patent shall be absolutely void and the lands shall revert to the United States. It is provided further that the Secretary of the Interior shall have power to make regulations whereby persons entering such lands may form co-operative associations for the purpose of constructing the necessary hydraulic works in any irrigation district in which lands are to be irrigated by said system, and the associations formed for such purposes may mortgage their right to lands entered by them for the purposes of obtaining funds for the construction of the necessary hydraulic works. Any mortgage or incumbrance made upon such lands without approval of the Secretary of the Interior is made void, the land to revert to the United States.

These propositions are interesting and important and should be thoroughly discussed by all those contemplating investment and enterprise in lands likely to be rendered available by the new Government work for irrigation.

IMPROVED FERRY-BOAT DECK.—The deck of a ferry-boat for the Clyde is movable, so that six elevators raise and lower it instead of needing movable landing stages and bridges.

Irrigation Districts.

Proposed Amendment to the Wright Law.

Two bills amendatory of and supplemental to the Act to provide for the organization and government of irrigation districts, and to provide for the acquisition of water and other property, and for the distribution of water thereby for irrigation purposes, commonly known as the Wright law, approved March 7, 1887, have been introduced in the Assembly by Hon. Vital E. Bangs of Modesto, passed by that house and reported to the Senate.

The first, introduced Jan. 24th, and designated as Assembly Bill No. 335, provides for changing the boundaries of any irrigation district, by excluding therefrom tracts of land which were included therein at or after its organization; "but neither such change of the boundaries of the district, nor such exclusion of land from the district, shall impair or affect its organization, or its rights in or to property, or any of its rights or privileges of whatsoever kind or nature; nor shall it affect, impair, or discharge any contract, obligation, lien, or charge for or upon which it was or might become liable or chargeable, had such change of its boundaries not been made, or had not any land been excluded from the district."

The owner or owners in fee of one or more tracts of land which constitute a portion of an irrigation district, may file with the board of directors of the district a petition praying that such tracts, and any other tracts contiguous thereto, may be excluded and taken from said district. The petition must describe the boundaries of the tracts to which it has reference, and it must be acknowledged in the same manner and form as is required in case of a conveyance of land.

The directors are required to publish notices of the filing of such petition for at least two weeks in the county where their office is situated and in every county within which lies any portion of the territory to be excluded, describing the lands, etc., mentioned in the petition and notifying all persons interested in or opposed to the change sought to present their objections in writing at the office of the board at a specified time—which shall be the regular meeting of the board next after the expiration of the time for the publication of the notice.

After hearing the petition and all objections thereto presented in writing by any person showing cause why the prayer should not be granted, the directors are to proceed in the manner provided for by the following sections:

SEC. 5. The board of directors, if they deem it not for the best interests of the district that the lands mentioned in the petition, or some portion thereof, should be excluded from said district, shall order that said petition be denied. But if they deem it for the best interests of the district that the lands mentioned in the petition, or some portion thereof, be excluded from the district, and if no person interested in the district shows cause in writing why the said lands, or some portion thereof, should not be excluded from the district, or if having shown cause, withdraws the same, and also if there be no outstanding bonds of the district, then the board may order that the lands mentioned in the petition, or some defined portion thereof, be excluded from the district.

SEC. 6. If there be outstanding bonds of the district, then the board may adopt a resolution to the effect that the board deems it to the best interests of the district that the lands mentioned in the petition, or some portion thereof, should be excluded from the district. The resolution shall describe such lands, so that the boundaries thereof can readily be traced. The holders of such outstanding bonds may give their assent in writing to the effect that they severally consent that the board may make an order by which the lands mentioned in the resolution may be excluded from the district. The assent must be acknowledged by the several holders of such bonds in the same manner and form as is required in case of a conveyance of land, and the acknowledgment shall have the same force and effect as evidence as the acknowledgment of such conveyance. The assent shall be filed with the board, and must be recorded in the minutes of the board; and said minutes, or a certified copy thereof, shall be admissible in evidence with the same effect as the said assent; but if such assent be not filed the board shall deny and dismiss said petition.

SEC. 7. If the assent aforesaid of the holders of said bonds be filed and entered of record as aforesaid, and if there be objections presented by any person showing cause as aforesaid, which have not been withdrawn, then the board may order an election to be held in said district to determine whether an order shall be made excluding said land from the district as mentioned in said resolution.

If at such election a majority of all the votes cast shall be against the exclusion from the district of the lands in question, the board shall deny and dismiss the petition, and proceed no further in the matter. But if a majority of such votes be in favor of the exclusion of said lands, the board shall thereupon order that the said lands be excluded from the district.

The remaining sections of the bill prescribe the manner in which details of business, consequent upon the order of exclusion, shall be carried out.

The second measure, introduced Jan. 25th and known as Assembly Bill No. 340, is the counterpart of the former, as it provides for enlarging the boundaries of an irrigation district, so as to include a tract adjacent. Its provisions as to petitions, publication of notices, hearings, denials, resolutions, elections, orders, etc., are similar to those of A. B. No. 335.

Under either of the above bills, an election is to be called only when objections are filed with the board, otherwise the board acts of itself. If it should agree with the objectors, then the petition for inclusion or exclusion of lands will be rejected without submitting the matter to a vote of the electors of the district. The election is called only when the board of directors are in favor of the petition and objections thereto are filed.

After either of the orders above referred to has been entered in the minutes of the board, and a certified copy has been filed in the County Recorder's office, the district affected shall be and remain an irrigation district as fully to every intent and purpose as it would be had no change been made in its boundaries.

In case of the inclusion or exclusion of any lands within any district by proceedings under the above Acts, the board of directors, at least 30 days prior to the next succeeding general election, shall redivide such district into five divisions, and one director shall thereafter be elected by each division.

Both these bills having passed the Assembly on Monday last, were reported in the Senate Tuesday and substituted for identical measures on the Senate file.

Interstate Water Rights.

It is telegraphed from Washington that Senator Stewart has introduced a bill, the object of which is to allow suit to be brought in the Circuit Court in either California or Nevada to determine water rights to streams rising in California and flowing into Nevada, and to enable parties to obtain service of defendants whenever they may be found.

Senator Stewart's bill is to amend Section 1 of the Judiciary Act as follows:

"That where the sole ground on jurisdiction is founded on the fact that the action is between citizens of different States, suit may be brought in the district of the residence of either plaintiff or defendant; and provided further, that when there is a controversy between citizens of different States involving the right to use water which flows from one State into another, and the plaintiff claims the right to use it in another State, suit may be brought up in the district where the plaintiff or defendant resides, and process may be used in any district where the defendant may be found."

There are in the irrigating regions many other localities to which this law will apply. Without such a law there is no practicable way of determining disputes.

AN ASTRONOMICAL SOCIETY.—At a recent meeting of the Pacific Coast Amateur Photographic Association, where Prof. Holden of the Lick Observatory was present, he said that, owing to newspaper enterprise, the results of the observations of the eclipse on January 1st, as far as they could be obtained, had been telegraphed throughout the world on the same day and had awakened great interest among astronomers. He had received several letters of inquiry from leading astronomers in Europe, and in his replies to some of them he had said that one of the most interesting features of the event was the extent and value of amateur co-operation, which could not have been obtained anywhere else in the world. The speaker then proceeded to unfold his plan for an amateur astronomical society. He had such a society in mind when he came to the coast to reside three years ago, but, observing the failure of several similar societies elsewhere, had concluded that the project had better rest. He had recently found that an astronomical community does exist in California, ready to co-operate with the observatory, and now was the time to organize this spirit of co-operation and this interest. The society, if formed, would have placed at its disposal at certain times—probably on nights during the summer months—the facilities of the Lick Observatory, which could be visited on certain nights. Many members of the association expressed themselves as enthusiastically in favor of the project, and during a lengthy discussion, in which Professor Holden showed how amateurs could render very valuable service by supplementing the work of the professional astronomers and doing work which they could not find time to do. It was determined to take definite steps to form the proposed society in the near future.

IMPORTING ALIENS.—With reference to a scheme for inducing immigration from Europe to California, the Fresno *Expositor* observes: Though not an advocate of Americanism as a political scheme, we are intensely American when it comes to filling up this country with foreigners brought over in job-lots as colonists. To the foreign-born person who has sufficient energy and manhood to come over and become one of us, a hearty welcome should be given, but for such as must be "induced," there should be no encouragement. Let's have no foreign colonies in the San Joaquin valley. There are thousands in our country who are virtually as ignorant as any resident of Europe of the resources and possibilities of this State whose presence might possibly be desirable, and we are satisfied that the larger portion of the contributors to the Board of Trade's fund will agree with us that it should be expended in advertising our advantages among our own nativity, of our own language and customs, and who are cognizant of our principles of government.

THERE are 15,000 photographic establishments in the United States, furnishing employment to about 50,000 people. Less than 50 years ago there was not a photographic camera in the world.

The Nation's Forests.

The first step in the effort to provide for the conservation of the forests on the national domain should be the withdrawal from sale of all forest-lands belonging to the nation. It will not be necessary to preserve and maintain all these forests permanently, but the extent of forest-territory which will be required by a practical plan of forest-preservation and management for our Western mountain regions cannot be at once precisely determined. A thorough examination of these regions, and of the agricultural country depending upon them for its water supply, will be necessary, in order to show what forests must be retained, and what tracts of timber can be put upon the market without injury to the important interests involved. Until such an examination has been made, none of the forest-lands now belonging to the United States should be sold.

The second step should be to commit to the United States army the care and guardianship of the forests belonging to the nation. There is in time of peace no other work of national defense or protection so important as this which the army can perform, and it is plain that under existing conditions the forests on the national domain will not be—indeed cannot be—adequately guarded and protected by any other means The measures which have been tried, including those now in operation, or nominally in operation, have proved almost ineffective. The forests on the public lands are pillaged by settlers, and by the employes of railroad and mining companies, without scruple or limit. Other instruments will have to be employed if the forests are to be preserved. Their complete and final destruction, with that of the soil which sustains them, is, under the present system, or want of system, only a question of time, and of a very short time.

The officers of the United States army are educated by the nation for its service, and they constitute a body of men not equaled by any other in our country in their equipment for guarding and protecting the great forest-regions belonging to the nation. They possess every kind of fitness for this work in greater degree than any other class of men, and if authorized by law to undertake this service they would have the power and the means necessary for its performance, while everybody else is at present inevitably powerless and incapable. As there is likely to be very little work for the army hereafter in the care of the Indians, it will be available for this service of guarding the national forests. The work can be done well by the army, and it would cost nothing, or very little, while any other plan would necessarily be both ineffective and costly. This guardianship and defense of the nation's forests by the army of the nation should be continued and maintained until a sufficient number of adequately trained and equipped foresters has been provided by the National Government for the administration of a complete and permanent system and policy for the management of the forests on the public domain.

This brings us to consider the third step. This should be the appointment, by the President, of a Commission to make a thorough examination of the condition of the forests belonging to the nation, and of their relation to the agricultural interests of the regions through which the streams flow which have their sources in these forests, and to report, with the facts observed, a comprehensive plan for the preservation and management of the public forests, including a system for the training, by the Government, of a sufficient number of foresters for the national forest service.

The Commission should determine what portions of the existing forests on the public domain should be permanently preserved, and in what manner the remainder should be disposed of. The national forests can be so managed that they will be perpetually reproduced, and will yield forever an abundant supply of timber for the inhabitants of the adjacent country, and a revenue which will more than sustain the cost of the forest service. A National School of Forestry should be established at a suitable place in one of the great mountain forests on the public lands, and its equipment should be as thorough and adequate for its purpose as is that of the National Military Academy at West Point.—*Garden and Forest, Jan. 30th, 1889.*

The Date Palm in Fruit.

We have had a number of allusions to the date palm in California and engravings of the tree and the fruit, but none which presents the subject so directly and forcibly as the large photo facsimile on this page made by the Dewey Engraving Co. from a photograph by W. R. Nutting of this city, who has given much attension to the catching of horticultural subjects with the camera.

The engraving is interesting from several points of view which we will briefly sketch. The scene is in front of the residence of J. R. Wolfskill, who, since 1842, has made his home on the south bank of Putah creek. The pioneer himself, in his eighty-sixth year, still full of interest and activity in horticulture, which is his chief delight, is seen in the foreground, while his oldest son, Edward Wolfskill, a prominent business man of the town of Winters, appears upon the step-ladder. Aside from the personal interest which pertains to these portraits, their figures serve to show the hight of the palms.

The engraving shows the male and female date palms, the taller tree on the left being of the masculine persuasion. Even though the trees are so near, it is found necessary for fructification to take the blossoms from the taller tree and suspend them near the opening bloom of the bearing palm. It has been observed also that the fruit growing on the side of the cluster nearest to the suspended branch is perfect, and has seeds, while on the side farthest away many imperfect fruits are seen. For this reason the male bloom is broken to pieces and they are hung up here and there around the prospective fruit clusters. The smaller palm began bearing fruit in 1877. It was then 15 years old, as the seed, taken from a dried date, was planted in 1862. The fruit is of a red color and becomes ripe and of good flavor. As the fruit ripens it turns black and falls.

The photograph from which our plate was made was taken about the middle of October, 1888, and some of the fruit was then ripe, and the mass of fruit was estimated to be twice the size of a flour barrel. About November 1st a cluster was taken from the tree and brought to the office of the State Board of Trade in this city, where it was suspended in the front window and was the admiration of all visitors. It has hung in the same place for nearly three months, and some of the fruit is still in eatable condition.

The tree is not in a favorable situation. It is so near the residence that the ground around it is continually hard-tramped and it is crowded by large olive trees and other growths adjacent, and yet it is full of thrift. Until two years ago it was not irrigated, but the scant rainfall has led to its refreshment artificially.

The success of these dates and others in the same neighborhood of which we shall soon present another engraving, shows well how important it is that more attention should be paid to this fruit. All California date palms are seedlings. The University Experiment Station is now endeavoring to secure the importation of the best Algerian varieties, which have to be secured by buying suckers or offsets from the most famous African trees. We trust the effort will succeed, for it is just as important that we should have the best varieties of dates as of other fruits.

DATE PALM IN FRUIT ON THE GROUNDS OF J. R. WOLFSKILL NEAR WINTERS, YOLO COUNTY, CAL.

ASTRONOMICAL STUDIES.—At a recent meeting of the Regents of the State University the following resolution was adopted: "That so many graduate students as can be furnished accommodations at Mount Hamilton, without expense to the University, not to exceed four for the present, may pursue astronomical studies with the director at the Lick Observatory. Such graduate students must be either candidates for the higher degrees of the University in the ordinary manner or special students admitted with the consent of the president of the University and the director of the observatory. Such candidates for higher degrees shall spend at least one year in their studies at Berkeley."

THE LARGEST ELECTRIC LIGHT in the world has been placed in the light-house at Haustholm, on the west coast of Jutland. This light is said to be of 2,000,000 candle-power, with a range of 26 miles.

MINING AND SCIENTIFIC PRESS.

A. T. DEWEY. W. B. EWER.

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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO
Saturday Morning, Feb. 16, 1889.

TABLE OF CONTENTS.

ILLUSTRATIONS.—An Electric Hoist for Mine Purposes; Continuous Trough Lixiviating Works Constructed by O. Hoffmann, 111. Date Palm in Fruit on the Grounds of J. R. Wolfskill, near Winters, Cal., 113. Iron River Mine, Showing Method of Stoping and Filling, 115.

EDITORIALS. — Trough Lixiviation Works; An Electric Mine Hoist, 111. Passing Events; Electric Street Railways; Elastic Sandstone; Assaying Gold and Silver Ores, 114. Mining in Large Bodies of Soft Ore, 116.

CORRESPONDENCE. — Washington Territory Mines, 112.

MISCELLANEOUS.—Reforming the Ballot; The Government Irrigation Work; Irrigation Districts; Interstate Water Rights, 112. The Nation's Forests; The Date Palm in Fruit, 113.

MECHANICAL PROGRESS.—How Common Circular Saws are Made; A High Compliment; Frictionless Bearings; Improvements in the Manufacture of Steel Spikes; The Cause of Sponginess in Ferro-Silicon and Cinder Iron; English and American Packing; The Great Distributing Center of Iron; Rapid Increase in the Demand for Steel Rails, 116.

SCIENTIFIC PROGRESS.—The Mechanical Feature of the Dust Explosion; The Influence of Sunlight on Trees; Letters and Postage Here and in Europe; Celestial Distances; A Burning Lake in Indiana; Origin and Erosion of the Mississippi River; Telegraph Induction, 116.

GOOD HEALTH.—Petroleum as a Medicine; The Science of Digestion; The Cure for Heart Neuralgia; Yellow Fever Germs; Danger to Life; The Diphtheria Microbe; City and Country Bred for Endurance; The Eye, 117.

USEFUL INFORMATION.—Timber Fraud Cases in the U. S. Supreme Court; Drapery Glass; Improvement in Umbrellas; Locomotive and Other Boilers; Immigration; To Stop a Chimney Fire; To Keep Soot from the Chimney; To Keep the Birds from Fruit; Knew Him Too Well; Pencils for Glass and Metals; Native African M. D.'s; Stoves, 117.

ENGINEERING NOTES.—The English Channel Tunnel; Railways in Asia; The Panama Canal; A Grand Scheme Nipped in the Bud; The Largest Vault, 117.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 118-19.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 122.

Business Announcements.

[NEW THIS ISSUE.]
Shares in a Gold Mine—H. Wiedersheim.
See Advertising Columns.

Passing Events.

A number of new quartz-mills are being built for the coming season. The quartz industry in this State is in a very flourishing condition at present, and is furnishing employment to a great number of men.

Fears of a "dry year" are felt all over the State. There is very little snow in the mountains and the water-courses are low for this time of the year. This will seriously affect the mining interests the coming season. This is not only the case in California, but in Nevada. A general "hanging up" of the river mills on the Carson may result.

The Comstock mines are now doing very well. Reports for the last quarter show that the total number of tons of ore extracted was 46,551, producing bullion valued at $891,898.38. The total product of the Savage, Gould and Curry, Occidental, Hale and Norcross, Alta, Overman and Six-mile Canyon is not included in the above list, which will swell the total to $1,250,000. The bullion product of the lode during the quarter ended Sept. 30, 1888, was $1,175,000.

The change of the electric railroad at Sacramento to a horse-car line and the complaints about that at San Jose, combined with the stoppage of the roads in Los Angeles and San Diego, are serious matters for the promoter of electric transmission on street railways to consider. Some better system than any we have in California is needed.

Electric Street Railways.

Whatever may be the condition of electric street railways in other parts of the Union, the experience with them in California has been, to say the least, unfortunate. Not a single electric road in this State has accomplished the work laid out for it, or been in any way successful from either a mechanical or financial point of view. Where the fault lies we are unable to say, but the fact remains.

The electricians of one system say the fault lies in the other system; others again say the roads were built for real-estate speculation and were never intended to run; and still others maintain that the roads will run all right if they can be made to pay.

Only this week the Sacramento electric road, after having had $6000 spent on it in experimenting, has been given up, and the road will, in future, be operated by horses. They tried the Wharton storage system.

The Los Angeles electric railway, about which there was so much talk, never was a success. The full number of cars were never run and not long since the road was practically given up. The Daft system was used here.

The San Diego electric road, on which $130,000 was spent, has also stopped running, the reason given being that there is not business to warrant it. Still, if we are rightly informed, it never did run as many cars as originally intended. Overhead wires were used, the system being that of Henry.

The San Jose electric road has been running a few cars on the Fisher-Rae system, but has not proven a success, though some $200,000 has been invested, according to the San Jose *Mercury*. Larger dynamos than originally designed have been procured, and many changes made, but the road is still in an experimental stage. The people are so inconvenienced that they demand the removal of the dummies, dynamos, etc., so that horses or other power can be applied and the cars run with more regularity. The unsatisfactory condition of this electric road has been officially considered by the city council and referred to the Street Committee. In San Jose it is considered a complete failure.

We are told, and we see by Eastern newspapers, that in other cities electric roads are running successfully. People from these cities, however, who have examined some of these roads, say they are not successful. When examining one road which was not doing what was expected, they were told of successful ones in other cities, and when they saw them the same story was told.

We see in the Eastern technical journals advertisements and descriptions of the roads tried here, from which it would seem that they were all that was claimed for them. Yet we know to the contrary to our sorrow. So far all tried here have been apparently experimental, for constant changes have been made.

Elsewhere we are credited with prejudice on this subject on account of the wide use of cable roads in California. But there is no prejudice aside from that in favor of a system that works well as against one which does not work at all. We speak of what we know. We see cable roads running regularly without breakdown and accommodating the public early and late; we see electric roads running intermittently and discommoding the public, and finally stopping altogether. Small sections of electric roads have been experimented with in Oakland and in San Francisco, but have not created a sufficiently favorable opinion to cause the investment of money. If electric roads can be built and operated cheaper and better than cables, then we would drop cables for electricity, except on our hills, but thus far the experience of California, with the systems tried here, has not been favorable to electric transmission. It is claimed that other systems not yet put at work here are satisfactory elsewhere. When we see a good electric road in California the street-railroad men and the public will have more faith than at present. All the money put into them so far has been practically lost.

Elastic Sandstone.

An item headed a "Geological Curiosity" is going the rounds of the press just now. A Washington *Star* reporter found the curiosity lying on the desk of the Acting Chief Clerk of the War Department. He says: "It weighed about a pound, and was, perhaps, 13 inches in length, and 2½ in width, and one-third of an inch thick. There was no doubt about it being a genuine stone, but it nevertheless possessed the flexibility of a piece of india-rubber. When taken in the hand and shaken in the direction of its flat surfaces, it would bend back and forth with a dull, muffled sound. The movement was more of a laxity in the adhesion, apparently, than an elasticity. When held horizontally by one end, the other would drop and remain in that position. With the two ends supported on rests, the free center could be pressed half an inch below the middle line. With one end held firmly on the desk, the other could be bent upward over an inch. The movement was not confined to the one direction—in the plane of the flat surfaces—but the entire stone seemed to be constructed on the principle of a universal joint, with a movement perceptible in all directions under pressure."

This is what is known as Itacolumite, or elastic sandstone. We have a fine piece of the substance at this office, where it can be examined by any one interested. The piece in question was obtained by Mr. A. T. Dewey at the Centennial Exposition. The label accompanying it says that the "Itacolumite is the reputed matrix of the diamond." It is very much as described above and is covered with micaceous specks or particles which shine brightly with a golden hue in the sun. The piece in our possession is about six inches long, an inch wide and a quarter inch thick. It is very flexible in all directions.

It is stated that a whole mountain of it exists in Southern Nevada, a short distance east of Death valley. It is found in California, Georgia and other localities in the United States. Itacolumite is nearly always to be found in regions producing the diamond.

Assaying Gold and Silver Ores.

"Assaying, Part 1, Gold and Silver Ores," by C. H. Aaron, has reached a second edition. The new volume contains 124 pages, which is about 24 pages more than its predecessor. Among the new matter will be found additional examples of dressing ore assays, an extension of the subject of weighing by oscillation, two more original methods of determining the value of specimens, never before published in any work, and shorter than others, tables of fractional assay tons in both grammes and grains; and last, but not least, a simple assay balance which any one can make in an hour, and which is really capable of doing good work.

The introduction of so much new matter with so small an increase in the number of pages is in part due to the omission of the original preface, but mainly to the well-known terse simplicity of the author's style, to which must also be ascribed the fact that his works are uniformly successful in a pecuniary sense. And yet Mr. Aaron is one of those who write neither for fame nor for gain, but simply for love of the subject; such writers are always honest and earnest, and, if the subject be useful, are generally successful. There has always been a good demand for Mr. Aaron's works. They are written in plain, clear style, free from puzzling technicalities, and, while useful to the skilled mining engineer and metallurgist, are equally so to the uneducated miner or millman.

We can conscientiously recommend this little volume as the best practical handbook for practical men. It is sold by Dewey & Co. Price $1.

THE DEBRIS COMMISSION.—The Government Debris Commission has commenced an official investigation of the localities affected. The members of the Commission were shown around Marysville this week by officers of the Anti-Debris Association. They have now gone to Oroville, and from there will go to the Cherokee hydraulic mine, one of the largest on the coast. It will take several months more to finish the gathering of data, and the time for filing their report is very uncertain.

THE Fish Commissioners are preparing to protect the perch in Tulare lake; also to stock it with black bass.

An Electric Mine Hoist.

(*Continued from page 111.*)

The flexibility is obtained by strong spiral springs placed around a vertical bolt, which is attached to a bracket secured to the base frame and passes through an eye bolt which is screwed into the outside pole piece of the motor, one spring being above and the other below the eye bolt.

Sudden shocks due to changes in direction, or intensity of force required, are taken up by a slight oscillation of the motor against the springs; the armature pinions and intermediate gear teeth being thus relieved of strain, and wear and noise of teeth are thus kept at a minimum.

This arrangement, which has given such satisfaction at Aspen, was first introduced by Mr. Sprague in attaching motors to axles of street-cars. Direct attachment of motors to axles was tried in Europe and given up as a failure, and it was left for Mr. Sprague's skill to discover the cause of the failure and apply an excellent remedy.

The reduction of speed from the armature shaft to the intermediate shaft is about one to six, and the reduction from this to drum shaft about the same. As the motor is of ten-horse power capacity, it is readily seen that such reduction permits of a great lifting effort. The direction of rotation is reversible by a sudden movement of the switch-handle.

The switch, occupying a vertical position, is incased in a box, the switch-handle being attached to a shaft which projects through a hole in the top. The body of the switch is a non-conducting cylinder having on its surface metallic contact plates, which are connected in various combinations with the coils of the compound-wound field magnets. The combination is changed by a simple motion of the switch-handle, and in this way the speed may be varied independently of the load.

The control of the drum is effected by throwing the friction-wheels in and out of gear, by braking the large friction-wheel against a shoe-brake placed beneath it, and operated by the same lever which controls the eccentric, and by variation of the motor activity as above described. Thus the most delicate control in handling the heaviest weights is secured.

The Sprague Co. has a department devoted to mining and milling work, with Mr. C. W. Jenks, an experienced miner, having supervision over it. This department has successfully equipped several large plants, and is at work upon others.

THE PARKE & LACY CO.—The Parke & Lacy Co. filed articles of incorporation last week to carry on a general machinery business, with a capital stock of $400,000, which has been subscribed as follows: L. O. Parke, $199,000; B. T. Lacy, $199,000; J. O. Harron, $1000; A. F. Price, $500; and M. S. Norton, $500. The old firm of Parke & Lacy has dissolved and the company has taken its place. This corporation includes the San Francisco and Australian houses. In Portland, the business of Oregon and Washington is carried on by the "Parke & Lacy Machinery Co." In Salt Lake, Utah, and Butte, M. T., practically the same firm conducts business under the title of the "Utah & Montana Machinery Co." The business has largely increased of late years, necessitating the formation of these corporations.

FOUNDRY NOTES.—The Morley M. Co., owning the Wetzlar claim in Hunt's gulch, three miles south of Jackson, Amador county, has let a contract to the Risdon Iron Works for the erection of a complete 20-stamp mill, to be completed on or before the 15th day of June, 1889. The mill is to be furnished with four Challenge ore-feeders, eight Frue concentrators, and operated by Pelton wheels. The contract also includes an air-compressor. The price is $41,624, not including masonry work.

IT has been found that the fire in the Calumet and Hecla copper mine extended downward 1300 feet from the starting point, making the total depth of the burned portion 2100 feet. The experiment of letting the fire in the mine burn out has proved that the forcing down of a carbonic gas saved the mine below where the fires started on former occasions.

THE proposed Nevada amendment to have a State lottery has been voted down by the people.

Mining in Large Bodies of Soft Ore.

The system of mining in use at the Iron River mine, Menominee region, Michigan, is well adapted to ores hard enough to stand over the width of the vein. In the accompanying cuts, Fig. 1 is a section across a stope and shows the method of work. The system was described by R. P. Rothwell of New York in a paper before the American Institute of Mining Engineers. The ore is taken down in an overhand stope running the width of the vein for any desirable length, and for a hight of say 12 feet. A timber-drift is then built along the floor of the stope, and the balance of the stope is packed with waste sent down from the surface through winzes previously sunk or upraised at intervals of about 50 feet in the length of the stope. A "mill" or chute is carried up every 50 feet along the level to run the ore down, and is made about four feet square inside, being built of round, rough, hardwood sticks.

The spaces between the sticks when they do not fit closely are filled with pieces of plank, and the inside of the "mill" is lined with hardwood planks spiked on to the side timbers. These planks are easily replaced when worn.

The packing is leveled over as close to the backs of the stope as is convenient for working, and is planked over, to keep the ore from mixing with the filling.

The "mill" is carried up before the filling as high as this is to go, and when the filling is leveled off a few large sticks are laid across the mill, leaving intervals large enough to throw the ore down, but narrow enough to prevent the falling in of a man or a block of ore large enough to choke up the outlet from the mill.

This method of work is extremely satisfactory where the ore is strong enough to stand without timbering across the vein. It requires no timber except the level and the mills, and the use of some plank, and it permits of the extraction of all the ore. The cost at the Iron River mine for the filling is given at 13 cents per ton of ore extracted; but the conditions were extremely favorable, and the filling did not replace all the ore extracted, so that the average cost will probably much exceed this figure.

Mr. Rothwell believes it will be found very much more simple, economical and advantageous in every way to work the vein out from the top down, instead of from the bottom up. The accompanying sketches (Figs. 2, 3 and 4) show the suggested method of work so fully that but few words will be necessary to describe it. Instead of driving the main level and crosscuts every 50 feet in the footwall, as in the Chapin method, I would drive the main levels in the vein, *A A A*, Figs. 2 and 3. (On the footwall would generally be the most convenient, though it is not essential.) This is possibly because the ground is undisturbed, and a level the width of an eight-foot set can be kept open, no matter how soft the ore may be. This will do away with the deadwork.

At intervals of say 100 feet (which, like other details of the system, will be determined by the hardness of the ore and other local considerations) the vein will be crosscut *B B B*, and stoped out the width of one set up from one level to the next above, a distance which will also be regulated by the nature of the ore, but may be counted at from 10 to 12 sets in hight.

However soft the ground may be, it will be possible, even with comparatively light timber, to hold a stope only eight or nine feet in width running across the vein in the solid well-drained ore. This will take the place of winzes and cross drifts at much less cost, and will serve as a pocket or chute to hold the ore, which can be drawn from it into the cars below, or the mill or chute through which the ore is sent down can be built, say three feet six inches by four feet on the clear section of round hardwood sticks, lined with hardwood plank, as in the Iron river mine, on the footwall, as shown in the drawings.

By a little care in packing around it this can probably be held in the packing, as a waste "mill" or chute, or, if it be found desirable, the "mill" can be cut in the footwall, as indicated by the dotted lines in the drawing.

When the cross-stope reaches the upper worked-out ground, longitudinal stopes, *C C C*, of one or two sets in hight and one set in width are driven to half the distance between the cross-stopes, or, as in the drawing, six sets, leaving intervals or pillars between them of two sets in width or more if the ground permit.

These longitudinal stopes are timbered lightly, having to stand but a very short time, and being in the solid undisturbed ore with the filling from above resting on each side of these on solid ore.

When the mid-distance between the cross-stopes is reached the backsloping commences by taking out the ore on each side, *E E E*, of the *C C C* stope to the width of a set, or half a pillar left between the longitudinal stopes *C C C* supporting the "gob" roof while doing so, and laying lagging poles or slats across the floor of the stope as the work proceeds. Any waste rock or material available or desirable may be thrown back on the packing, and when a space, *E E E*, the area of one or two sets is worked out on each side of the last sets of the longitudinal stope, *C*, the temporary timbering is drawn; the "gob" roof with the lagging previously laid under it is allowed to drop on the bottom of the stope *C C C*, *E E E* lagged to receive it. Light poles, or even brushwood, will serve for thus keeping the ore from mixing with the waste.

It will probably be found possible, as well as advantageous in many cases, to drive these longitudinal stopes *C C C* two sets high and draw back the upper one a little in advance of the lower, and as they can be driven out at any point in the cross-stope *B B*, as shown in Fig. 2, a whole horizontal slice or section of the ore body, no matter what its thickness, can be opened out, say two sets in hight at the same time.

The advantages claimed for this system of mining are: First, there is no deadwork in it; all the work is simply stoping. Second, all the levels and stopes that have to be timbered are in solid, undisturbed ore, and being only one "set" in width, are easily held and require but light timber, while much of this is drawn and saved in letting the roof down. When the stope comes up to the filling this has only to be supported over one set of timber, while it rests on the solid ore on each side of this. Third, the packing follows the ore down, and as long as this occurs the cave on the surface can be constantly filled from "borrow-pits" much cheaper than by sending the filling below. If finally found desirable, the filling can be sent down, as in other cases, through "mills," etc. Fourth, this system renders it possible to obtain practically all the ore in the vein, and to get it free from mixture with waste. Fifth, disastrous caves are impossible.

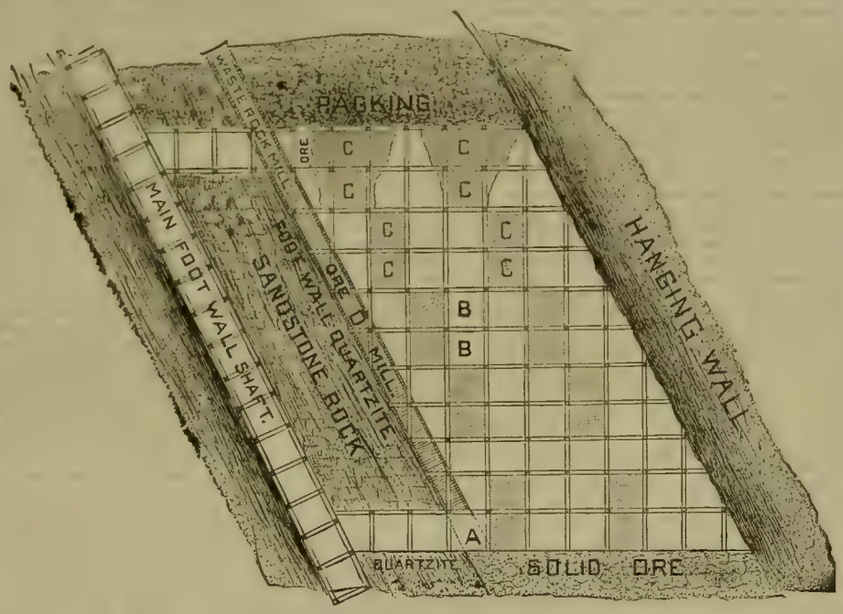

Fig. 3.—VERTICAL SECTION ACROSS ORE-BODY.

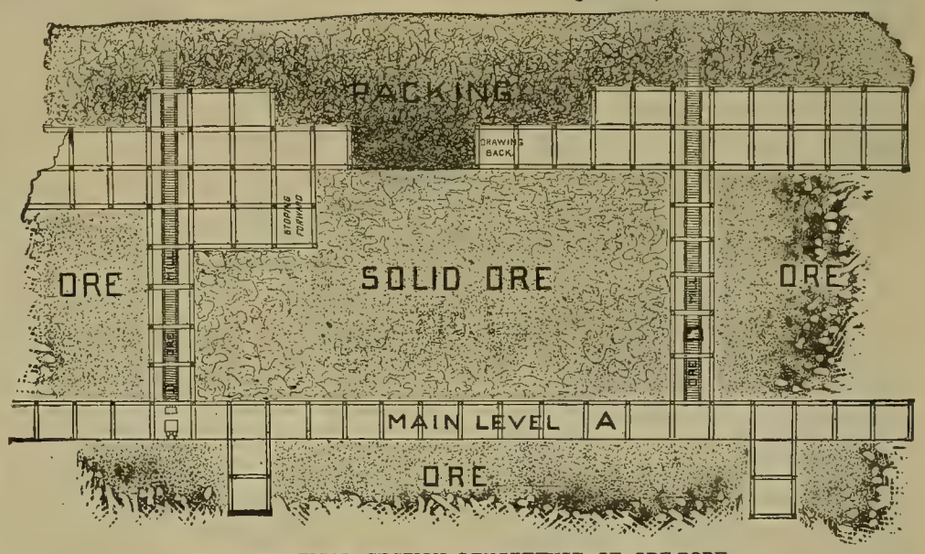

Fig. 2.—VERTICAL SECTION LENGTHWISE OF ORE-BODY.

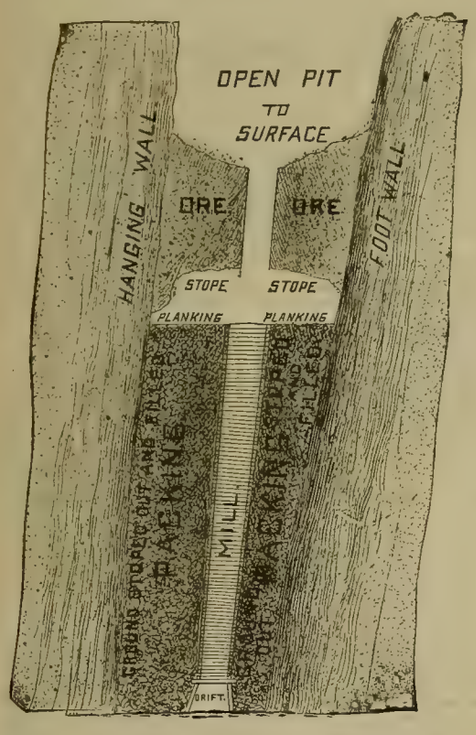

Fig. 1.—IRON RIVER MINE, SHOWING METHOD OF STOPING AND FILLING.

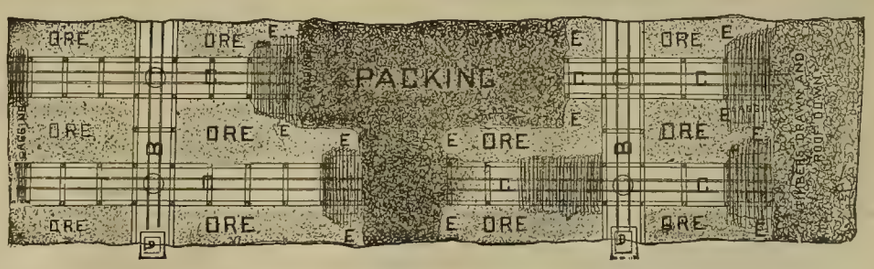

Fig. 4.—HORIZONTAL SECTION THROUGH WORKING STOPE.

MECHANICAL PROGRESS.

How Common Circular Saws Are Made.

Ordinary circular saws are of all sizes, from six inches to six feet in diameter. The plates from which they are shaped come from steel-mills in circular form, almost round, if not perfectly so. The first thing to be done is to see that each plate is made a perfect circle. A hole is then cut in the center, and the teeth are marked around the rim. The plate is then taken to a machine on which the teeth are to be cut. It is placed upon a pin at such a distance from the machine that the edge becomes beneath the die, and the operation of teeth-cutting begins. The steel is cut cold, each tooth being made by one blow. All sizes and descriptions of dies are necessary, as the style of saw and saw-teeth are many. After the teeth have been cut the next operation is that of tempering, which is the most difficult and important process in the making of a saw. Several saws are placed in the furnace at a time, and allowed to remain until they have reached the proper temperature, a light cherry red, when the plates must be taken from the oven and plunged into a vat of whale oil, heated by pieces of red-hot iron or steel, which are placed in the vat one after another until its contents are properly heated. As each piece is dropped in, a brilliant flame leaps from the surface of the oil and continues to burn until extinguished by stirring the liquid with a long iron rod. The large, glowing plates are then cautiously slid into the vat. Leaving the tempering department, the saw goes back to the main shop to be hammered and straightened ready for grinding. This work is done by hand. After the plate, which has been more or less warped in the tempering process, has been made perfectly straight again, it is placed in the grinding machine, which is a carriage between two wheels, which turn it, and at the same time press its sides against a rapidly revolving grindstone. The carriage is fixed in automatic bearings, and is moved back and forth at the will of the operator. It usually takes about two hours to grind a large five-foot circular saw, though the time varies according to the kind of saw that is being made. The next operation is that of polishing, which is done with emery-wheels. To polish a large circular saw the plate is secured to a large wheel or flange, which turns, carrying the saw with it, the workman meanwhile pressing an emery ball (attached to a handle) against the side.

The saw must then be "rounded," that is, care must be taken to prevent one tooth projecting farther than the others. For this purpose the saw is placed in a bearing and made to turn slowly. It is then gradually brought in contact with an emery-wheel, the latter turning very swiftly, until the edge of every tooth touches the wheel. The saw is next sharpened and submitted to further hammering for the purpose of "truing" and straightening, and is then cased ready for shipment.

One important part of the sawmaker's business is the renovation of old saws injured in fires. It is straightened up, tempered over again, and provided with a new set of teeth.

This article has dealt only with common, circular saws, the teeth of which are not separate from the plate. Other saws, however, supplied with inserted teeth of various kinds, are made in large numbers. These are all patent saws, and can be supplied with new sets of false teeth as often as necessary.

A HIGH COMPLIMENT.—The "Encyclopedia Britannica" says, in an allusion to a Pittsburg iron firm, that it is more modern in every way than any of the iron-mills in Europe. Considerable space is given to a description of plate-rolling and also cold-shaft rolling at the works of the firm. The article then continues: "The marked feature in most American iron works is the general handy, compact and efficient nature of the machinery of all kinds and the uses of various physical exertion-saving contrivances and arrangements for ventilation and cooling of workshops, etc., many of which appliances are not so frequently to be met with on the eastern side of the Atlantic, more especially in England. The general arrangement and planning out of the works, moreover, is usually far superior to that of the older British works, which have gradually grown to their present dimensions, and consequently have not been systematically laid out as a whole. In consequence of attention to such details as these, the output of finished material from a given amount of plant is frequently considerably greater in America than would be attained in other countries, while the labor required is not proportionately increased; thus the largest makes of Bessemer metal from a given converter ever registered have been obtained in American works, so in other instances."

FRICTIONLESS BEARINGS.—An ingenious improvement in the manufacture of frictionless bearings has been recently invented, says *Iron* of London, and is now being introduced. These bearings are made of babbitt metal, or some other similar alloy, and they are cast in solid metal chills, which are worked up with the greatest accuracy, so as to produce externally of the bearing of the exact outline of the interior of the plummer block, while the interior of the bearing corresponds mathematically with the journal which it is intended to support. The chills are, moreover, so designed that the bearings would form a complete circle but for the intervention of a dividing plate, which separates the metal, and forms two castings, each complete in itself, and together forming a perfect circle. The cast-iron plummer blocks are also constructed as to present uniform interiors for the reception of the bearings. The chief merit of this system consists in the absence of the friction caused in all gun-metal bearings, which have been bored or machined, however carefully, in consequence of the exposure of the rough edges of the minute particles which form the surface of the bearing, and which catch against microscopic projections on the surface of the journal. In Mr. Garrett's bearings no boring or machining takes place, the metal being cast in chills. The bearing surface is consequently composed of unbroken molecules of metal, and since these molecules do not possess individual strength to resist the friction of the journal, they are flattened to a perfect polish, and a great economy of power and lubricant results. It has long been usual to bush metal bearings by pouring Babbitt's metal in a molten condition into the cavity existing between a journal and its bearing, the latter being purposely bored out larger than the journal for this purpose; but it has remained for Mr. Garrett to produce accurately finished and interchangeable bearings of this material, such as can be readily replaced by others of mathematical identity when replacement becomes necessary.

IMPROVEMENT IN THE MANUFACTURE OF STEEL SPIKES.—A series of experiments were recently tried at the Etna Iron Works, in Pittsburg, in the manufacture of steel spikes. The object was to make a finished article by rolling the bar so that its width would be the length of the spike and in such a shape that the spikes may be cut from it with shears, pretty much as a cut nail is made except that the head is formed in the rolling process. The first test was made by running through some steel rails that had been slowly heated for 2½ hours. The result was fairly successful, and it was thought that a few changes in the rolls would make the operation entirely satisfactory. Should the scheme be successful, it will work a revolution in the cost and manner of making railroad spikes.

THE CAUSE OF SPONGINESS IN FERRO-SILICON AND CINDER IRON.—There are differences of opinion among ironmasters as to the cause of the sponginess in ferro-silicon and cinder iron. There are some among scientific experts who think this phenomenon is due to contraction in cooling, and refer for illustrations to a similar phenomenon observed in the earth's crust, which is universally attributed to contraction. The majority of experts, however, dissent from this explanation, holding that it cannot be due to mere contraction of the metal, because there is a distinct bubbling up of the molten metal, which sometimes shoots up to a hight of several feet. Hence there must be some internal development of gas which produces the disturbance and consequent sponginess.

ENGLISH AND AMERICAN PACKING.—A correspondent of London *Engineering* refers to the rough usage of machinery on shipboard, and to the fact that the admirable manner in which American machinery is packed gives American manufacturers an advantage. He cites instances in which heavy castings from English houses are broken, and says: "Quite fragile castings, such as stoves (from American manufacturers), are delivered in perfect order, owing to the admirable packing." The manner in which machinery is packed has a good deal to do with the shape in which it gets to its destination, and the shape in which it gets to its destination has a good deal to do with future orders.

THE GREAT DISTRIBUTING CENTER OF IRON. Chicago is the largest distributing market for the various grades of iron and steel in the country, and it is here that some of the largest rolling-mills are located. Of these, there are seven which give employment to 6749 workmen and have an aggregate capital amounting to $11,000,000. Taking all the manufactures of iron and steel in all their various forms and they number 255, with an aggregate capital of $23,915,000, give employment to 21,219 workmen, and have turned out a product the past year valued at $54,945,000. The amount of wages for 1888 foots up $14 000,000, which is something less than during 1887.

RAPID INCREASE IN THE DEMAND FOR STEEL RAILS.—An English paper gives the following statistics in regard to the increased demand for steel rails in Japan, the Argentine Republic and Mexico. The comparison is between the first 11 months of 1887 and those of 1888: Japan, from $362,575 to $899,695; the Argentine Republic, from $826,425 to $2,865,610; in Mexico, from $9774 to $310,405. In the demand for railroad materials of all sorts, the Argentine takes the lead, the value of such demand having increased from $1.478,965 for the first 11 months of 1887 to $3,018,396 during the corresponding period of 1888.

THE United States produced 7832 net tons of spiegeleisen and ferro-manganese in 1875, and 47,598 tons in 1887. The year of largest production was 1886, when 47,982 net tons were produced.

SCIENTIFIC PROGRESS.

The Mechanical Feature of the Dust Explosion.

A few years ago, says the *Monitor*, such a story as recently came from Chicago regarding the explosion at the oatmeal factory, would have been received with general incredulity. That a force, comparable in its efforts with dynamite, could have been developed through the burning of the dust so familiar in the atmosphere of flour-mills, would not have been believed. Subsequent investigation seems to show that dynamite *was* at the bottom of *that* mischief, but this will not affect the argument.

The subsequent destruction of a candy factory and of one of the great flouring-mills at Minneapolis, as well as numerous lesser accidents, have familarized the public mind with the possibility of such catastrophes. But there are some who are still unable or unwilling to be convinced that flour dust may be as fatal as gunpowder. The difficulty is this: If fire comes in contact with powder, dynamite or any other ordinary explosive, the result is certain and instantaneous. An atmosphere of dust, on the contrary, may for years be in contact with a flame. That without any apparent change in its character, it should suddenly explode after so long demonstrating its harmless qualities, seems incredible.

The enigma would be less perplexing if the mechanical properties of matter were more generally understood. The latest advances in scientific investigation prove more and more conclusively that mechanical modifications are at the bottom of all the varied forms and properties of matter; that we are, in fact, dealing with a substance whose essence is the same, whether it be gold or iron or earth or water, or any other material with which we are acquainted—that it is the building up of the atoms, their mechanical structure, which determines to which of the great classes of metals or minerals the substance shall belong. The same atoms may be gunpowder, or they may be clay; they may be water or air or lead, according to their mechanical arrangement. Chemistry in its last analysis would seem to be nothing more than the laws and principles of the mechanical arrangement of atomic quantities.

When this truth is recognized it is easier to understand how a dust-laden atmosphere may suddenly develop the most dangerous properties after years of apparent harmlessness. That dust will burn in the presence of flame and air, and that the product will be a gas much greater in volume, all will admit who have ever tossed a handful of flour dust on the fire. But the conditions under which a dust-laden atmosphere will burn are so peculiar that, experimentally, they rarely occur. Every boy who has kindled a bonfire knows how much his success will depend upon the arrangement of the sticks and the strength of the fire already started. Until sufficient volume of flame is secured each stick must be carefully adjusted to support the slow combustion of its fellows. But once under full headway, he may toss his sticks as he pleases, and they are instantly licked in the embrace of the roaring fire.

Somewhat after the same fashion we may regard the flour dust. Until the distribution of particles has reached a point where they will sustain each other in creating a volume of flame, no explosion will occur. The individual particles in contact with a lamp or candle may be insensibly consumed, while their fellows float harmlessly around them. But once the precise conditions are present, the flame, with ever-increasing energy, shoots through the mass and the explosion follows. Fortunately, the conditions favorable to such a disaster are so rare that skepticism still prevails.

The Influence of Sunlight on Trees.

In the latest report of the head of the Forestry Department of the United States, reference is made to the effect of light on the growth of various trees. It is well known, says Prof. Ferrow, that light is necessary for the development of chlorophyll, and, therefore, for the life of all green plants, and especially for that of trees. The heat alone, which accompanies the light, is not sufficient, although the relative influence of the light and the heat on the growth is still an open question, as well as the relative requirements in light of different species of trees. In the case of forest weeds, which in forestry serve as an indication of the amount of shade which the trees exert, and with their capacity of impeding evaporation, some require full sunlight for their development, others are averse to a high degree of light. To this must be due the change in the plants of a district when its forests are removed. Then the amount of shade needed is modified by site. Where the sunlight is strong, in higher altitudes, drier climates, or where the growing season is longer, or there are more sunny days, some species will endure more shade. The flora of high altitudes in general requires light.

Trees nearly always develop best, in other words, make most wood, in the full enjoyment of light, but their capacity of developing under shade varies greatly. The yew will thrive in the densest shade, while a few years overtopping kills the larch; the beech will grow with considerable energy under partial shade, where the oak would only just keep alive, and the birch would die. When planted in moist places all species are less sensitive to the withdrawal of light. In the open, maples, elms, sycamores, and others grow well and make good shade trees; in a dense forest they thin out and have but scanty foliage. Conifers, such as spruces and firs, which preserve the foliage of several years, have, perhaps, the greatest capacity of growing under shade and preserving their foliage in spite of the withdrawal of light.

In America sufficient data to group the forest trees according to the amount of light required by them have not yet been collected, but rules based on experience have been formed in Germany, where the behavior of trees under different conditions of light has been carefully studied. It has been found, for instance, that on the same branch those leaves which are developed under the full influence of sunlight are not only larger and often tougher in texture, and thicker, but that they have a larger number of stomata or breathing pores than those less exposed to light. The whole subject is one of the utmost importance in forestry, and observations and experiments are to be carried out in regard to it in the United States.—*Builder and Woodworker.*

LETTERS AND POSTAGE HERE AND IN EUROPE. In 1792 the postage for a single letter in this country was 25 cents for a distance of more than 450 miles. Now the rate is two cents for 3000 miles or less. The people now demand one cent postage. The deficiency in the post-office revenues for 1888 is less than half of what it was in 1885, showing wonderful increase in business. We have in this country 57,376 postoffices. Germany has 18,688, Great Britain 17,587, and France 7296. Russia, with more than twice our territory and nearly twice our population, has less than a tenth as many postoffices. Our mail routes cover 403,976 miles; those of Germany, 85,885; those of Great Britain, 41,275; and those of France, 65,334. The American mails carried last year 3,576,100,000 pieces, letters, papers and packages; the British carried 2,279,532,000; the German, 1,816,066,000; the French, 1,463,249,000. The average number of pieces carried for every inhabitant of the United States was 71; of Great Britain, 61; of Germany, 41; of France, 37. The postal expenditure last year in America was $55,795,358; in Germany, $44,348,949; in Great Britain, $28,876,235; in France, $28,327,666. In all these figures the telegraph service of foreign nations has been omitted. Our letter and postal card rates are the same as those of Great Britain, and cheaper than those of Germany and France.

CELESTIAL DISTANCES.—The planet Venus is about 26,000,000 miles away; or, at 60 miles an hour, without stopping, she is distant from the earth a journey not of three weeks, or six months, but of some 50 years. On an imaginary railway, such a journey would be possible, for a great many persons live longer than 50 years. But in real life no one ever has traveled, and no one ever will travel, anything like so far. No human being ever has traveled 5,000,000 miles, and it is safe to say that no one ever will. To complete this measure of journeying would require an average of 100,000 miles a year for 50 years. And yet, with the exception of our moon, Venus is the nearest of all the innumerable hosts of stars to the earth. Who can appreciate the amazing mystery of space?

A BURNING LAKE IN INDIANA.—According to a recent press dispatch from Vincennes, Ind., a small lake, one mile east of that village, is blazing fiercely and emitting a sulphuric odor. Those living near the burning lake are preparing to leave the place. The lake is a pretty body of water about half a mile in diameter and surrounded by a dense forest. It has always been a great hunting and fishing ground. Two hunters, who were after wild geese, were the first to discover the phenomenon. The flames rise about six inches from the surface of the water and burn with a pronounced flicker and a purplish alcoholic color. There is no smoke. Scientists who have visited the place, it is reported, cannot explain the mystery.

ORIGIN AND EROSION OF THE MISSISSIPPI RIVER.—As a possible theory of the origin of the Mississippi, Messrs. Robert Bates and John A. Kayes suggest that its erosion was accomplished by means of a mighty cataract which began far down the river near its original mouth, and by gradual retrogression dug out the valley-like gorge which is so marked a feature in the upper part of its course, and left the high bluff walls on either hand. This view makes St. Anthony's Falls the ever decreasing and receding remnants of the once most stupendous cataract the world ever saw, having a perpendicular descent of perhaps 600 feet. The time required to cut the entire channel is placed at 400,000 years.

TELEGRAPHIC INDUCTION.—The earth currents are at times accountable for the unpleasant noises heard in the telephone but usually ascribed to induction. Being alternating currents, or at any rate not constant in direction, and of slight duration and intensity, an exceedingly delicate ballistic magnetometer is desired for their measurement. More definite knowledge on this subject, says *Modern Light and Heat*, is likely to lead to the perfection, at least for war purposes, of telegraphing under certain conditions between any two points not far distant on land or sea without connecting wires.

GOOD HEALTH.

Petroleum as a Medicine.

It is a matter of surprise that the medical profession has not given more investigation and publicity to the virtues of native petroleum as a remedial agent in many diseases. Common coal oil has cured many acute cases of inflammatory rheumatism, just by rubbing it on the parts affected. Incipient consumption has been cured by taking the *native* petroleum internally. The writer knows of one case where the disease was so far advanced that the voice had lost power to speak above a whisper, and his voice was fully recovered, and his body was restored from its emaciation. The oil he used was pure native West Virginia natural oil of 29 gravity—a lubricating grade. He used about one gallon in doses of a teaspoonful, and was restored to robust health. It has also proved beneficial in dyspepsia. The oil-well borers are constant tasters of crude oil, and say it gives them perfect digestion and operates as a mild laxative.

Care must be exercised in procuring the right quality. Pure native petroleum of a gravity of 29 to 30° is the proper kind to use, and it cannot be obtained short of West Virginia. All the oils in market called "West Virginia" are manufactured in the still and are unfit for internal use. California oil contains asphaltum, and is unfit to use.

Dr. Blache states in the *Bulletin de Therapeutique*, that a refiner of petroleum, having been prohibited by a prefet the distribution of petroleum in medicinal doses, the fact led to an inquiry being made as to its alleged utility in affections of the chest. The native petroleum from Pennsylvania and Virginia was that experimented upon first. It is a very safe substance, for even large quantities, when drank by error; and in such cases has caused only a little nausea. In chronic bronchitis, with abundant expectoration, it rapidly diminishes the amount of the secretion and the paroxysms of coughing, and in simple bronchitis rapid amelioration has been obtained. Its employment in phthisis has been continued for too short a time as yet to allow of any opinion being delivered as to its efficacy, beyond that it diminishes the expectoration, which also loses its purulent character. The petroleum is popularly taken in doses of a teaspoonful before each meal, and after the first day any nausea which it may excite in some persons, disappears. M. Gardy, a Paris druggist, has prepared capsules, each containing 25 centigrammes of petroleum, or, as he calls it, *huile de Gabion*, from the name of an ancient petroleum spring, and this Dr. Blache considers as the most favorable mode of administering it.

THE SCIENCE OF DIGESTION is just now being discussed in the English papers in a light quite different from the generally accepted theories in this country, as may be seen from the following which we clip from London *Iron:* The fallacy of "plain living" has long been exploded, and it has been proven that the stomach never performs its duty so effectually as when called upon to act upon a variety of food, provided, of course, that the food is well cooked. The popular opinion now is that a dinner consisting of three or four varieties of solid food is more easily digested than the meal which is confined to one sort only. The old fashioned notion of a single joint and a simply-made pudding is pronounced to be a fruitful source of indigestion. On this subject Dr. Geo. H. Taylor says in the *Sanitary News:* "Ready digested and easily digested foods are the abomination of dietetics; they prevent normal incitation of the digestive organs, necessary for normal secretions; they encourage a false notion that nutrition can be assured without reference to expenditure or to providing any use for nutritive material, and thus are liable to cause unnatural, irregular, unmanageable increase of the unstable ingredients of the organism, which react injuriously upon the digestive secretions, especially those of the liver. The prevalent recourse to these presumably enforced methods of nutrition are, in short, a violent and abnormal reaction against the former prevalent reign of physic, depletents and so-called alteratives. These old methods actually provide modes of disposing of unused nutritive supplies, although they be morbid modes."

THE CURE FOR HEART NEURALGIA.—Angina pectoris (agony of the chest) carries off many people, one of whom, according to the newspapers, was the novelist, the Rev. E. P. Roe, who expired in one day because of its crushing anguish. Major-General George B. McClellan, according to the published reports of that time, likewise succumbed after 24 hours of uncontrollable pain. Just how these patients were treated I am unable to say, but Dr. Richardson of London, long before General McClellan's death, had received a prize of 25,000 francs from the Academy of Medicine in Paris for having discovered an almost infallible remedy for angina pectoris by the administration, in small doses of 1 100 to 1-25 of a grain, of nitro-glycerine! This discovery entitles Dr. Richardson to the never-ending gratitude of every suffering man, woman or child afflicted with angina pectoris. I know a number of persons who always carry tablets of nitro-glycerine with them, and I am equally certain that all these people, by the use of nitro-glycerine, are living in comparative comfort, who would otherwise have fallen under the insupportable torture of that form of heart neuralgia, the most dreadful of all pains.—*N. Y. Graphic.*

YELLOW-FEVER GERMS.—In our last issue mention was made of the character and appearance of the yellow-fever germs. Since then we have learned that Prof. H. J. Ditmer of the Ohio State University has succeeded in photographing the germs as found in the human tissue. His description of them is much the same as given in our last issue. We quote from the N. Y. *Sun* as follows: The bacilli present themselves in four forms: The first is a plain, dark, round mass; the second, an oval, with a dark point at each extremity; the third an oblong disk, with dark points, as in the second; and the fourth, two dark points united by a film and strikingly resembling a dumb-bell. The professor says: "Dr. Sternberg of Johns Hopkins University for a number of years has made exhaustive search for yellow-fever germs, but without success, in the tissues. During the last epidemic he made several post-mortem examinations at Decatur, Ala. Liver and kidney tissue of two persons, at least, were sent by him to Dr. Reeves for the purpose of mounting for microscopical purposes. I have several negatives, each of which is good. Some show the bacteria singly, others in masses, with the capillaries distended with them."

DANGER TO LIFE.—If there be any possible danger to life and property that cannot be overcome by man's ingenuity, it has yet to show itself. The deadly elevator has at last been rendered innocuous by means of an air cushion. If it breaks loose at the tenth story, or the fifth, it is received on this cushion so safely that no harm can be done. The *Scientific American* tells of an experiment where an elevator, weighing 2300 pounds, equipped with plate-glass mirrors and loaded with baskets of eggs and goblets, was cut loose and allowed to shoot down 80 feet. The air-cushion received the elevator with so much ease that not a drop of water was spilled or an egg broken. The pressure at the point of concussion was 60,000 pounds.

THE DIPHTHERIA MICROBE.—The *Figaro* says the professors connected with the Pasteur institute have succeeded in identifying the generative microbe in diphtheria. The discovery in a preventive form of a vaccine virus is expected.

CITY AND COUNTY BRED FOR ENDURANCE.—It is stated that during our civil war city-bred men stood long marches better, were subject to less disorders, and recovered from gun-shot wounds more readily than country-bred men.

THE EYE.—It is said that a fatigued eye recovers last the perception of the color by which the fatigue has been induced, and first recovers the sensitiveness of the complementary color.

USEFUL INFORMATION.

TIMBER FRAUDS CASES IN THE UNITED STATES SUPREME COURT.—Washington dispatches state that on the 4th instant the Supreme Court set aside the order denying the motion to advance the cases of the United States against Geo. H. Perrin, M. F Riley and John D. Hall, and assigned the cases for hearing the third Monday in March. These cases were appealed from the Circuit Court for the District of California on a certificate of that court. The reasons urged by the Attorney-General for an advancement are: 1st, That in certain localities of the United States a large number of cases have arisen wherein fraudulent conspiracies were entered into, in which parties concerned are alleged to have conspired to obtain contracts for the surveying of public lands; that without making any actual survey of lands according to law, they made up false, fictitious and fraudulent pay vouchers and received money thereon from the United States. 2d—Prosecutions were instituted against some of the alleged conspirators, and the three cases of this class are now pending on the decision or opinions in this court involving the same general character of questions. 3d—That 23 civil suits have been brought against parties to such conspiracies, and among others against defendants in this indictment, and the court wherein civil suits are pending declines to try the civil cases until this and other like criminal cases shall have been disposed of. 4th—That the amount claimed by the Government in this class of civil cases now pending amounts in the aggregate to $564,247 20. 5th—That there is reason to believe that if the trial of cases be delayed, much of the evidence on which the Government relies will be lost.

DRAPERY GLASS.—*Scribners' Monthly* for December contains an article on the uses to which this glass has been put, the writer claiming that our artists and decorators are now producing effects in stained glass windows far superior to the best work of European artists. He describes part of the process of manufacturing drapery glass as follows: "This is made from the glass as it is thrown in a melted state upon a flat table of iron to be rolled into a disk. When the glass is spread out, very much like piecrust, the roller by which it is spread keeping up the resemblance, the edges are seized by the glassmaker, armed with short tongs, who overlaps an edge or pulls and twists it in various directions as his fancy may suggest. This glass, when annealed and cooled, reveals in great variety the flow and twist of folds of drapery, and when the artist-artisan, with the main direction of the lines of the draperies of the cartoon which he is following firmly fixed in his mind, visits the racks in which, row upon row, the disks of glass are stored, he is generally able to select pieces which, placed in the window, represent in the color of the glass, unaided by the painter's skill, the most subtle gradations of light and shade in the form of the drapery."

IMPROVEMENT IN UMBRELLAS.—Two improvements in umbrella-making have recently been patented. The first is in the frame, where the "git," which holds the stretcher to the rib, is now being made of hardened and tempered steel instead of soft iron, while at the same time the fork end of the stretcher, by which it is connected with the rib, is narrowed somewhat, the result being that when the umbrella is folded it is practically impossible to distinguish any "knee," and at the same time a stronger joint is formed. These new frames are not only very light but very durable. The second improvement is in the ferule, where a hard india-rubber tip has been introduced with the effect of saving the frame from jarring, and at the same time rendering the umbrella noiseless when used for a walking-stick.

LOCOMOTIVE AND OTHER BOILERS.—*Mechanical Progress*, an English publication, says that in the United States there are more locomotive boilers than any other single class, and in one monthly report of explosions we find that only two of this class of boiler exploded, while during the same period there were no less than eight explosions of sawmill boilers. In the latter case 13 persons were killed and 11 seriously injured. It there were really thorough means of obtaining statistics of the number of people annually killed and wounded by boilers run by incompetent men, the list would show a most appalling record of suffering and death.

IMMIGRATION.—More than half a million immigrants from Europe arrived last year at the five landing ports of the United States, considerably exceeding the figures of 1887. By the laxity of the immigration laws a very large proportion of the immigrants belong to the criminal and pauper classes, against which honest labor is making a determined opposition. Capital, too, is finding that murderous hordes, while they cheapen labor, are expensive in other directions.

TO STOP A CHIMNEY FIRE.—Zinc, placed upon the fire in a stove or grate, is said to operate as an effective extinguisher of chimney fires. According to this representation, when a fire starts inside a chimney, from whatever cause, a piece of thin sheet zinc, about four inches square, is to be put in the stove or grate connecting with the chimney. The zinc fuses and liberates aciduous fumes, which, passing up the flue, are said to almost instantly put out whatever fire there may be.

TO KEEP SOOT FROM THE CHIMNEY.—To prepare soft coal in such a way, at small cost, that there will be no accumulation of soot in the chimney, and that the under side of the stove lids will be kept clean and nice all the time, and the good wife's objections to the use of "nasty coal" will be removed: For a ton of coal, buy about 15 cents worth of common salt, make a brine of it, and pour it over the coal. So says an exchange.

TO KEEP THE BIRDS FROM FRUIT.—Pans of water placed in fruit and berry patches will keep birds from eating the fruit. An English naturalist claims that the reason birds eat cherries and strawberries is because in the blazing heat they get dreadfully thirsty. If the birds can easily get at water, they soon leave off taking the fruit. The experiment is certainly worth trying.

KNEW HIM TOO WELL.—At one of the crossroads in Brazil, an idol carved from the wood of an orange tree was placed for the Indians to worship. On one occasion it was noticed that an old redman omitted to perform his act of obeisance. On being commanded to kneel he stubbornly replied: "No; I knew him when he was an orange tree."

PENCILS FOR GLASS AND METALS.—The new pencils introduced by Faber for writing upon glass, porcelain and metals, in red, white and blue, are made by melting together four parts of spermaceti, three parts tallow and two parts wax, this mixture being colored with white lead, red lead or Prussian blue, as desired.

NATIVE AFRICAN M. D.'S.—Two of the young African natives whom Cardinal Lavigerie sent to Lille, there to study medicine, have just obtained their degree of M. D., after passing their examination in a brilliant manner. Their names are Frederick Mahomed and Vital Hamed.

STOVES.—It is now just about 50 years since stoves—cooking and heating—first began to be generally used. That was when Americans began to make stoves for the home market.

A SCREW which is half nail is a new invention. Its holding power in white pine, they say, is 333 pounds against the 298 pounds of the present screw.

ENGINEERING NOTES.

THE ENGLISH CHANNEL TUNNEL.—We clip the following from London *Iron:* It is stated that, notwithstanding the threatened opposition of the Government, the Channel Tunnel Company will proceed with the bill which it proposes to bring before Parliament and take a division upon next session. It is said that since last year the promoters have received great encouragement to proceed, particularly from a large number of persons connected with the manufacturing and commercial centers of England and Scotland. They have also, we are assured, in many cases been promised the support of several members of Parliament. The machinery which was used for boring the tunnel is still in the heading, and is periodically set in motion to keep it in order; but no attempt is made to advance the heading, the length of which measures about 2100 yards. It is now two years since the works were stopped, and the tunnel is said to be so far impervious to water that on an average not more than 400 gallons has found its way into the entire heading in the course of 24 hours. The boring operations for coal near the mouth of the tunnel still continue, and a depth of about 1000 feet has now been attained. The character of the strata is such as to encourage the continuation of the operations in the hope of ultimately finding coal. While the prosecution of the borings for coal ought to be encouraged in every way, the same cannot be recommended for the tunnel works, for, in the present state of public opinion, the money spent that way will only be wasted.

RAILWAYS IN ASIA.—The railway is becoming an important instrument in modern civilization. It is making rapid inroads into the ancient methods, customs, and industries of Asia. Japan is becoming very rapidly revolutionized, and is introducing this method of transport and travel with great enthusiasm. Southern, Central and Northern Asia is also being rapidly opened up to commerce by the pushing energy of England and Russia. The same may be said of Persia. The great Empire of China, however, still clings to her ancient policy of non-intercourse so far as possible. But she is beginning to gradually yield to the inevitable. The latest scheme of this kind is the building of a railway from Tien-Tsin, China, 81 miles into the interior, with the probability of its early extension to within 15 miles of the capital of the Empire. The consummation of a work of this character is of the utmost importance to the future development of Chinese internal and external commerce. It is a significant sign of a radical change in the imperial policy affecting the industrial growth of the country. A pioneer railroad extending 81 miles from a commercial port toward the interior, means thousands of miles of railroads throughout the Empire within not many years. Already, it is reported, the road has become popular with the Chinese people, and that is all that is needed, under good management, to make it a paying investment.

THE PANAMA CANAL.—The dissolution of the old Panama Canal Company has been decreed on the petition of parties acting in accord with De Lesseps. The court appointed Brunet official liquidator. The application for the dissolution was made by two directors of the company. The tribunal authorizes the dissolution of the old company as preliminary to the formation of the new company. The liquidator appointed by the court is given full power to dispose of the property to the best interest of the company. The public feeling in Paris regarding the chances of the new company is one of very great despondence. De Lesseps, in an interview, said that if all the 60,000 bonds issued through the Banque Parisienne are not taken the enterprise must be abandoned, and a foreign nation would for a morsel of bread get the gigantic work, which was nearly finished, and upon which French investors had invested their millions. The canal would be completed, but neither by nor for the French. At this writing not one-quarter of the bonds have been taken, and there is little hope that any considerable increase of subscription will be realized.

A GRAND SCHEME NIPPED IN THE BUD.—A grand scheme was recently started having for its object the improvement of the navigation of the Allegheny river. The plan was to construct a canal from near Niagara Falls across the country to French creek, through which stream a sufficient quantity of water was to have been obtained to be emptied into the Allegheny river so as to make it navigable. According to a rough estimate, this work was to cost $12,000,000. The scheme appears to have been quite thoroughly talked up before any engineer was put upon the ground. When that was done, however, the report came that the Allegheny was considerably higher than the Niagara river, and consequently if a canal was cut through as proposed there would be a rush of water in the opposite direction. The Allegheny would be *drained* and not *filled*.

THE LARGEST VAULT.—The United States possesses the largest vault and the largest deposit of money in it of any Government in the world. It can hold $100,000,000, but the prospects are favorable for a call for increased storage of silver. There are about $20,000,000 in half dollars that do not budge.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

KENNEDY.—Amador *Ledger*, Feb. 9: This mine claims the palm in having yielded a larger amount of gold last month than any mine in the county. We are not able to give the exact amount of the cleanup, but should judge it was in the neighborhood of $30,000. The mill is kept running principally on small seams of rich quartz. A large quantity of rich ore has accumulated on the dump, in consequence of which a number of miners were laid off this week until the dump-pile is reduced.

MISCELLANEOUS.—A cleanup at the Alice mine, above Big Bar bridge, owned by Messrs. Petrie, Tripp & Littlefield, was made recently, which yielded very satisfactorily. We are told the rock gave a clear profit of between $2 and $3 per ton. We learn with regret that the Keystone mill is to be closed down soon. The rock has not been of a paying grade lately. Some extensive prospecting will be done.

BELL WETHER.—*Dispatch*, Feb. 9: They have encountered a ledge of good-looking ore on this prospect. A contract has been let by Mr. Bright to run a tunnel 100 feet on the ledge.

COSMOPOLITAN.—East crosscut in 210 feet, face in hard slate; west crosscut in 90 feet, face in hard slate. There are about 30 men on the pay-roll.

GOVER.—The Gover mill closed down on Monday, so as to connect the hoisting-works with the new pipe.

OVERPLUS.—There are two men at work on this property taking out ore. The mill is closed down at present.

Calaveras.

A BONANZA.—Angels *Echo*, Feb. 9: Considerable talk has been going the rounds in this section during the past week regarding the discovery of an immense bonanza in the Nevills mine in this town. We visited the mine last Monday and inspected the 400-foot level where the reported bonanza was said to have been discovered. The ore bodies just discovered were found east of the old vein. What was supposed to have been the hanging-wall of the old vein, has proved to be only a stratum of slate about ten feet wide. The running of a crosscut has developed a new vein of quartz about 15 feet in width, when another stratum of slate, seemingly a hanging-wall, was found. The crosscut was extended through this supposed wall, which also proved to be a stratum of slate, eight feet in width, when another immense vein was tapped. The crosscut has been run into this latter vein a distance of 21 feet and the hanging-wall has not been reached yet; consequently the exact width of the ledge is not known. The ore is of a higher grade than any heretofore found in this mine. The newly discovered ledge has every indication of being the main lode. Quite a stream of water courses along the vein, something never known in this mine before, the ore heretofore mined being perfectly dry. If you could call the old vein a mine, the new discovery constitutes a greater one, consequently there are two mines in one. The crosscut that has tapped the bonanza was run on the 400-foot level and 122 feet south of the shaft. A few months ago preparations were made to sink the shaft deeper, the opinions of the owners being that the ore was about exhausted above the 400-foot level, but the new discovery will now obviate the necessity of sinking for many months to come. A new crosscut was started Monday, which is being run eastward from the shaft to tap the new veins, and through which the ore can be transported to the cage to better advantage as soon as stoping commences.

MINE FLOODED.—*Mountain Echo*, Feb. 9: Water from the old works at the Angels mine broke into the new works last Sunday evening, flooding the mine up to the 200-foot level. The miners hurried out, and luckily nobody was hurt. The mine is now being drained as rapidly as circumstances will permit.

HALF-INTEREST SOLD.—*Chronicle*, 9: A half interest in the Voght gravel claim, situated on the Amador side of the Mokelumne river, about three miles from this place, has been sold to Messrs. Louis Blanding and D. J. Leggett. This mine is well supplied with machinery and has been in operation for nearly three years. The new partners are men of means as well as of practical experience in mining operations, and intend to push operations vigorously. They are engaged in sinking.

El Dorado.

TUNNEL.—Georgetown *Gazette*, Feb. 10: A new tunnel has been started on the Hog's Back mine, about 100 feet deeper than the old one, and will be about 1700 feet in length. It has been shown that the bed of the ancient river in that locality is covered with a deposit of cement and other material to a depth of from 400 to 500 feet.

Lake.

GOLD.—Lake Co. *Avalanche*, Feb. 6: We have seen some fine specimens of flake gold that were found in the mountains of Lake county, and the gentleman who made the discovery is of the opinion that if water was to be had near, it would pay to work. The same gentleman also had some specimens of quartz, which came from the same vicinity, that had every evidence of bearing gold. Now we are no sensationalist, but we are confident that where such fine specimens of gold exist there is a possibility if not a probability of there being more and in paying quantities. Why should not a company be formed to put a few good prospectors into the field and see what we have here in Lake county in the way of metals?

Mariposa.

VIRGINIA.—Mariposa *Gazette*, Feb. 9: The Virginia mine is running the pump and taking the water out of the shaft, and the hoisting-works are nearly ready for use.

Nevada.

WILLOW VALLEY MINES.—*Transcript*, Feb. 10: The mining outlook in Willow Valley district, this township, was never brighter than it now is. At the Neversweat four men are working steadily. They have now on the dump 40 tons of ore taken from a point 280 feet down on the ledge and 40 feet below the drain tunnel, which is in 1400 feet and taps the incline which is down over 300 feet. The work is being done through the tunnel. The last cleanup of the Neversweat paid at the rate of about $80 per ton in free gold for the general run of ore, and 3 tons of sulphurets therefrom gave $260 a ton. Nine tons of picked ore yielded $300 a ton. The ledge is of good size and well defined. Edward Gagan's claim, near Harry Striker's cabin and just this side of the Deadwood mill, is doing well. Two men took between $3000 and $4000 from it last year. Leander Ragon and Wm. Meyers are sinking a new incline on the Constitution and have a fair prospect. The Lecompton is being worked through a tunnel and a winze by Messrs. Ciemo and Harris of Gold Flat, who have a two years' lease. They recently had a crushing of ten tons which paid well, the sulphuret ore giving $206 a ton. The five Ebaugh brothers have relocated the Beach claim near the Neversweat and are engaged in driving a tunnel for the ledge which they expect to reach within a week. S. S. Luey and Joe Kitts are getting out timbers preparatory to again starting up work on the Jackson. This mine has produced considerable gold in past years.

YIELDING.—*Tidings*, Feb. 6: The Washington, Eagle Bird and Yuba mines of Washington township are yielding remuneratively. The water in the Blue Bell is about "forked," and explorations will soon be started.

Shasta.

CHROME.—Shasta *Democrat*, Feb. 6: That tin ore discovery we reported last week turned out to be chrome iron. The Calumet mill at Middle creek is shut down for a few days, undergoing repairs. The Calumet M. Co. has bought the Poorman mine, in Buckeye district, and has commenced opening it up. The new mortar for the Wheeler mill on Kline gulch has been placed in position and the mill is now running again. The Huntington mill on the Ten Eick brothers' mine on Spring creek has been running for ten days past on good ore. This mine is developing handsomely. Ore was exposed lately that is exceedingly rich in ochre sulphurets and free gold specimens. Another rich strike is reported to have been made lately on a gulch tributary to Dog creek, which has so far yielded several hundred pounds of specimens. R. G. Dunn, Mr. Brastow and Mr. Hall, all Wells, Fargo & Co. officials, are developing another good prospect on Nigger Hill. Mr. Ironsides, an old Nevada miner, is prosecuting the work and thinks the prospect will develop into a good mine. The ore in the discovery shaft, now down 15 feet, prospects well in a mortar.

MINING NOTES.—*Democrat*, Feb. 13: Mr. Butters has bought up all the tailings of the Texas, Central and Mammoth mines, and is shipping them to his mill at Kennett. The Walker mill is shut down on account of scarcity of water. The owners are talking of putting in pumping machinery to get a supply from the river. The Lucky Bart mine on Stacy gulch is probably the richest find ever made in the county. The shaft is now down 41 feet on a six-foot ledge.

Sierra.

THE MARGUERITE.—Sierra *Tribune*, Feb. 8: The Marguerite mine has at last adopted a sure way of overcoming the great trouble that has heretofore prevented successful working. A contract has been made with Knight of Sutter Creek, Amador county, to put in two of the Knight pumps (not Cornish pumps). They will be 17-inch pumps, and will be driven by Knight's hydraulic engine, with a pressure of 356 feet. This machinery is highly recommended by William Johns. The pumps are guaranteed to throw 50 miners' inches of water 1000 feet high; or in other words, hand the water out of the mine 1000 feet deep. A good deal of money has been taken out of this mine, and large sums have been taken from the stockholders' pockets. There are three levels worked out, and the fourth is sunk, only awaiting the miner's pick to bring to the surface the precious metal. Each of the three levels has produced $200,000. The present pay chute so far as opened is 540 feet. In the face of the tunnel west on the fourth level is a good-paying ledge. The company agreed to buy the Italian ditch, which has 800 inches of water in the driest season.

THE SACRED MOUNT.—Four men are running a tunnel at the claim. The main tunnel is in about 200 feet. A ledge three feet wide can be seen in the face of the drift. Assays of rock from the ledge give $24 a ton in free gold and $168 in sulphurets. It is the intention of the company to have work continued during the winter months.

JANUARY CLEANUP.—The Sierra Buttes Co. made a cleanup of $20,000 as a result of their work for January.

OXFORD.—*Mountain Messenger*, Feb. 9: The Oxford quartz mine continues to improve, the rock getting better as the tunnel progresses. They have already developed a chimney about 100 feet long, and the end is not yet. J. W. Pearson of Forest City has discovered some very rich gravel on Kanaka creek, taking out four ounces of gold in one day. Campbell & Shepherd have located some ground adjoining.

YOUNG AMERICA.—The cleanup of the Young America Co., Sierra City, for January was $27,200, and a dividend for the past month has been declared of $10,000. Total dividends to date, $370,000. The ledge is now fairly opened again, and prospects are good for large and steady dividends.

GOLD.—A man by the name of Adams has found some very rich rock at St. Charles Hill. He has already taken out considerable gold with a small mortar. Mr. Rouse, who has been operating in that vicinity for some time, has secured a bond upon the claim, and intends to put a mill upon it as soon as it is possible to do so.

GRAVEL.—Wm. Morse came over from Port Wine, Tuesday, and reported very little snow there. Between 30 and 40 men are employed at Happy Hollow, and good pay gravel is being taken out of the Union Consolidated drift claim, and also from the Riffle at Grass Flat.

TUNNEL.—A tunnel has been started by Oscar Jones, R. P. Mott, and others, to develop some ground lying along the North Fork, on the Bald Mountain ground. It was too low to be worked through the old Bald Mountain tunnel.

THE SIERRA BUTTES people think they have found a new and rich quartz ledge in No. 2 tunnel. The report is that the Rainbow Co. has found some very good rock in their lower tunnel on Kanaka creek.

CLEANUPS.—It is reported that the Buffalo mine in Hog canyon has made several good cleanups, and that one or two more will put the company out of debt.

THE RUBY CO. has resumed work after being compelled to suspend for a time because the water was frozen up and they could get no air.

San Diego.

OWENS.—Julian *Sentinel*, Feb. 6: Things have been quite lively at the Owens mine this week. Men are at work retimbering the old shaft, and are making good progress. Prospectors have struck a rich lead on the hill above the hoisting-works, and the ore prospects $20 a ton. A new blacksmith and carpenter-shop has been built, and things are beginning to assume a business-like appearance once more. Work will be begun on the new shaft as soon as enough timbers are sawed to make a start.

NEVADA.

Washoe District.

BEST AND BELCHER.—Virginia *Enterprise*, Feb. 9: The north drift from east crosscut No. 2, 350 level, is still in a mixture of quartz, clay and porphyry. Quartz carrying metal is being encountered in No. 1 crosscut west. No. 2 west crosscut is still in vein material

HALE AND NORCROSS.—On the 400 level, in the north lateral drift, at a point 95 feet north of the west drift, have started west crosscut No. 1 to encounter the upward extension of the 500 level ore body. This crosscut is now extended 69 feet. On the 500 level the north drift has been advanced 20 feet; total distance, 169 feet. This drift is still in good ore. The stopes above this drift continue to yield ore of good quality. Since last report have hoisted 1825 tons of ore, shipped to the Mexican mill 1697 tons and reduced 1717 tons. Average battery assays, $21 per ton. A shipment of $4641.53 in bullion has been made, making the total so far for the month $58,350.

CON. CAL. AND VIRGINIA.—Work is in progress on all the levels from the 1400 to the 1750. The south drift from the winze below the 1465 level is yielding much good ore. On the 1650 level in east crosscut No. 2 from the main north drift from the Con. Va. shaft, east of upraise No. 3, are stoping ore of good quality. The stopes on the seventh and eleventh floors of this level are showing ore of fair quality. The north drift from the bottom of 60-foot winze is in material of some value. About the usual amount of ore is being shipped to river mills and the average of battery assays will be about the same as last week.

SAVAGE.—On the 400 level No. 1 southwest crosscut on the south boundary has encountered two feet of good ore in the face of this crosscut, and have turned the drift north following this ore. This drift is now advanced 27 feet and continues in ore of good quality. From the north and south drifts on this level are extracting ore, and from the old stopes. Have hoisted 617 tons of ore, shipped to the Rock Point mill 782 tons and milled 848 tons. Average battery assays, $21.39 per ton. Bullion shipped and on hand, $25,647.

CONFIDENCE.—All the ore stopes are still looking well, and 450 tons a week are being shipped to the Brunswick mill, which is running 32 stamps. A shipment of nine bars of bullion, valued at $25,219.63, has been received from the mine at the Bay this week, being the final shipment on January account, during which time there was produced $89,321.96.

OVERMAN.—Have run the mine six days during the past week. Extracted 296 tons and 1600 pounds of ore. Shipped to the Vivian mill 236 tons and 1600 pounds of ore.

CHOLLAR.—Are shipping about 150 tons of ore a week to the Brunswick mill. On the 300 level the north drift continues in vein material of a favorable appearance.

YELLOW JACKET.—The accident to the spur-wheel has interfered with underground operations during the week, but all will next week be running as usual.

UNION CON. AND MEXICAN.—On the 1465 level a joint Union north drift started from the east drift from the Ophir is advanced 501 feet in Mexican ground.

CHOLLAR.—The prospecting drifts on the 550, 650 and 750 levels are still in favorable vein material. The Nevada mill is crushing the usual amount of ore.

OCCIDENTAL.—Ore is being extracted from the 300, 450 and 550 levels; also from the west crosscut from the winze down from the main tunnel.

POTOSI.—The exploring drifts on the 650, 750 and 850 levels continue in the same vein porphyry mentioned last week.

NORTH OCCIDENTAL.—Vein material carrying metal is encountered in the drifts on both the 220 and 400 levels.

IMPERIAL.—Good headway is making in No. 2 east crosscut on the 110 level. No change of material to report.

JUSTICE.—The ore-producing sections of the mine continue to look well. The mill is kept in constant operation.

SEG. BELCHER.—Are drifting east from the end of the 1100 level south drift to connect with the 1300 raise.

GOULD AND CURRY.—The southwest crosscut on the 450 level is still in a mixture of quartz, clay and porphyry.

BALTIMORE.—During the week an important development has been made well out west on the 300 level.

SIERRA NEVADA.—The east crosscut from the south drift is still in material that carries some metal.

ALTA.—All is working well in the mill and the stopes yield the usual quantity and quality of ore.

SILVER HILL.—Opening and timbering a station at the 160 level. Shaft cleaned out to 400 level.

OPHIR.—The south drift from the bottom of the winze on the 1300 level is still showing value.

ANDES.—The work of cleaning out and repairing drifts on the 175 level is progressing favorably.

BELCHER.—On the 200 level the north drift from the shaft is out 463 feet. No change of material. Have cleaned out and repaired 156 feet of the old 1100 north drift and have advanced the 1100 south drift 50 feet. This has now been turned and run east 45 feet, when a winze will be sunk 45 feet to connect with the Seg. Belcher and Mides raise.

NEW YORK.—The face of the north drift on the 800 level is in a favorable vein material.

UTAH.—The main south drift on the 600 level is in vein material carrying metal.

SCORPION.—The usual progress is making in the crosscut on the 300 level.

CROWN POINT.—On the 800 level No. 2 crosscut is out 76 feet.

BENTON.—Will soon have a hoisting plant of their own.

Cherry Creek District.

THE STAR.—Tuscarora *Times-Review*, Feb. 6: Several prominent mining men of San Francisco have recently visited Cherry Creek, and it is thought that a strong company will be formed shortly to work the Star on a larger scale.

Santa Fe District.

COPPER.—Esmeralda *News*, Feb. 9: A. E. Dick a New York mining man, who has been experting on copper mines in this county in the interest of New York capitalists, last week succeeded in purchasing a group of mines in Santa Fe district. The mines were purchased from B. W. McClane, Eli Johnson, J. W. Hogan, and J. Fagen, and, so far as can be learned, there was something like $20,000 changed hands on the transaction. This sale has been the means of creating a considerable amount of interest in copper mining in our county, and a number of prospectors, who own copper locations, have been induced to resume work on the mines that were heretofore considered useless. From an interview with one of the gentlemen immediately interested a *News* reporter gleaned the following facts concerning the intentions of the copper men: They intend to purchase all the copper mines that have been developed to any extent, and where owners will not sell, they will purchase from or work the ore for them. On or about the first of March next the work of erecting a furnace will be commenced. The site for the furnace has not as yet been definitely decided upon, but from present indications it will be located at a point near the line of the C. & C. railroad and about seven miles south of Luning. The furnace will be of water jacket pattern and of thirty tons capacity. The company has secured the water right and every arrangement has been made to begin operations immediately. The erection of the furnace, whether in Hawthorne or elsewhere in the county, will have a decidedly beneficial effect; it will create a stir and encourage prospecting, for when a person does discover a mine he will know that the facilities for working the ore are at hand. The copper mines of this section have almost been a dead letter of late years. It is claimed that on the several dumps of the property recently purchased there are now about 3000 tons of good ore, and that the mines are in such shape that 100 men could be put to work immediately extracting ore.

Tuscarora District.

BELLE ISLE.—*Times-Review*, Feb. 8: South drift from the east crosscut, 250-foot level, extended 10 feet.

COMMONWEALTH.—Shaft has been repaired, timbered 25 feet, and is in good running order. 100-foot level: No. 2 east crosscut from main south drift has been advanced 12 feet; some low-grade ore is showing in the face. Intermediate drift from No. 4 chute has been extended five feet, still exposing good ore; car samples average assay $240 per ton. Drift from top of No. 8 chute, being run to connect with the intermediate drift, has been extended nine feet in high-grade ore.

GRAND PRIZE.—300-foot level—Drifts have been started east, on the hanging and footwall veins, from the south crosscut; the former extended seven feet, showing bunches of good ore, both yielding concentrating ore. 400 foot level—North crosscut has reached the west vein. Connection has also been made with the winze from the 300-foot level on the east side of crosscut. The vein is three feet wide, two feet of which is high-grade ore.

NORTH BELLE ISLE.—Intermediate drift south from No. 1 winze, below the 300-foot level, extended five feet. Ore continues about same grade. No. 1 winze, 400-foot level, extended 14 feet in favorable-looking rock.

NAVAJO.—The crosscut from the south drift, 350-foot level, extended 16 feet and is passing through favorable-looking ground. The stopes are looking well and have yielded the usual quantity and grade of ore.

NORTH COMMONWEALTH AND DEL MONTE COMBINATION SHAFT.—The Combination shaft has been sunk and timbered 21 feet; total depth, 140 feet. The formation looks very favorable for ore.

NEVADA QUEEN.—Work at the concentrator is progressing favorably. Will start up again Monday, when everything will be in good shape to run steady.

FOUND TREASURE.—Prospect shaft has been sunk 10 feet, and is passing through stringers of good chloride ore.

Wild Rose District.

THE PARADISE MINES.—*Silver State*, Feb. 6: From Supt. McCurdy, of the Paradise Valley Mining Co., we learn the following relative to the ore body in the Wild Goose mine. In drifting north on what is called the 70-foot level, that is, 70 feet above the upper tunnel, and 280 feet below the surface, and 30 feet north of the large chimney of ore which has been worked for the past five years, the new chimney of ore was found. The ore as taken out will average about $100 to the ton and runs high in gold. The drift is in 28 feet on the ore body. The vein on the face is about seven feet wide, and there is quartz in the foot-wall which has not been cut in drifting, that may still further increase the width of the vein. The south ore body above the upper tunnel is looking well, and the ore is of a good grade and mills higher than was expected. Altogether the outlook is very promising. The mill is now running and regular shipments of concentrations will be made.

ARIZONA.

MOHAVE CO.—*Miner*, Feb. 9: Marshal and Jamison are at work on the Pixley mine, Layne Springs, taking out some good ore. John K.

Mackenzie shipped a four-ton lot of ore from the Prince George South. There were 75 tons of high-grade ore from the C. O. D. mine worked at the sampler during January. MacDuffee, Heimrod & Uncapher are at work on the Connor South, and getting some fair shipping ore. Kelley & McKinnon have encountered another body of good ore in the north end of the Connor mine, which promises to exceed in value anything they have found. Now that the weather has moderated and the roads are again in good condition, we may expect the arrival of considerable ore during the next ten days, there being numerous small lots at the various camps. The machinery for a complete 10-stamp gold-mill, to be erected on the Rattan mine, was purchased by Supt. Brother during his recent visit to S. F. John Mulligan departed for the New London on Wednesday for the purpose of prosecuting work on the south extension of that mine. John has discovered some extremely high-grade ore. The contract of driving the main tunnel of the Nighthawk mine is completed, and a fine body of ore opened up. Supt. Bowers is preparing to work the mine on a more extensive scale than ever before. Reports from the recent strike at Wallapai Springs made by Mr. Cummings show that property to be considerably richer than at first reported. The pay streak is from 18 to 24 inches wide, and by returns from the sampler works 150 ounces silver per ton, while the assorted ore ran up to 575 ounces silver per ton. The Arizona Sampling Works have been quite busy during the week. Among the ores sampled we notice the following local lots: Rogers Bros., 40 tons of lead ore from the Schoolkyll, Chloride; C. O. D., 30 tons; D. W. Grant, two lots from the Juno, Chloride; Chas. Cummings, 12 tons from Wallapai Springs; Joe Prisk, a small lot from Mineral Park; Jose Canyas, 4 tons; Darden & Shippe, small lot; Mulligan Bros., 2½ tons lead ore from the New London; while there are awaiting treatment at the sampler the following lots: Two carloads from the C. O. D.; one carload from W. W. Clack, lessee at the C O D.; one carload from the Cupel; and about 4 tons from the Prince George South.

HARQUA HALA.—Silver City *Enterprise*, Feb. 8: A representative of the *Enterprise* during the week had the pleasure of interviewing L. A. Snyder, a mining man of extended experience, and one whose opinion on mining matters is entitled to respect and careful consideration. Mr. Snyder has just returned from the new strike, and furnishes our readers with the following information: "The district is not a new one, and there are several shafts ranging from 10 to 60 feet in depth, and within six miles of the strike is a ten-stamp mill. The strike itself, known as the Gold Mountain, is a contact vein of extremely well-defined proportions for the amount of development. The formation in which the vein occurs is quartzite and porphyry, the latter forming the foot-wall of the contact, and dips to the east at an angle approximating 15 degrees from the horizontal. The shaft or pit is only five feet deep, and discloses a vein of ore varying from 2 to 3 feet, and has a milling value approximating $100 per ton. There are other prospects in the district lately discovered which are quite promising. The lead carbonates assayed show a value of about $80 per ton in gold and silver. The opinion of many mining men who have visited the strike is that development is the one thing needed, and that careful exploitation will undoubtedly demonstrate the value of the camp. The conditions seem to be favorable and many look forward to the time when the Harqua Hala mountains will be a lively, populous and thriving mining district."

COLORADO.

LESSEES.—Georgetown *Courier*, Feb. 7: The lessees on the East Dives, Pope & Co. and Prout & Co., are taking out ore of a good grade. That of Pope & Co. returned as high as 572 ounces silver and 33 per cent lead. The McClellan is shipping a good deal of ore that mills all the way from 100 to 1500 ounces silver per ton. During the past week Barrett & Co., Omodt & Co. and Falkner & Co. of the Corry City mine, sent nearly 80 tons of ore to the Pueblo ore market, which milled from 40 to 200 ounces silver per ton. Five levels from the main shaft on the Pay Rock are being driven ahead, and good ore has been opened up in three of them during the past week. During the month of January 267 tons of ore were sold at the Public ore market, the assay value of which was $33,611. Frank Snodgrass is driving through a large body of blende on the Backbone. The directors of the Neath have taken treasury stock for their claims on the company, and have, by so doing, cleared the company of debt. Besides this, $5000 of the $7000 to be raised has come in, which gives the company a fair start. In 27 shifts during the month of January the Ashby tunnel of the Florence Co. was driven a distance of 110 feet, a trifle over four feet a shift. Forty feet was through red granite. The tunnel is 8x9 feet and three men are employed with power drills. The cost was less than $8 a foot.

IDAHO.

ORO FINO.—Idaho *Avalanche*, Feb. 9: We are reliably informed that a fine body of ore has been found in the Oro Fino, some of which is almost equal in richness to that taken out by Mr. Regan two or three years ago. We were shown some of the specimens brought down, which are covered with gold. Good ore is also in sight in two or three other lodes included in the Oro Fino group. The Leonard mill was running on good ore from the Oro Fino when it shut down, because ore could not be hauled from the mine, by reason of the roads. It will start up as soon as the ore can be hauled. It is again running.

THE RED ELEPHANT.—Wood River *Times*, Feb. 6: For some time past the Red Elephant group of mines, near Bullion, has been yielding an average of $1000 worth of ore per day. This amount will be doubled next week, when Colonel Bryan, the manager, will put on additional hauling capacity. A miner who recently worked in the group states that the production is intentionally limited at present, as Colonel Bryan intends to go East soon, to purchase concentrating works. The Red Elephant group is evidently developing into a big property.

THE SMOKY BULLION.—Michael Hennessy came in from Smoky, a couple of days ago, bringing samples of ore from the Smoky Bullion, a claim which he owns in partnership with Charles Sherry and P. H. Kinney of this city. The samples were from two veins which run parallel one to the other at a distance of about 300 feet. The samples from one vein showed a value of only 30 ounces silver and 83 per cent lead, and those from the other vein assayed 1933 ounces silver and 47½ per cent lead per ton. The owners intend to make at least one trial or test shipment before the breaking up of the roads in the spring.

ORE IN THE PARKER.—Wood River *Times*, Feb 2: The people of Ketchum have been feeling highly elated, since yesterday noon, over the news from the Parker, which is to the effect that a vein of first-class gray copper ore, carrying only three per cent of galena, has been cut into on the lowest level of the Parker. Chunks of the ore and thorough samples of the new discovery have been brought to Ketchum and handed about and assayed. They were found to carry 540 ounces silver. The ore is therefore of the high grade for which the Parker is so famous, and as the vein has every indication of being a permanent one, the leasers, W. H. Watt and Sam Allen, are to be congratulated. The ore vein is said to be 2½ feet wide.

MONTANA.

THE HELENA SMELTER.—Montana *Mining Review*, Feb. 6: One stack of the Helena smelter was fired up last Saturday, and two more furnaces will be fired up within ten days. The first shipment of silver-lead bullion was made from the smelter yesterday, Feb. 5th, and, Providence permitting, shipments of the same precious material will regularly go forward from this time forth, at the rate of 20,000 pounds per day until the other two furnaces are fired up, when the first section of the great smelter can be said to be in full blast, with a combined production of about 60,000 pounds of silver-lead bullion daily. Supt. Raht is highly pleased with the working of the machinery and other modern appliances connected with the smelter, to say nothing about the output of bullion, and judging from the smoothness with which everything seems to move, the Helena smelter has evidently started upon a long and successful career.

NEW MEXICO.

DEVELOPMENT WORK.—Silver City *Enterprise*, Feb. 8: There is not a gold property of value in the Carlisle mining district for which negotiations are not pending. The Aztec Co. is shipping concentrates in carload lots. The Standard mill at Gold Hill will start up during the present month. Several interests in this district have been consolidated. Recent developments in the Potosi and Copper Glance mining claims, five miles southeast of Santa Rita, show up untold copper riches. A party of several gentlemen left Silver City last Saturday morning to examine the properties of Capt. Cooney on Silver creek in the Mogollon mountains. Negotiations have been pending for the purchase of these mining estates by an English syndicate, and the report and examination of these properties, soon to follow, will undoubtedly result in their purchase and complete equipment, and be the direct means of stimulating mining enterprises in other portions of this rich mineral-bearing range.

BLACK HAWK.—It is reported on good authority that the Good Hope mine in Black Hawk mining district has been leased. The owners of the Rose are taking out the water preparatory to the active resumption of work. Claim No. 2, formerly the Last Chance, a relocation on the north end of the Solid Silver, owned by Ben Hobson, is producing a very high-grade silver ore.

COW SPRINGS.—The Snowdrift mine, formerly the Alaska, has recently been sold to Mr. Hussey, the consideration being $3000.

MANGAS.—The Cora Miller mine in the Mangas valley, two miles below Mangas Springs ranch, has been leased to Mr. C. C. Martin for a period of six months. Mr. Martin has already begun operations.

OREGON.

$3000 FOR AN EXTENSION.—Bedrock *Democrat*, Feb. 6: We learn from parties down from Cracker creek that Fred Huntington has disposed of his Rainbow mining property, the extension of the Hurricane, to George Thompson, the consideration being $3000 cash down. The Hurricane is the property purchased by Mr. Thompson and his associates a few weeks since. The recent purchase would indicate that he is very favorably impressed with his first purchase.

WILL OPERATE EXTENSIVELY.—It is reported that the placer claims recently discovered on Powder river are soon to pass into the hands of a wealthy company, who will operate them extensively the coming summer. It will hardly be possible to work the ground during the high water in the spring, but later on that difficulty will be done away with by wing-damming or some other means to turn the water from its natural channel to enable bedrock to be reached.

UTAH.

ORE AND BULLION SHIPMENTS.—Park *Record*, Feb. 6: During the week the Crescent shipped 20,000 pounds of first-class ore. For the week just ended the Mackintosh sampler received 484 440 pounds of Woodside leasers' ore; 187,390 of Ontario, and 24,180 of Daly ore; total, 696,010 pounds. The Ontario bullion shipment for the week was 34 bars, containing 18,732.62 fine ounces of silver. There was no Daly bullion from the Marsac mill this week. Ore shipments have been rather light the past week on account of bad roads. Some sample lots of ore from Mexico have been received for experimental treatment by the Russell process at the Marsac mill. When Manager Wm. McKay was in town the first of the week he was heard to say that it was contemplated to resume work at the Massachusetts some time in May or June. Some fine specimens of ore from recent openings made in the West End ground were shown in the *Record* office a few days ago. The developments are of a very encouraging nature. On Thursday a ventilating shaft for the Ontario's big three-mile drain tunnel was started. It is being sunk at a point about 500 feet up from the mouth of the tunnel, and a depth of 100 feet will reach the tunnel level. The tunnel is being driven in comparatively easy working ground now and it is in upward of 750 feet.

MARKET REPORTS.

Local Market.

SAN FRANCISCO Feb 14, 1889.

General trade continues light. Owing to the dry weather and the light deposit of snow in the mountain ranges, merchants are disposed to pursue rather a conservative course, that is, they are not anxious to press goods on the retail merchant unless he pays cash or meets his engagements promptly. With a well-distributed rainfall soon, the present gloomy feeling will give way to a more hopeful feeling. With iron-workers there is more doing, but, as yet, business with them is far from active. In the local market money is reported to be generally easy. The savings banks have large sums idle. There is more inquiry for funds, with realty as security, but, as a rule, more money is wanted than the banks are willing to place on the property. The inquiry is chiefly from the country. The commercial banks report money easy, with no marked call from any quarter. The speculative movement in grain options continues to absorb some funds, but for speculating in local securities and mining stocks there is very little call, owing to the depressed condition of the market, chiefly in mining stocks. There is no question but that the past two months every means has been brought to bear to depress values so as to get the outside public to sell back at lower prices the stocks they bought at higher figures. How successfully it has been done, the empty boxes of the brokers and the empty pockets of the majority of the outside operators but too plainly show. Yet there are well-informed parties who look for still lower prices. Public advices from the districts whose mines are listed on the two exchanges, are of a bearish character, but reliable private information is very encouraging. The water in the Carson river, Virginia City, is reported to be increasing in volume, and more ore can be crushed if desired. From the mines our advices are as follows: In Crown Point they have uncovered a continuous body of good milling ore, running from the 300-foot level down to the 800 level, varying in width from 20 to 30 feet. On the 1700 level in the same mine, they are in on ore going $80 a ton; the width is given at 2½ sets of timber. The drift connecting Belcher and Seg. Belcher on the 1300-foot level has exposed a body of good milling ore, the assay value of which is not given. In Savage on the 400 and 500-foot levels an improvement is reported. Hale and Norcross has a large body of ore going about $60 a ton, from which, it is reported, they will soon begin to stope for milling. In Gould and Curry and Best and Belcher, promising work is being done. Continued good reports are made of Con. Virginia, but from the other North End mines there is nothing of interest obtainable. The work now going on in West Con. Virginia is being closely watched by mining men in Virginia City. From the Bodie and Tuscarora districts, important work is reported underway. From the Quijotoa district, Arizona, a correspondent writes as follows: There has been quite an excitement in camp for the last two days, about the discovery of a rich gold ore ledge, about one mile east of the Indian Chief district. They had some of the ore assayed, and it went $800 per ton in gold. The location belongs to Verdugo & Co. Free gold is to be seen all over the rock. All our mines in the district are in fact turning out excellent, and producing plenty of good ore, so it is immaterial to us whether the market booms or not.

At the California Electric Light Co. the writer was informed yesterday that the company had received word that it was not necessary to push the work in getting the other four dynamos to working in the Nevada mill, Virginia City, owing to the low stage of water. As less water is used since the two dynamos are in good working condition, mining men were led to the opinion that still less water would be required when all the dynamos are in use.

SILVER—The market strengthened the past week with sales made up to 93¾c for shipment by the last steamer to China, but at the close, buyers are bidding only 92⅞c, owing to the London market coming through at 42½d, with a weak tendency. Our market is very sensitive, due to the light output of the mines, chiefly in the Comstock district, where there is a small supply of water. Last month's report of Con. Virginia gives an increase in the percentage of gold. But the other mines in that district report about the usual percentage of gold.

The steamer that sailed for China on February 13th, took out the following: To Hong Kong, Mexican dollars, $208,615; silver bullion, $68,000; to Bombay, in silver bullion, $311,000. The market was well cleaned up by these shipments, but since then a few small consignments have been received.

QUICKSILVER—The market is strong at a slight advance. The demand is light for the season. The European market has fluctuated under manipulation.

LEAD—There are no changes to report in the market. The demand from canners is reported to be good, with considerable going out on orders and also on contract sales.

TIN—The market has a stronger tone, but no advance in prices is reported. The movement is chiefly in deliveries on contract sales, although some spot sales are reported.

COPPER—The market has a weak tone, owing to the conflicting reports regarding the financial status of the French syndicate. The general feeling is that the syndicate cannot control the markets of the world, and consequently a lower range of values is inevitable.

IRON—The market is reported to be steadier. The spot supply is quite large, but the quantity to arrive is said to be light. The demand is quiet.

COAL—The market for steam coals is said to be steadier at the low prices quoted. Several cargo parcels were placed at reduced quotations, netting to the importers quite a loss. Some Australian costing over $9 were placed at a loss of from $1.50 to $2.25 a ton. The tonnage on the berth at New Castle, Australia, for this port, is steadily increasing. For prompt shipment, $6.75 to $7 is asked. The output of house coal on this coast continues large. At the decline in prices the consumption is said to be increasing; probably this is due to a change in the weather, it now being colder.

Eastern Metal Markets.

By Telegraph

NEW YORK, Feb. 14, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42¼	92¼	$16 65	$3 77½	$21 40
Friday	42¼	92¼	16 40	3 75	21 35
Saturday	42⅛	92⅜	16 40	3 75	21 40
Monday	42⅛	92⅜	16 60	3 70	21 25
Tuesday	42⅜	93⅛	16 60	3 67½	21 20
Wednesday	42⅜	93¼	16 60	3 65	21 35

Borax is steady, under the new arrangement. Outside rates for only jobbing business, refined, 8¼@9¼c; concentrates, 7⅛@8½c. Quicksilver—Frequent fluctuations; 25 flask lots were once down to 56@57c, closing with an advance abroad of 60@61c. Lake copper is dull, February and March ¼c below offering. There is a fair movement in pig lead, at lower prices. Tin is stronger at a slight advance.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Feb. 14, 1889.

ANTIMONY	13 @ 14
BORAX—Refined	7½@ 7¾
Powdered	7½@ 7¾
Concentrated	6¾@ 7¼
COPPER—	
Bolt	26 @ 27
Sheathing	26 @ —
Ingot	18 00 @19 00
Fire Box Sheets	— @ 26
IRON—Glengarnock ton	27 @ —
Eglinton, ton	26 @ —
American Soft, No. 1, ton	— @31 00
Oregon Pig, ton	— @30 00
Clay Lane White	— @ 24 50
Shotts, No. 1	— @28 50
Bar Iron (base price) ₱ lb	2½@ 3
Chrome iron ore, ₱ ton	00 @10 00
LEAD—Pig	4¾@ —
Bar	5 @ —
Sheet	8 @ —
Pipe	7 @ —
Shot, discount 10% on 500 bags Drop, ₱ bag	1 85 @ —
Buck, ₱ bag	1 75 @ —
Chilled, do	1 95 @ —
STEEL—English, lb	16 @ 20
Canton tool	9½@ —
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Toe Calk	4½@ —
TINPLATE—Coke, prompt shipment	4 85 @ 4 95
Coke on spot	5 10 @ 5 15
Charcoal, 14x20	6 75 @ 7 25
do roofing, 14x20	5 50 @ 5 62
Pig tin, ₱ lb	23 @ —
QUICKSILVER—By the flask	42 50 @43 00
Flasks, new	1 05 @ —
Flasks, old	86 @ —
COKE—English, ton, spot	20 00 @— —
Do, do, to arrive	13 50 @— —

PRICES OF COAL "TO ARRIVE."

	Per Ton.	Per Ton
Australian	8 7 00 @ 7 50	Cardiff	9 50@10 00
Liverpool Steam	10 00 @10 50	Lehigh Lump	16 50@17 00
West Hartley	11 00 @11 50	Cumberland blk	16 00@16 50
Scotch Splint	11 00 @11 25	Egg, hard	15 50@16 00

Legislative.

Among other bills introduced in the Legislature is a very important one intended to remedy existing evils connected with employment offices. The main features are in the first section, which are as follows: From and after the passage of this Act, any person, firm, company or corporation doing business in any of the several cities, cities and counties, or towns within the State of California, as keepers, conductors or proprietors of any intelligence office, employment office or other place wherein fees are charged applicants for employment, who shall charge and accept fees from such applicants for situations that never existed, and who shall send or induce such applicants to go to any place or places for situations that never existed, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding $1000, nor more than 1000 days' imprisonment in the jail of the county, city and county, or town in the State of California within which such offense was committed, or by both such fine and imprisonment.

Goucher has introduced a bill appropriating $75,000 for a permanent fund for the purchase of jute at San Quentin prison. The bill is recommended by the Prison Committee. The present revolving fund of the prison is $40,500.

Murphy of San Francisco introduced a concurrent resolution instructing our representatives in Congress to urge a report on the bill to repair the flagship Hartford. Murphy stated that this bill had been passed unanimously by the House of Representatives, had gone to the Senate, and had been referred to the Naval Committee, where it had remained ever since. The resolution was passed unanimously.

The bill appropriating $350,000 to establish an insane asylum at Ukiah went through the Assembly, receiving on its final passage 58 votes. It will now go to the Governor.

The proposed appropriation to the State Mining Bureau has been cut down from $150,000 to $100,000, which is $40,000 more than was given by the last Legislature. The institution is evidently becoming more popular now that its reports give some practical information to the mining community.

The Governor has signed the bill providing for the proper sanitary condition of factories and workshops and compelling employers in mercantile establishments to supply seats for saleswomen. He has also signed that raising the salary of the Labor Commissioner and giving him a deputy.

The Senate has passed the bill prohibiting the deposition of sawdust in the streams of the State; also that empowering the State Board of Fish Commissioners to remove obstructions in the American river.

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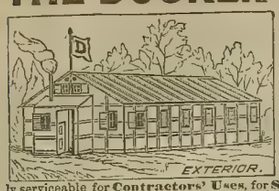

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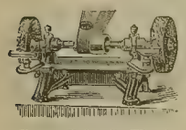

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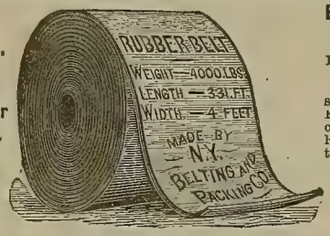

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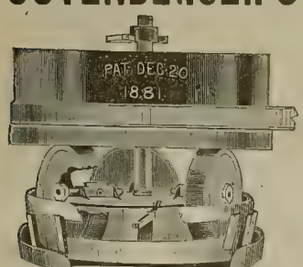

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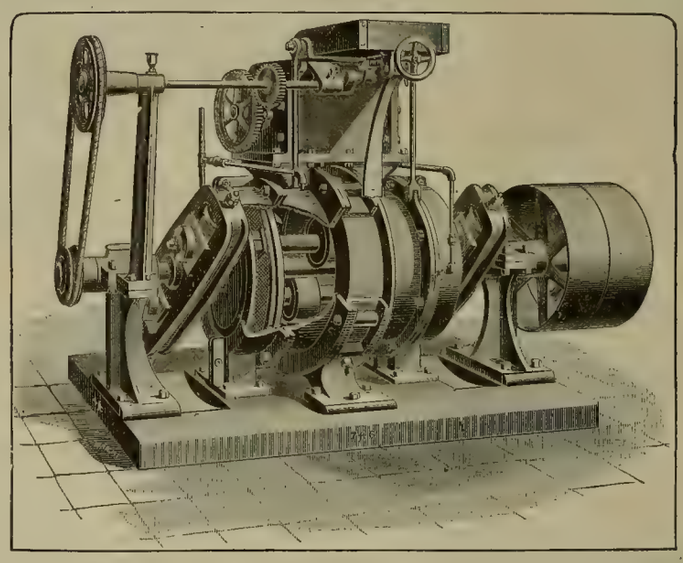

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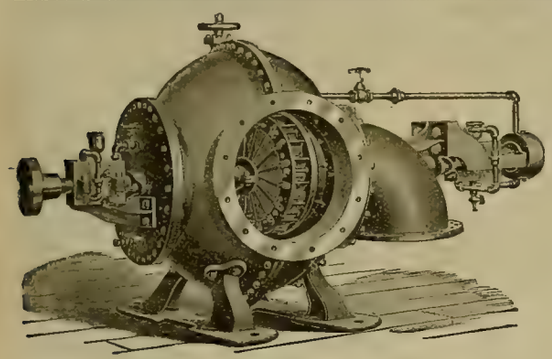

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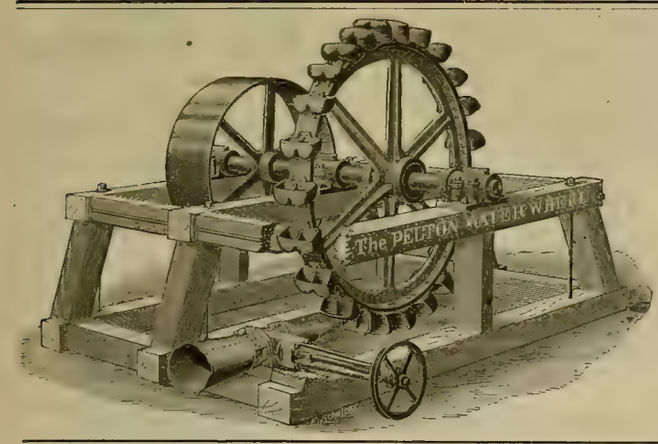

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List of U. S. Patents for Pacific Coast Inventors.

Specially reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

[illegible]

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Pioneer Patent Agency the following are worthy of special mention:

Quartz-crushing Machine.—George A. Fuller, S. F., Cal. No. 396,262. Dated Jan. 8, 1889. This machine is intended for crushing ores of various degrees of hardness. There is a combination of the receiver or hopper having an eccentric motion from the lower end over which the ore is fed—the hopper having a spout and concentric seat to which the other end of which is pivoted to a stationary support, to enable it to be placed through the rock from the front to the rear and employing separate spout openings from the rear end of the hop- and separating and covering the seat. It consists also of a crusher composed of a bed-plate, a pivoted ring or spring-arm and a cone-plate as said ring and bearing it, a curve rock for carrying the crushable ring, and the cable for tightening it up. When a broken rock becomes away from any cause it is essential that it be immediately replaced. This is done by drawing the cable of the lower to expose a nut to part and the connection to chamber at the inner end of the bucket and fitted to pass upon the rod which is passed through the rock from the front and a plug and nut dimmer to move which have already been passed upon the front end of the rod so that by screwing up the front nut rock plugs may be drawn together tightly upon the end pieces of the rock. The chief advantages of the mode of operation are in the waste of time necessary for the cutter to cool after the drawing of the rock, the cutter of the boiler during this time and the danger to the operator and these rocks and to many attempts to plug the rock out only from the front. In these instances plugs of the form of ordinary interior sharpers have been passed through to the rear end of the rock by means of a rod, and also an expansible washer of packing has been employed, which could be pressed partially to cover the inner end of the rock. It is the object of Mr. Tanner's invention to provide a plug which can be passed through the rock from the front and not covered during passage to that upon emerging from the rear end of the rock it can be tried to place and cover the inner end of the rock in corresponding the same manner as the ordinary plug covers it at the front end.

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COMPANY.	LOCATION	NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS
[illegible]	[illegible]	42	10	Dec 31	Feb 21	Mar 7	[illegible]	[illegible]
[illegible]	[illegible]	1	10	Jan 7	Mar 1	Mar 21	[illegible]	[illegible]
[illegible]	[illegible]	1	10	Jan 7	Mar 1	Mar 21	[illegible]	[illegible]
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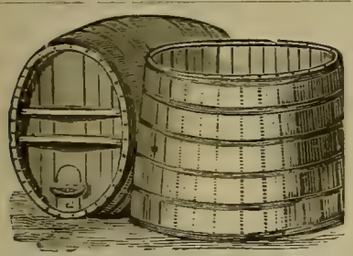

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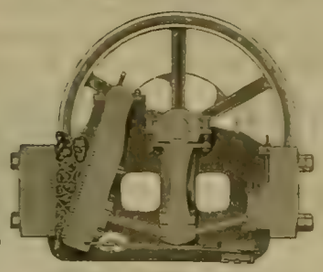

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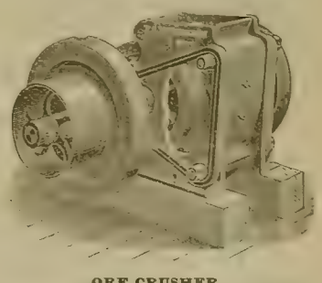

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents to DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING FEB. 5, 1889.

397,269.—SEWING-MACHINE SHUTTLE—C. H. Benoit, San Jose, Cal.

397,224.—CUTTING APPARATUS—Clark & Ashley, Stockton, Cal

R. 10,983.—ORE FEEDER—J. & J. H. Hendy, S. F.

397,292.—COLLAR-STUFFING MACHINE — Geo. E. Hoyt, S. F.

397,295.—LIFTING MACHINE—Jos. G. Kearney, S. F.

397,385.—CABLE OR ELECTRIC STREET RAILROAD—W. S. Phelps, S. F.

397,450.—BOILER-TUBE PLUG—E. W. Tucker, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

COLLAR-STUFFING MACHINE.—George E. Hoyt, S. F. No. 397,292. Dated Feb. 5, 1889. The machine is intended for stuffing straw into horse collars. There is a combination of the receiver or hopper having an extension from its lower end over which the collar-tube slips, and a hook and counterbalance by which the collar-tube is held in place upon the filling-tube. The auger and actuating mechanism carry and pack the straw very firmly into the leather tube which is to form the collar.

BOILER-TUBE PLUGS.—Edwin W. Tucker, S. F. No. 397,450. Dated Feb. 5, 1889. This invention relates to the class of plugs or stoppers for closing up leaky boiler tubes. It consists essentially in a sectional plug adapted to be contracted to a diameter sufficient to enable it to be passed through the tube from the front to the rear end, said plug expanding again upon emerging from the rear end of the tube and encircling and covering its head. It consists also of a novel expansible plug consisting of a sectional ring by spring arms and a core fitting in said ring and holding it in place, the rods for carrying the expansible plug and the nuts for tightening it up. When a boiler tube becomes leaky from any cause, it is essential that it immediately be plugged up. This is usually done by drawing the fires of the boiler to enable a man to pass into the combustion chamber at the inner end of the tubes and then to place upon the rod which is passed through the tube from the front end a plug and nut similar to those which have already been placed upon the front end of the rod, so that by turning up the front nut both plugs may be drawn together tightly upon the end heads of the tube. The disadvantages of the mode of operation lie in the waste of time necessary for the boiler to cool after the drawing of the fires, the disuse of the boiler during this time and the danger to the operator, and these have led to many attempts to plug the tube entirely from the front. In some instances plugs in the form of ordinary interior stoppers have been passed through to the rear end of the tube by means of a rod, and also an expansible washer or packing has been employed, which could be pressed partially to cover the inner end of the tube. It is the object of Mr. Tucker's invention to provide a plug which can be passed through the tube from the front end and pushed entirely through, so that upon emerging from the rear end of the tube it can be fitted to place and cover the inner head of the tube in substantially the same manner as the ordinary plug covers it at the front end.

Mining Share Market.

Stocks continue dull, and there does not appear to be any immediate prospect of any change. The Virginia *Enterprise* says:

The mines along the lode still have good reserves of ore, and but for the unusual lack of water in the Carson river everything would be humming. A full milling stage of water cannot be expected. The small mountain tributaries of the Carson river are nearly all frozen solid, and until we have either rain or snow the water will steadily decrease in volume. A storage reservoir would now be a very good thing to have. The Nevada mill is running steadily to about two-thirds of its capacity. The water used there is made to do double duty.

The Virginia *Chronicle* says: The stamp-mills in Six-Mile canyon are in full operation again, their motive-power having been freed of ice by the mild temperature of the past week. The blanket-sluicers have also resumed concentrating sulphurets from ore tailings from the Chollar mill, the business proving profitable again now that the flow of the creek has been curtailed by discharging the water operating the surface Pelton wheel on those driving the Sutro tunnel dynamos.

The Con. Cal. and Virginia Company, after paying January operating expenses and disbursing the February dividend, has a cash surplus of $17,000. If the flow of the water in the Carson is not speedily increased by a snow or rainfall, the prospect of the bullion product of the mine the current month covering operating expenses and leaving a balance sufficient, with the coin surplus in the treasury, to cover a March dividend, is not flattering.

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COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Best & Belcher M Co	Nevada	42	25	Jan 10	Feb 15	Mar 7	L Osborn	309 Montgomery St
Baltimore S M Co	Nevada	4	25	Feb 4	Mar 8	Mar 26	A R Grim	402 Montgomery St
California Slate Co	California	3	30	Dec 13	Jan 19	Fe 18	J O Hansome	10 California St
Con Pacific M Co	California	10	15	Feb 5	Mar 11	Apr 2	F E Luty	330 Pine St
Gould & Curry M Co	Nevada	61	30	Jan 10	Feb 14	Mar 7	A K Durbrow	309 Montgomery St
Gray Eagle M Co	California	11	03	Jan 23	Feb 26	Mar 19	O H Bogart	327 Pine St
Julia Con M Co	Nevada	23	10	Jan 30	Mar 7	Mar 28	J Stadfeldt Jr	309 Montgomery St
Martin White M Co	Nevada	22	25	Jan 19	Mar 6	Mar 26	A B Cooper	325 Montgomery St
Mayflower M Co	California	44	50	Jan 14	Feb 18	Mar 11	J Murizio	328 Montgomery St
Nevada Queen M Co	Nevada	4	50	Dec 21	Jan 28	Feb 25	H Deas	309 Montgomery St
North Belle Isle M Co	Nevada	16	50	Jan 3	Feb 6	Feb 27	J W Pew	310 Pine St
New Coso M Co	California	22	30	Feb 5	Mar 14	Apr 1	J L Hunt	308 Montgomery St
Overman M Co	Nevada	59	25	Jan 15	Feb 19	Mar 12	G D Edwards	414 California St
Occidental Con M Co	Nevada	3	25	Dec 27	Jan 31	Feb 25	A K Durbrow	309 Montgomery St
Puget Sound Iron Co	Wash Ter	13	1.00	Dec 29	Feb 2	Feb 25	A Halsey	328 Montgomery St
Peer M Co	Arizona	7	10	Jan 28	Mar 5	Mar 28	A Waterman	309 Montgomery St
Piedmont M Co	Nevada	1	05	Jan 28	Mar 6	Mar 27	J J Scoville	309 Montgomery St
Savage M Co	Nevada	72	50	Jan 7	Feb 11	Mar 4	E B Holmes	309 Montgomery St
Superior M Co	Nevada	24	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
S F Natural Gas & Oil Co	California	1	25	Jan 3	Feb 4	Feb 28	J Scoville	309 Montgomery St
St Louis M Co	Nevada	2	05	Jan 14	Feb 18	Mar 16	W E Dean	309 Montgomery St
Scorpion M Co	Nevada	24	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
Scott Bar M & M Co	California	2	10	Jan 23	Feb 28	Mar 19	H Pink	313 Pine St
Union Con M Co	Nevada	37	25	Jan 4	Feb 8	Mar 1	J M Buffington	303 California St
Western Belle M Co	Nevada	1	20	Jan 24	Mar 1	Mar 21	J H Sayre	328 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DAT
North Peer M Co	Arizona	H Dess	309 Montgomery St	Annual	Feb 23
Standard Con M Co	California	J W Pew	310 Pine St	Annual	Feb 18
Spring Valley G M Co	California	H Pichoir	320 Sansome St	Special	Feb 26
Watt Blue Gravel M Co	California	G A Berton	313 Montgomery St	Annual	Feb 18

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	90	Jan 10
California M Co	Nevada	A S Chemhuata	328 Montgomery St	08	Nov 26
Candelaria Con M Co	Mexico	C T Givens	221 Market St	50	Nov 12
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Idaho M Co	California		Grass Valley	7.50	Feb 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Dec 10

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 24.		WEEK ENDING Jan. 31.		WEEK ENDING Feb. 7.		WEEK ENDING Feb. 14.	
Alpha	2.15	2.50	1.95	2.30	1.90	2.20	1.75	2 00
Alta	2.45	2.80	2.25	2.40	2.00	2.35	2 15	2.50
Andes	1.00	1.15	1.05	1.15	1.05	1.10	.85	1.05
Argenta	.10	.15	.10	.15	....	.10	.05	.10
Belcher	4.60	5.25	3.25	4 80	3.50	4.55	2.80	3.65
Bodie	....	....	....	....	....	....	....	....
Best & Belcher	5⅝	6.75	5⅜	6⅛	5.50	5⅝	4.75	5.50
Bullion	1.15	1.45	1.15	1.20	1.10	1.25	.95	1 10
Baltimore	.35	.40	....	.35	.20	.30	.20	.35
Belle Isle	....	.45	....	....	....	.40	....	.35
Bodie Con	....	....	1.55	1.30	1.60	1.75	1.60	1.70
Benton	4.00	6.25	3.30	3.50	3.00	3.50	....	3.50
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	....	.55	.50	.55	.50	.60	.50	.55
Con. Va. & Cal	8.50	9.00	7⅞	8.50	8.00	8⅜	7.50	8⅛
Challenge	4.50	4 90	4.25	4.50	4.30	5.00	4.10	4.60
Champion	....	....	....	....	....	....	....	....
Chollar	3 10	3.80	3.15	3.35	3.15	3.50	2 55	3.10
Confidence	13	13⅛	12⅝	13	13	15¼	13⅜	14⅛
Con. Imperial	.75	.85	.70	.75	.70	.80	.70	.75
Caledonia	....	.40	....	....	.40	.45	.35	.45
Con. Pacific	....	....	....	.05	....	....	....	....
Crown Point	5⅜	6.00	4.90	5.50	4.75	5⅛	4.45	5.25
Crocker	.95	1.05	.85	1.10	.90	1.10	.70	.85
Central	....	....	....	....	....	....	....	....
Dudley	....	....	....	.15	....	....	....	.15
East E. & B	....	....	....	....	....	....	....	....
Eureka Con	....	2.50	....	2 25	....	....	....	2.00
Exchequer	1.05	1.20	1.00	1.15	1.05	1.15	.90	1.05
Grand Prize	.95	1.10	1.10	1.25	1.05	1.15	1.05	1.50
Gould & Curry	2.75	3.20	2.70	2.90	2.70	2.85	2.55	2 85
Hale & Norcross	5.00	5.25	4.85	5.00	4.85	4.95	3.90	4 75
Holmes	....	....	....	....	....	....	....	....
Independence	....	.50	....	....	....	....	....	....
Iowa	.35	.40	....	.35	....	....	....	....
Julia	....	.35	....	.35	....	....	.25	.30
Justice	1.95	2.30	1.95	2.10	2.00	2.05	1.85	2.00
Kentuck	2.05	2.10	2.00	2.10	2.05	2.25	2.00	2.20
Lady Wash	....	.55	.45	.50	....	.45	.40	.50
Martin White	....	....	....	....	....	....	....	....
Mono	1.10	1.15	1.20	1.25	....	1.20	1.00	1.20
Mexican	3.35	4.00	3.30	3.60	3.40	3.50	3.05	3.65
Mt. Diablo	....	2.75	....	2.25	....	....	....	....
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.50	1.65	1.55	1.65	1.50	1.60	1.40	1 60
North Belle Isle	2 50	2.60	2.40	2.50	2.25	3.00	2.50	2 80
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.95	3.15	3.35	3.70	3.15	3.35	2.90	3.15
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.50	1.65	1.05	1.65	1.65	1.75	....	....
Ophir	5⅜	6⅛	5⅜	5⅞	5.25	6⅛	5⅜	5.75
Overman	1.25	1.65	1.25	1.40	1.25	1.45	1.15	1.30
Potosi	2.25	2.90	2.35	2.45	2.35	2.55	2.10	2.35
Peerless	1.35	1.45	1.20	1.35	1.05	1.15	.85	1.05
Peer	.35	.40	....	.40	....	....	.35	.25	.35
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	.10	....	....
Savage	2.75	3.20	2.85	3.20	2.90	3.10	2.75	3.30
S. B. & M	2.90	3.30	2.75	2.95	2.85	3.35	2.85	3.20
Sierra Nevada	3.00	3.50	2.95	3.05	3.05	3.35	3.10	3.25
Silver Hill	.75	.90	.75	.80	.75	.80	.75	.80
Silver King	1.25	1.40	1.00	1.30	1.25	1.30	....	1.05
Scorpion	.45	.55	.45	.50	.45	.60	....	.55
Syndicate	....	....	....	....	.25	.10	....	....
Union Con	2.75	3.15	2.60	2.75	2.70	3.30	2.85	3.20
Utah	1.25	1 40	....	1.25	1.40	1.50	1.20	1.35
Yellow Jacket	4.50	5.00	4.10	4.75	4.40	4.60	3.90	4.40
....	....	....	....	....	....	....	....	....

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Bluebird, Feb. 9, $15,624; Alice, 9, $13,856; Lexington, 9, $20,736; Cons. California and Virginia, 9, $92,342; total for January, $267,847; Peerless, 12, $12,070; Navajo, 12, $12,000; Mt. Diablo, 13, $7658; Peerless, 12, $3600; Savage, 12, $26,848; Bluebird, 10, $2960; Livingstone, 10, $20,352; Hanauer, 6, $2200; 7, $1750; 10, $2300.

Our Agents.

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Sales at San Francisco Stock Exchange.

THURSDAY, Feb. 14.

400	Alta	2.10	
500	Andes	.80c	
50	Alpha	1.70	
150	Belcher	2.75	
500	B. & Belcher	4½	
150	Baltimore	20c	
200	Bullion	.80c	
500	Belle Isle	35c	
350	Bulwer	50c	
160	Chollar	2.50	
560	Con Va & Cal	7⅛	
150	Con. Imperial	45c	
650	Crown Point	4 15	
50	Commonwealth	4.90	
30	Confidence	13	
200	Crocker	77c	
100	Dudley	15c	
900	Exchequer	85c	
1000	Grand Prize	1.25	
300	Gould & Curry	2.60	
535	Hale & Nor	3.50	
500	Justice	1.70	
200	Julia	25	
890	Mexican	3.0c	
250	Mono	1.00	
70	Nev. Queen	2.75	
50	N. Belle Is	2.60	
450	Ophir	.5	
100	Overman	1.05	
100	Occidental Con	1.60	
150	Potosi	2.05	
500	Peerless	85c	
300	Peer	25c	
200	Savage	2 80	
310	Sierra Nevada	2.90	
450	S. B. & M	2.75	
400	Scorpion	50c	
250	Utah	1.30	
350	Union	2.80	
700	W Comstock	35c	
450	Yellow Jacket	3.70	

THE owners of Thermalito colony intend to build a foot-bridge over the Feather river.

Sampling Works for Sale.

The works are situated at Daggett, Cal., in the Calico Mining District, and on side-track of the Atlantic & Pacific Railroad. They contain a first-class Engine and Boiler with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPY & CHILDS, 123 California street, San Francisco.

SHARES IN A GOLD MINE.

A limited number of shares of Buffalo Con. G. M. Co.—a developed and working mine in Sierra County, California—will be sold, in order to procure additional appliances in connection with the water supply. The mine has a mill and is producing good rock. The shares are non-assessable and held among a few owners, and none of them have been put on the stock market.

Apply to H. WIEDERSHEIM, Cave Cigar Store, No. 900 Market street, San Francisco, Cal., or by mail to No. 1513 Curtis street, Oakland, Cal.

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The Empire Foundry and Machine Shop in the city of Marysville, now and for many years doing a remunerative business, is offered for sale at less than half its value. Everything as it stands—stock, machines, patterns, real estate, etc., etc., will be sold on easy terms. A first-rate opportunity for establishing an agricultural implement manufactory as an adjunct. This is the only foundry and machine shop in the neighborhood.

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STOCKHOLDERS' MEETING.

OFFICE OF
The Superior Mill and Mining Company.

A SPECIAL MEETING of the stockholders of the Superior Mill and Mining Company will be held at the office of the company, Room 11, 303 California Street, San Francisco, California, on Wednesday, February 20, 1889, at 1 o'clock P. M., for the purpose of taking into consideration the increasing of the capital stock of said company from ten million (10,000,000) dollars, divided into one hundred thousand (100,000) shares of the par value of one hundred (100) dollars per share, to fifteen million (15,000,000) dollars, divided into one hundred and fifty thousand (150,000) shares of the par value of one hundred (100) dollars each. Transfer books will close on Monday, February 18, 1889, at 3 o'clock P. M. By order of the Board of Directors.

J. M BUFFINGTON, Secretary.

OFFICE—Room 11, No. 303 California Street, San Francisco, California.

EXTENSIVE GOLD MINE FOR SALE.

To be sold at public auction by the undersigned, at the Merchants' Exchange, in the City of Halifax, on Thursday the Fourteenth day of March next, at twelve o'clock noon, that extensive, valuable and well-equipped GOLD MINE known as the Dufferin GOLD MINE, situate on the Atlantic coast, about ninety miles east of said city. Daily mail from Halifax. Telegraph office at Salmon river, four miles from the works. Salmon river harbor never freezes, and is safe and easy of access. The mine embraces 342 areas, each 150x250 feet, all in one block. The entire area measures fifteen hundred feet in width across, and eight thousand five hundred and fifty feet along the lodes. The leases have nearly fourteen years to run, and can at any time be renewed for a period of twenty-one years, upon payment of two dollars per area. Within this area is a belt of veins dipping on each side of an anticlinal. They have been found by tests made on the surface to extend upwards of 4,000 feet The ore has been partially removed to a depth of 200 feet over a distance of about 700 feet, and to a depth averaging about 70 feet over an additional 1,000 feet in length or thereabouts. The veins are of various width, the largest averaging about ten feet of solid quartz.

This mine was discovered in the Autumn of 1880, but was not worked to any extent until the Autumn of 1881. It has yielded up to the end of November, 31,012 ounces of gold from 64,508 tons of quartz, according to the sworn returns made to the Mines Office. The gold can be produced at a cost which will leave a very handsome margin of profit.

The mine is operated by machinery worked by water power, the power being transmitted by a line of wire rope running from the water wheel to the mine—a distance of about 4,750 feet—and lying parallel to the outcrop of said veins, at a distance therefrom of about fifty feet. The Salmon river crosses the property twice. It supplies the hoisting and pumping power, and the same water is afterwards used to drive the crusher. The latter has thirty-eight stamps, and there is ample water power to operate three times that number. Sixty stamps can be operated with present machinery. Of the 120 horse-power existing for pumping and hoisting only about twenty-five is used. There are about 700 acres of well timbered and well watered land owned with the mine. This partly covers the areas, and where it does not immediately adjoins them. It is also provided with a steam plant to operate hoisting gear and pumps in case of accident to the transmission power, a sawmill, sufficient for the requirements of the property, a tramway from the mine to the crusher for carrying quartz, and stables, offices, and boarding-houses, sufficient to accommodate a large number of employees.

The mine is owned and has been operated by a partnership, and owing to the death of one of the principal owners it has to be sold to enable his estate to be settled. A good title will be given.

Terms, ten per cent cash, balance within thirty days from day of sale. The deposit to be forfeited in case the purchaser fails to complete the purchase within that time. Further particulars can be had on reference to N. H. MEAGHER, Q. C., Bedford Row, Halifax, or to JAMES DUGGAN & SONS, Auctioneers, Bedford Row.

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THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No 1, 32 ft; No. 2, 9½ ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

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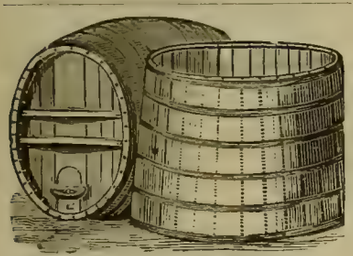

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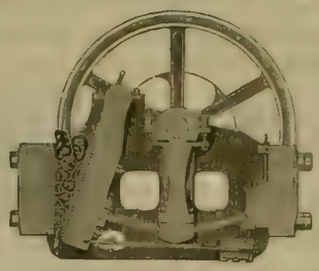

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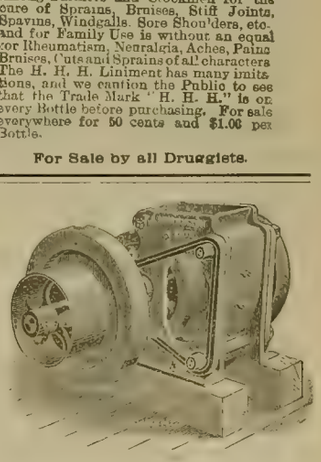

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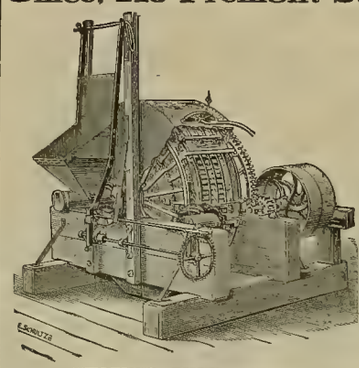

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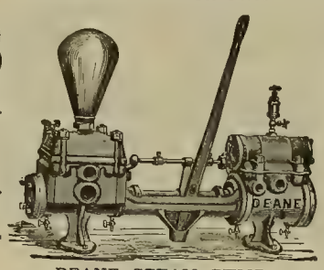

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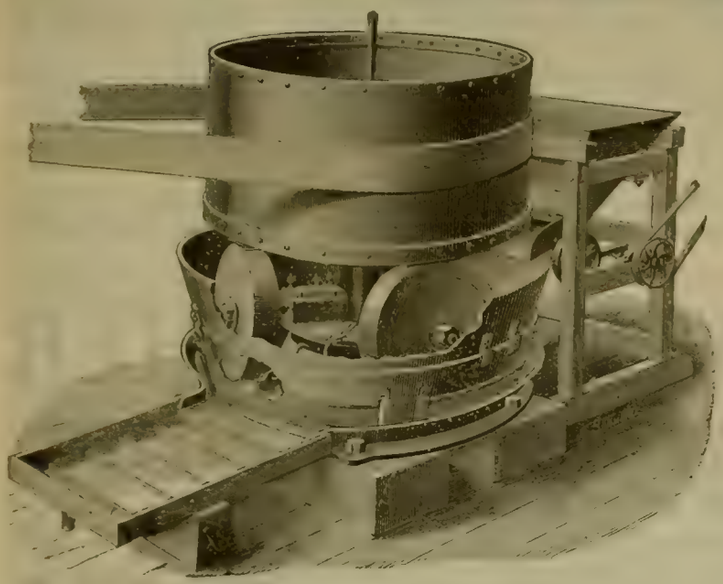

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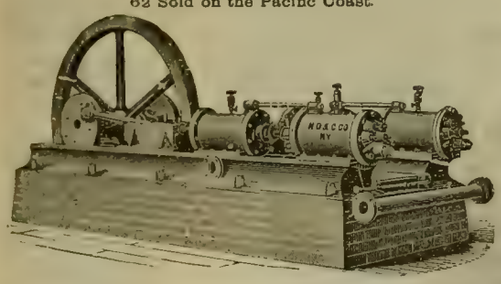

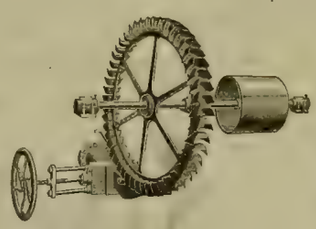

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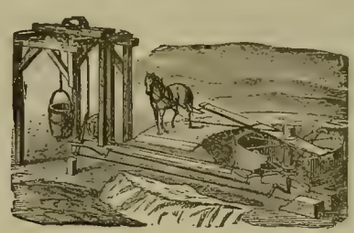

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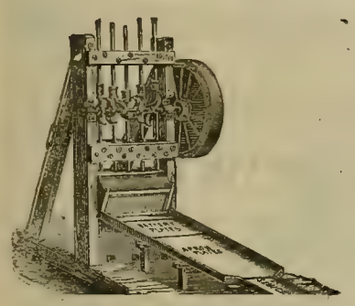

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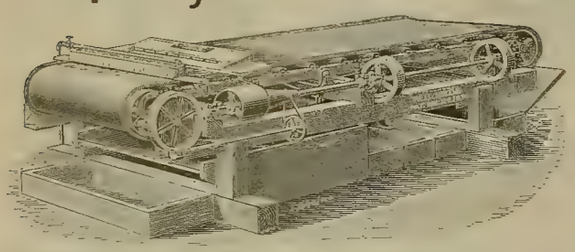

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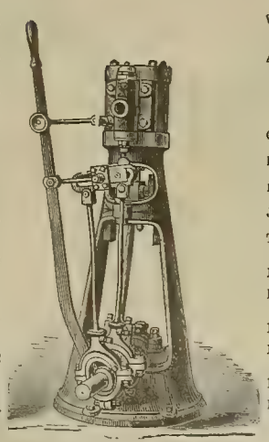

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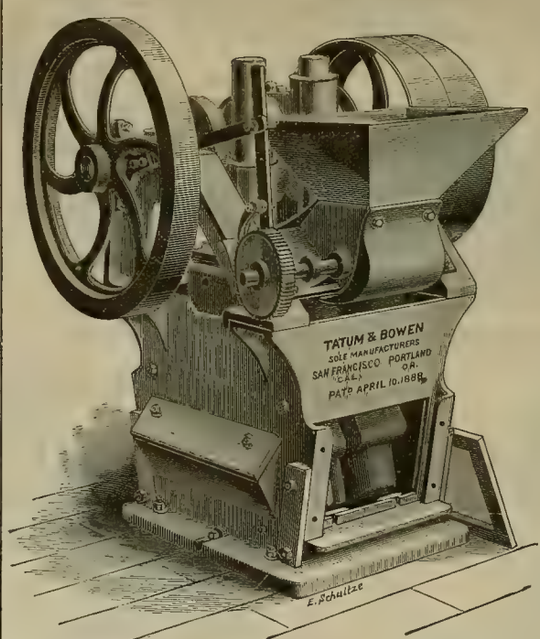

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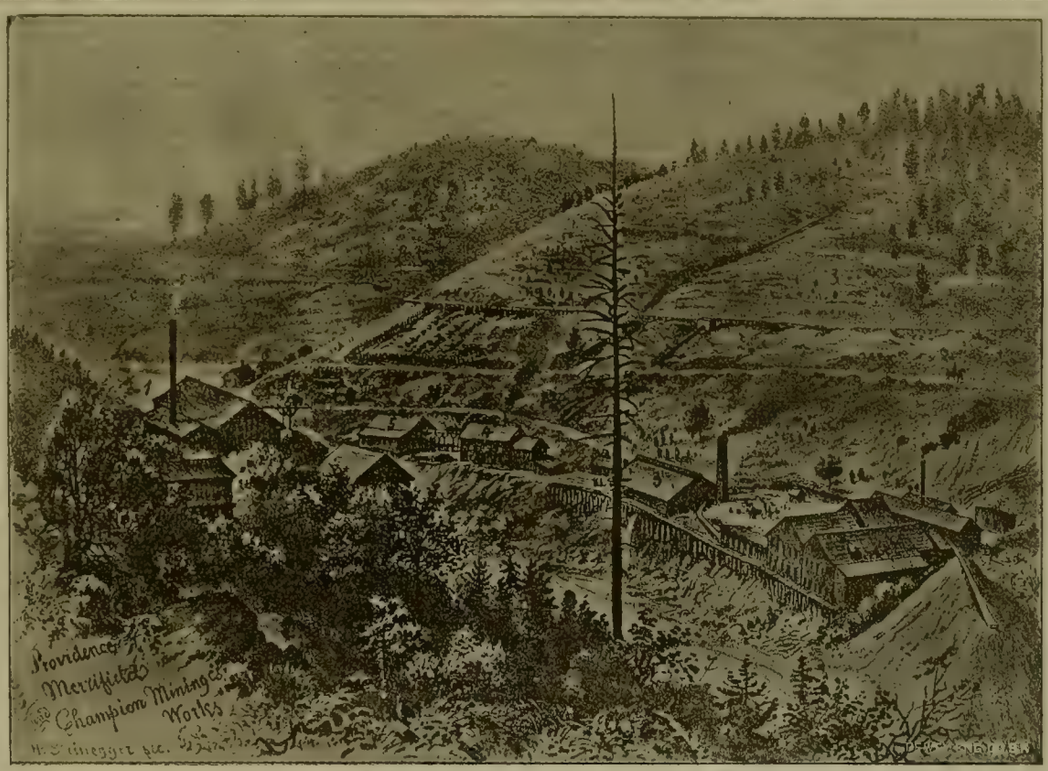
Nevada City Mines.

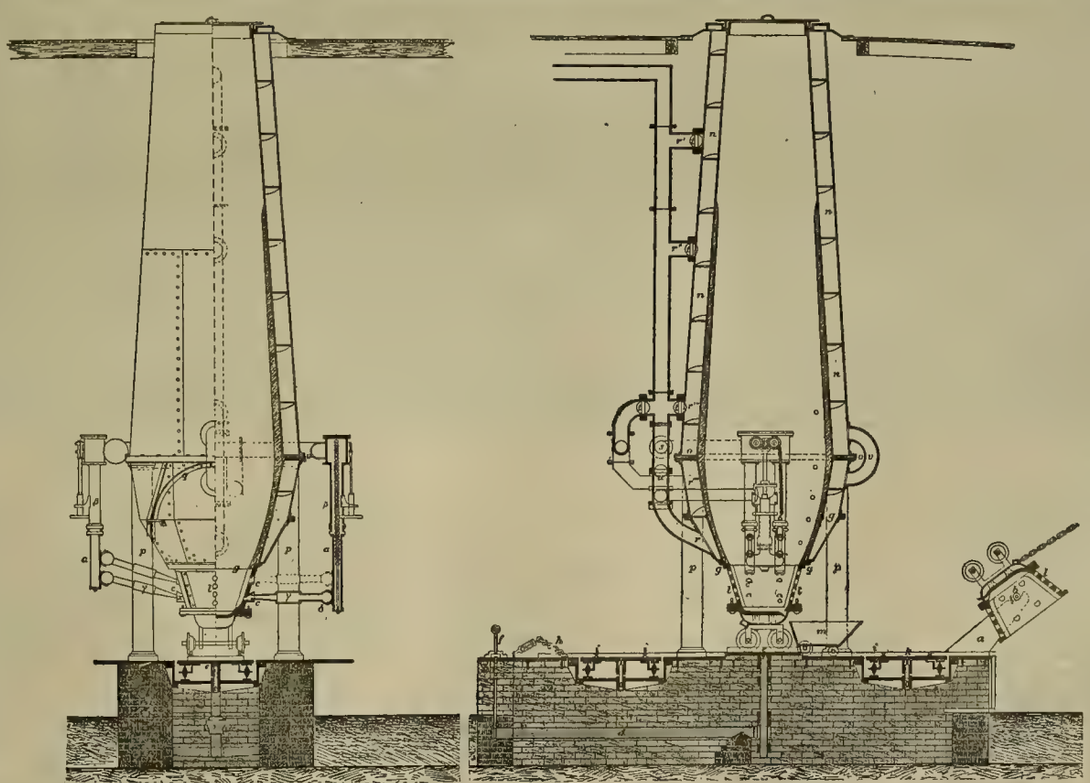
A sketch is given on this page of some of the mining and reduction works on Deer creek, Nevada City district, Nevada Co., in this State. In the sketch No. 1 is the Providence hoist; No. 2 the Merrifield mill; No. 3 the Merrifield chlorination works; No. 4 the Champion hoist; and No. 5 the Champion mill. The building further on, beyond No. 5, is the Wyoming hoisting works.

The Providence mine has been let to tributers of late, and efforts have been made to "place" it on the London market. The Champion has a ten-stamp mill, which is supplied with ore yielding from $5 to $9 per ton in free gold and four per cent of sulphurets. The latter contain from $70 to $75 per ton in gold. The vein is about two feet wide.

The Merrifield chlorination works are leased by Mr. H. Stansfield, who buys concentrated sulphurets from the various mills, paying from 85 to 90 per cent of the result of sample assay. His charge for custom work is $18 per ton. These works consist of a reverberatory roasting furnace 70 feet by 10 feet, with a capacity of three tons of concentrates in 24 hours. The works contain two chlorine generators, four "gassing tubs" (chlorinating vats) three precipitating tubs for gold, three for silver, and other usual implements and apparatus. The dimensions of the "gassing tubs" are: diameter six feet eight inches, depth two feet six inches inside, with a capacity for three tons of ore. The precipitating vats for gold have a diameter of six feet and a depth of three feet, those for silver being of like dimensions. The leaching tubs for silver are similar to the "gassing tubs." The vats are coated with a mixture of asphalt and coal tar, in the manner first introduced by G. F. Deetkin, M. E.



REDUCTION WORKS ON DEER CREEK, NEVADA CITY DISTRICT.



WARTSILA FURNACE, 1884.—Half-Elevation. (See page 137.) WARTSILA FURNACE, 1884.—Vertical Section.

In the report of the State Mineralogist it is stated that after the gold has been leached out, the ore, if it contains silver, is transferred to the silver leaching-tubs, where it is leached with calcium "hypo" for the silver. The latter, after being thus extracted, is precipitated as silver sulphide in the precipitating-tubs, by stirring in a solution of calcium polysulphide. On the sides of the silver precipitating-tubs a thick black crystalline crust has formed, which contains a large proportion of silver, it being probably gypsum and silver sulphide.

The chlorine generators are of the pattern formerly used by Prof. Crosby at Nevada City, being without stirrers. They stand in a slightly inclined position, so that the bottoms slope downward from the point of ingress of the acid. A water bath is used for heating the generators, it being preferable to a hot plate, as it prevents too high a degree of heat, which causes the solid in the generator to form a hard crust, troublesome to remove. The tops of the generators are of the flat style, luted in a flange. They very seldom require to be raised, as, by avoidance of too high heat, the exhausted charge is readily removed by means of a stream of water, through the spout in the side, which passes through the wall of the iron pan forming the water bath. For the eduction of the chlorine there is a short, wide standpipe in the cover, in the upper end of which is fitted a plug of lead carrying the eduction pipe, also of lead. Another similar arrangement carries the S tube by which acid is introduced, this being made wide enough to serve also, on removing the plug, for the introduction of the charge of manganese

(Concluded on page 137.

CORRESPONDENCE.

We admit unindorsed, opinions of correspondents.—EDS.

Moths, Gnats and Skeeters.

EDITORS PRESS:—From the earliest that we read of the Rocky mountains, the buffalo or bison seldom, if ever, crossed to the west of those mountains, albeit there is abundance of good buffalo feed between the Rockies and the Sierras. Lewis and Clarke tell us that the Shoshone Indians of what is now Eastern Idaho and West Montana were compelled, at the risk of being scalped, to cross the mountains for buffalo meat or starve to death; that was in A. D. 1805. The buffalo did not then cross the Rockies nor ever since. Is that beast afraid of a mountain? No. I have walked in his ancient trails where he used to cross the mountains in Virginia. In fact, the National road from the Atlantic seaboard to the Ohio river, practically followed the old buffalo trails across the mountains. What then was it that kept the buffalo to eastward of the Rocky mountains? I answer: "*Gnats and skeeters.*" The nearer you approach westward toward those mountains the more numerous become the alkali flats with their accompanying little sandhills. In these sandhills breed myriads of almost microscopically small black gnats with silky white wings. These gnats, though small, are powerful—very powerful—and they are "pizen" to a buffalo. They get in among his long hair and set him "plumb crazy." And I assume, from some actual observation, the depressed places on the "plains across," commonly known as "buffalo wallows," will be found most numerous near the alkali country, or also near streams where mosquitoes abound.

Now, when one reflects on the vast herds of innumerable buffalo seen by Lewis and Clarke, and so recorded, 84 years ago, is it not wonderful that the route of the yearly journeyings to and fro, north and south, of these vast herds, should be directed by a miserable little gnat? There is a gnat called the "buffalo gnat," but I do not think it is the same as the "alkali gnat" nor quite so venomous.

Let us take note of what a large contract the gnats once had in the buffalo business. The History of the Expedition of Capts. Lewis and Clarke says, under date of July 11, 1806: "They" (the buffalo) "at this season, are bellowing in every direction, so as to form an almost continual roar, which at first alarmed our horses, who, being from the west of the mountains, are unused to the noise and appearance of these animals." The expedition was then on its way home to St. Louis from the Pacific Coast, and these buffalo were seen on the headwaters of the Missouri river.

Again, "Saturday, July 31, 1806, during the whole night the buffalo were prowling about the camp and excited much alarm lest in crossing the river (Upper Missouri) they tread on the boats and split them to pieces."

"Sunday, August 1st. * * * * * The buffalo now appear in vast numbers. Such was the multitude of these animals, that although the river, including an island over which they passed, was a mile in length, they stretched, as thick as they could swim, completely from one side to the other, and the party (of the expedition) was obliged to stop for an hour." The river at that point, before it is split by the island, is one mile wide, so that here was a column of solid buffalo beef more than a mile square succeeding itself every minute for an hour. That scene must have meant *meat.*

Again, says this history, "August 29, 1806 (near the mouth of White river, now Lyman county, Dakota.) * * * * These last animals are so numerous that from an eminence we discovered more than we had seen at one time; and if it be not impossible to calculate the moving multitude which darkens the whole plain, we are convinced that 20,000 would be no exaggerated number."

[NOTE.—These are but a few of the herds mentioned by Lewis and Clarke in the years A. D. 1805–6, the history of the expedition of many herds numbering from hundreds to thousands in each, and to-day, January 29, A. D. 1889, the American bison is extinct. Gone, gone, gone!]

Now about the gnats and skeeters. A mosquito is bad enough, but not so bad as the gnats of the alkaline plains. You can scarcely see those gnats and you cannot feel the biting in their first work on you, when they are biting, but in a few hours afterward the external skin about your head, ears, eyebrows and whiskers becomes sore and irritable—you are tempted to rub or scratch, and the external layers of the skin peel off, to the red, in a thin, angry blister. Into this blister the gnat works daily, aided and abetted by his cousin, the mosquito, unless you tie up your head in a veil of very fine meshes or dope it with rank bacon grease; goose grease tinctured with kerosene is good enough.

Lewis and Clarke call these gnats by different names, frequently denominating them "eye-gnats," and I assume that this name is given because the earlier noticeable work of the gnat to a "tenderfoot" is seen just in and below the eyebrows. But the "Expedition" does not speak—that is, not seriously—about gnats until it gets into the alkaline country along the upper portions of the Missouri river. Of course all along this river and its tributaries, when the wind and weather will permit, countless millions of mosquitoes are not exactly like angels on the wing. The mosquito, however, does not go very far out upon the treeless, naked, breezy plain, away from shade and water; but the gnat is found wherever alkali abounds, and that is nearly all along the more immediate eastern slope of the Rocky mountains. From the Pacific surf to the summit of the Rockies—some 600 miles—the "Expedition" records no complaint about gnats or mosquitoes, albeit they journeyed on the waters of the Columbia river in canoes most all the way; but just so soon as they turn the summit and start down the eastern slope, the complaints begin.

At a distance easterly of nine miles down from the most easterly summit they camp for the night, and make this entry in the journal of travel on the 7th of July, 1806: "We procured some beaver, and this morning saw some signs and tracks of buffalo, from which it seems that those animals do sometimes penetrate to a *short distance* within the mountains." [The italic business is mine.]

Now let us notice from this history how troublesome the gnats and mosquitoes were to the voyageurs. On the way out there is constant cry about these insects, particularly the mosquitoes, as the party voyaged by water. Above the great Falls of the Missouri—now in Choteau county, Montana—July 13, 1805, * * * * the mosquitoes and gnats persecute us as violently as below, so that we can get no sleep unless defended by biers (bars), "with which we are all provided." And thus it continued to the fountain-head of the Missouri; at which point, by the way, one of the men employed by the expedition, putting a foot on each bank of the little "spring branch," took off his coonskin cap and enthusiastically exclaimed: "Thank God, I've lived to straddle the Missouri river."

But it was on the return trip the insects made monstrous manifestations. At the Missouri Falls, July 15, 1806. * * * * "We are now troubled with another enemy, not quite so dangerous as the grizzly bear, though even more disagreeable; these are the mosquitoes, who now infest us in such myriads that we frequently get them into our throats when breathing, and our dog even howls at the torture they occasion."

At the mouth of the Yellowstone river—now Gallatin county, Montana—in camp "Aug. 4, 1806. The camp became absolutely uninhabitable in consequence of the multitude of mosquitoes; the men could not work in preparing skins for clothing, nor hunt in the timbered lowgrounds."

"Aug. 5th, as they proceeded. On one occasion Captain Clarke went on shore and ascended a hill after one of the big horns; but the mosquitoes were in such multitudes that he could not keep them from the barrel of his rifle long enough to take aim."

The quotations are not taken from random notes of individual travelers, but from the archives of the United States Government, sanctioned and sanctified by being indorsed by the sacred name of Thomas Jefferson, President.

Who would want to be a buffalo and take the risk of going any further west in such a country?

I have no hesitation in attributing great powers to insects. Livingston, the African traveler, informs us that he could not take his horses and cow-cattle into the interior of Southern-Central Africa because a fly, the tzetze, bit them to death. And I know from much reading and some earnest experience that a few "bugs" are laboring night and day to get up a "fruit trust," and to control the horticulture, viticulture, citriculture and several other cultures in California.

There is much to be learned from insects even by capitalists, monopolists, and trustmongers, or by the lounging, non-laboring, never-sweats of the labor howlers. Finally, brethren, let us all piously remember that the Good Book says in one of its entomological verses:

"Go to the ant, thou sluggard."

Yours largely, J. W. GALLY.

Watsonville, Jan. 29, 1889.

SCRUB TIMBER IN NEVADA.—D. L. Bliss of Carson testified before the sub-committee of the Senate Committee on Mines and Mining that if the cutting of scrub timber on the lands of Eastern Nevada was prohibited it would put an end to mining operations there. He swore that the timber was unfit for any purpose except to be used for firewood, etc., and that the refusal to permit it to be cut would ruin the farmers as well as miners, inasmuch as the farmers depended upon the miners to buy their produce.

THE suit of Richard F. Knox et al. against the Great Eastern Quicksilver M. Co. has been dismissed in the United States Circuit Court by consent of both parties. The action was commenced to recover $40,000 for the alleged infringement of a patent on furnaces, but since then the parties to the action have settled their grievances out of court.

IN testing steel at the factories for U. S. war vessels, a good many boards of naval officers are necessary. The Secretary of the Navy has a new plan, which is to hold manufacturers responsible for all steel used and only test it after the vessel is ready.

The Acorn and the Oak.

[Read before the California Academy of Sciences, Feb. 4, 1889, by THEODORE H. HITTELL.]

I hold in my hand an acorn. It is the nut of that species of the oak which is familiar to everybody throughout California, and commonly called the Californian White Oak. To science it is known sometimes as *Quercus Hindsii*, sometimes as *Quercus Longiglanda*, and sometimes, and most generally, as *Quercus Lobata*.

This acorn, as will be perceived, is elongated, conical and rather sharply pointed. It is about an inch and a half long and half an inch in its thickest transverse diameter. Such seems to be the usual size and shape of the nut; though in some cases, owing to peculiar conditions, it is found as much as two and a quarter inches in length, and a little thicker, or a little thinner, than half an inch crosswise, as it may happen.

In solid measurement, it may be estimated, with sufficient precision for present purposes, to be equal to two cubes of half an inch each—in other words, to one-quarter of a cubic square inch.

The oak which produces it is common throughout nearly the whole State of California, on the plains and in the foothills, and forms one of the most attractive features in the landscape of our beautiful valleys. It is a majestic tree in appearance, sometimes with a trunk as much as twenty feet in circumference, a hight for the topmost branches of a hundred feet, and a spread of limbs on each side of sixty feet.

In some cases under extremely favorable circumstances, the outer branches hang down with an almost uniform size of ten, twenty, thirty or more feet, the lower ones sometimes reaching the ground. Trees with such depending branches frequently receive in popular phrase the name of hanging or weeping oaks; but they do not essentially differ from the other white-oaks of the State.

In all, there appears to be a tendency in the ends of the long branches to depend; and in the cases referred to this tendency is so greatly developed that the small outer limbs seem to hang like leafy vines, and to sway backward and forward in graceful sweeps with every breath of the summer zephyrs.

Taking one of the best specimens of this magnificent tree, and calculating the solid contents of its wood and bark, and it will be found to contain about eighteen cords, or, in rough numbers, about four million (4 000,000) cubic inches This makes a mass sixteen million (16 000,000) times larger than the acorn. There can be no doubt that every oak tree, or nearly every tree, that is found in the State grew from an acorn; but, on the supposition that some trees have grown up from the roots of other trees produced from acorns, then the above-mentioned comparatively immense mass of wood and bark, considered as getting its start from a single acorn, must be prodigiously increased.

If the acorn be opened by cutting through the hard outer shell and examined, it will be found to consist of two equal or nearly equal halves, between which at the pointed end is a body, looking something like a very small, smooth, whitish-colored worm, usually called the germ. It is this germ that grows when the acorn is placed under the proper conditions of heat and moisture. The other parts, the two halves before mentioned, are merely the food stored up for the support of the germ in its earliest stages of growth, and the hard outer shell is merely the armor, which protects the germ and its store of infant food until such time as it may find proper conditions of heat and moisture for its growth. Such being the case, it is evident that the size of the great tree, before spoken of as containing a mass sixteen million times larger than the acorn, must, if compared with the size of the little germ, be increased many thousands of times. And again, if the germ be microscopically examined it will be found that its life-bearing part, the part which grows or originates growth, is a mere cell, so small as to be invisible to the naked eye. If an attempt should be made to compare the size of the full-grown tree with the size of this cell, from which it starts when it commences its growth, the calculation would lead to almost endless files of figures like the blackboard filling quantities that are used in astronomical determinations.

It was at one time a question whether the acorn originally came from the oak or the oak from the acorn; in other words, which was first created. According to the first chapter of Genesis, "the earth brought forth grass, and herb-yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind." It is difficult to understand exactly what was meant by this account of creation. Until comparatively recent times, the general understanding seems to have been that the tree full grown, with its fruit and seed fully ripened, was at once produced by creative act. But the statement that the earth "brought forth" the grass and the herb and the tree yielding fruit, does not affirm that it brought them forth in the beginning in any different manner from that in which it brings them forth now.

How is the oak brought forth now? Unless the acorn is subjected to the proper conditions of heat and moisture, it remains an acorn.

It is difficult, perhaps impossible, to say how long it could be kept an acorn capable of germinating. Doubtless a very long time. It is said that some of the wheat buried in the pyramids of Egypt three thousand years ago, will still germinate and grow. If this statement be correct, there is no good reason why an acorn, capable of germinating, might not be kept for nearly as lengthy a period. As long as it can be and is so kept, it is obvious that it contains within itself the principle of life. It is in all essential respects a living thing, though not in the sense in which the term [illegible] ordinarily understood. It has no [illegible] and no growth or change of sub[illegible] more than so much other dead or in[illegible] But for all this, it still lives, is still [illegible] thing, or, if the expression be preferred, ing being. When such an acorn is subject[illegible] the proper conditions of heat and moisture, [illegible] little germ begins to move and expand. The principle of life within it, which has hitherto remained dormant becomes active. The process consists in the first place of an appropriation by the germ of the matter which is stored up in the acorn itself. Very soon the germ, as it moves and expands, bursts the shell of the acorn; and while one end springs upward toward the light and air, the other end sinks downward into the ground. In a comparatively short time all the food-matter, which is stored up in the acorn, is appropriated. By this time, however, the plant has begun to draw the food necessary to its growth from the air by means of its leaves and stems, and from the ground by means of its roots; and it goes on thus drawing and appropriating food from the air and the ground until in the course of time, by continued appropriations and accessions, it becomes the magnificent tree which so often excites the admiration of the traveler in our scenes of quiet sylvan beauty.

The fundamental principle in the growth of the plant, after it has taken its start, is the appropriation and incorporation into its own substance of various inorganic substances, which it finds distributed at large in the air and earth. The chief of these substances, or, in other words, the main food of the plant, is carbon. This carbon is eliminated through chemical processes from the carbonic acid contained in the atmosphere by means of the leaves and stems, all and every square inch of which is more or less exclusively devoted to this purpose. Such being the case, it is obvious that all the outside of a plant is, so to speak, its stomach, or, in other words, the organ or series of organs by which it assimilates its food. In this respect it, of course, differs from an animal, the fundamental idea of whose organization is an inside sack or stomach, comparatively small in size and being the only part of the animal body adapted to the reception and assimilation of food. Broadly stated, therefore, one of the great differences between the animal and the plant, in addition to those more obvious characteristics which distinguish the separate kingdoms of nature to which they respectively belong, is that while the animal has a stomach resembling a sack with the food on its inside, the plant has a stomach like a sack turned inside out with its food on the outside.

Another of the great differences of the same general character between the animal and the plant, and arising chiefly from the before-mentioned differences of their organs of nutrition, is that while the food of the animal is mostly either in a solid or fluid form and consists almost exclusively of organic matter, the food of the plant, with the exception of some comparatively small quantities of water and earthy matter taken up by the roots, is just as exclusively of inorganic matter and just as entirely of aeriform or gaseous nature. Whatever and however important a part the water and earthy matter extracted by the roots from the ground may play in the growth and development of the plant, there can be no question that the main, and, as before stated, almost exclusive, source of its food, is the carbonic acid gas of the atmosphere. This is produced and thrown out into the air by combustion of various kinds, and not least by the combustion upon which animal life depends, and is wafted and distributed over the earth by the winds. Thus the currents of the air are the food-carriers of the forests and fields as the currents of the sea are the food-carriers of the continent-forming shell banks and coral reefs.

In the days of Job—who, by the way, was one of the first and best of scientific observers—it was supposed that wind alone as a food-supplier could afford but a lenten entertainment.

It will be recollected that, as an illustration of the very acme of vanity and emptiness, the patriarch was substantially asked whether he could fill his belly with the east wind. The answer, had there been a direct one, would probably have been, No. But on the other hand Job might just as well and just as truly have answered that the grasses and the herbs and the trees, that yielded him and his flocks food, filled their bellies with the east wind and found it very solid and substantial pabulum.

To consider for a moment how the southeast trades suck up the waters of the South Pacific; how they carry them over one-half the globe and pour them with open-handed liberality upon our Californian orchards and fields, opening their pores and enabling them to transform and assimilate the substances contained in the air into fruit and grain, and how they thus yearly crowd our markets and pack our warehouses and load our ships, we may well say: "Perhaps not directly, but indirectly, Yes; we are all filling our bellies with the east wind."

The facts that the atmosphere is the food-magazine and that the winds are the food-carriers of the vegetable kingdom, and the fact that the food of plants is not only inorganic, but gaseous in its nature, lead naturally

to the question, what change takes place when the food contained in the atmosphere is converted into the substance of the plant? or, to come back to our special subject of investigation, how is the great oak produced out of the little acorn? As the process goes on from the first movement of ... there is plainly a continual accession ... absorbed by the leaves from the air ... reformed from inorganic into organic ... or, if the expression be preferred, from ... matter into live matter. What quality is ... communicated to the carbon, that is incorporated into the growing oak, which was not contained in the carbon that was circulating over land and sea on the wings of the wind?

If this quality be life, and if this life be something which was not inherent in the inorganic matter, then it follows that every particle of living matter contains something which did not exist in it before, and which could not exist unless it were newly created. If this thing called life is then a newly created thing, it must be created with every change of matter from the dead inorganic state to the living organic state. Such a supposition would of course necessitate the assumption not only of an infinite number of little creations going on at the same time, but also of an infinite series of such little creations succeeding one another as long as living beings should grow and should continue to grow. Every leaf and every infinitesimal cell of every leaf of the oak is a laboratory where this change is going on; and the whole oak, as a living integer, is but an aggregation of an infinity of these little changes, each one of which, separately, is so small as to be invisible.

In contemplating the growth of the oak from the acorn, therefore, and comparing the great mass of living matter contained in the eighteen cords of which the full-grown tree consists with the microscopic germ from which it originates, we are obliged either to consider each increment of growth as a new creation caused by a separate act of creative power, or to attribute it merely to a new arrangement of matter arising necessarily from the inherent nature of the matter entering into the new growth as subjected to the influences surrounding it. When a loadstone is brought close to iron filings, the latter move and arrange themselves in definite lines. There are in this case movements, and movements in an invariable direction, in accordance with the position of the magnet and the inherent nature of the particles of iron. But the movements of these particles are not regarded as out of the natural order of things or involving the exercise of any extraordinary or unusual powers. Again, when a solution of salt reaches a certain density, a certain number of the salt molecules shoot out in invariably definite directions and form those magnificent aggregations called crystals. Here again there are movements and movements in an invariable direction inherent in the nature and constitution of the solution itself. The formation of the crystal seems in one sense to be the creation of a new thing; but chemistry teaches us that there is nothing in the crystal that was not in the solution, and that the only change which has taken place is merely a change in the position of the molecules of the salt, they being in the one case held suspended in the solution and in the other case aggregated according to definite laws of polarity in the solidified mass. Wonderful as the formation of the crystal is, the powers which produce it are inherent in the nature of the substance or substances which build it up. But no one regards these powers as extraordinary. On the contrary, they are supposed to be as natural as the law of gravitation or any other of the conditions under which all matter exists.

If, now, we contemplate a growing oak leaf, and carefully examine the composition of the new structure, we will find that it has merely added to its size by increments of new matter taken from the surrounding medium. It has managed like the loadstone to draw from the atmosphere the particles of matter suitable to its growth, and, like the crystal, it has arranged them in definite positions. The formation of the leaf is a more complicated process than the formation of the crystal, but there does not seem to be any good reason, merely on account of its greater complication, to suppose that the one is any less a natural process or any more requires the exercise of creative power than the other.

There is nothing in the completed leaf that was not in the material environment, any more than there is anything in the crystal that was not in the solution.

In each case, matter of certain kinds was aggregated under certain conditions; and, so aggregated, the live leaf was the natural result in the one case just as the definitely angled crystal was in the other.

Mention has already been made of the acorn as capable of existing for an indefinite period simply as an acorn, with the principle of life contained within it in a dormant state. If such an acorn were never to sprout, it could not in the ordinary sense be said ever to live as an independent being. But if at any time, be the period a year or a century or thirty centuries, it should be subjected to the proper natural conditions of heat and moisture, it would immediately assume the movements and qualities which are termed life.

If what is thus called life is the natural result, and nothing more than the natural result, of the influence of the heat and moisture upon the dormant and otherwise dead matter of the acorn, why may not the combined heat and moisture be called the cause of the resulting life? If they do not create the life resulting

(*Concluded on page 133.*)

THE NEW UNITARIAN CHURCH, SOUTHWEST CORNER GEARY AND FRANKLIN STREETS, SAN FRANCISCO.—See page 133.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

KEYSTONE.—*Ledger*, Feb. 16: Some 30 men were discharged from the mine last Saturday. It is understood that this is a preliminary step to the closing of the mill. The mill is running at present to its full capacity, but we learn that the Blue Lakes Water Co. has been notified that after the present month no more water will be needed at the mill, unless a better grade of ore is encountered. It is of course the intention to do some extensive prospecting before any idea of final abandonment is entertained. This prospective suspension or partial suspension of work at the famed Keystone is the severest blow that has fallen upon the mining industry of the county for years. The Keystone is the oldest bullion producer in the county, and has probably contributed more to the world's stock of gold than any other mine in the county. For many years the ore averaged from $10 to $12 per ton, and her monthly output reached between $30,000 and $40,000. For several years past, however, the quality of the rock has seriously deteriorated, and of late it has failed to respond in paying quantities. Although prospecting has been carried on very extensively, no ore body of any consequence has been discovered below 1200 feet. The stoppage of the mill will throw 60 or 70 men out of employment.

AMADOR GOLD MINE.—The south shaft is now down 450 feet where the company are cutting out for a station, after which the sump will be made and ground excavated for the water-tanks. The shaft will then be prepared for the pumps and skips. Laborers are now grading out for the ore bin. Monday a gang of men will commence getting out rock for the foundation walls. One hundred and sixty-five rods of ditch have been completed.

MISCELLANEOUS.—Mr. Ballard of the New London mine is expected up this week, when steps will be taken toward the erection of a 40-stamp mill on this property. W. G. Anderson of the New York mine has received reports from the ore he shipped to San Francisco to the effect that it assayed over $40 per ton.

PLYMOUTH CON.—Forty stamps of the Pacific mill were started this week. Additional men are being put on almost daily, and Plymouth begins to assume an air of activity once more. The general opinion still is that the Empire mill will not be started.

ALPI.—*Dispatch*, Feb. 16: We visited the Alpi last week and found the shaft down about 25 feet, while the tunnel which is being run in to tap the same is in about 40 feet. Like the other mines south of Sutter creek, the quartz is east of the granite, with a gouge between. The ledge is an immense one and the only question is will the rock pay? The sulphurets have a copper color, and the rock is flinty. Neither is a good indication, yet every piece of quartz prospects well. The ledge is so large and so easily mined that we believe it will pay, and well, too, if managed right.

MORLEY MINE.—This is a new name to Amador miners, yet it is none other than the old Wetzlar claim in Hunt's gulch, three miles south of Jackson. The new company evidently means business, as on the first of this month they gave a contract to the Risdon Iron Works of San Francisco to erect and complete for them a 20-stamp mill.

Butte.

THE GOLDEN QUEEN.—Oroville *Mercury*, Feb. 16: The ten-stamp quartz-mill at the Golden Queen mine at Forbestown is completed. In the coming spring another ten-stamp mill will be added. The mine shows a better prospect than ever before. A seven-foot ledge, heavily sulphureted, carrying about ten per cent, has been shown up. The coming summer the owners contemplate the erection of chlorination-works with a capacity of three and perhaps six tons per day. Never before in the history of Forbestown were the prospects more flattering for a big yield in quartz mining. Big shipments of bullion have already been made to the mint.

Calaveras.

BALD HILL.—*Mountain Echo*, Feb. 16: A few days since we were shown some splendid specimens of quartz taken from the Bald Hill mine, situated near Albany Flat and about two miles southwest of Angels. The ore is of a different character from any we have yet seen in this section. It was taken from a depth of 60 feet, where the vein is nearly six feet in width. The specimens shown us would, in our judgment, yield at least $500 a ton. The ore contains a large per cent of sulphurets, some of which have been tested and yielded as high as $2400 a ton. This property was formerly known as the Brunner mine, but is now owned and worked by Thos. Machell & Co. It has always been the supposition that this mine was only a surface talc formation and, therefore, of little value, but later developments have proved it to be a true fissure and a valuable mine.

MOKELUMNE HILL.—The quartz mines in and around Mokelumne Hill have not even been prospected, and, judging from the enterprise displayed in that direction of late years, they never will. There are many good ledges in and around Mokelumne Hill, which, if developed, would prove productive mines.

El Dorado.

MIDDLE FORK. — Georgetown *Gazette*, Feb. 14: Wm. Roland passed through Georgetown on Monday, from Placerville, on his way to the Middle Fork G. Mining Co.'s mines, owned by Prof. Price & Co. Some three months ago Mr. Roland began the work of prospecting a large and promising ledge for the company on the El Dorado side of the river, just below Volcanoville, in Sec. 7 of Tp. 13 N., range 11 E. A tunnel has been run on the ledge 200 feet, and a crosscut made which shows the lode to be 28 feet wide, and looking well. This mine has the advantage of abundance of timber, as well as great depth to be gained by tunnel.

PURCHASE.—H. M. Dains has purchased A. W. Porter's mine, between this place and Georgia slide. This mine is generally well spoken of by miners.

EQUATOR.—Placerville *Observer*, Feb. 12: On Friday last, Supt. Burdick brought up from the Equator mine a lot of ore which prospects up to his expectations. The Equator promises now to be one of the big mines of the county. That company deserves success for their perseverance.

Mariposa.

GRUB GULCH.—Mariposa *Gazette*, Feb. 16: The prospects here are bright. The Josephine mine, controlled by an English company, has a force of about 50 men, and the mill runs night and day. Mr. J. B. Little, the superintendent, is a man of practical mining knowledge, and everything is in splendid working order around the mine and the fine 20-stamp mill. The Haley mine employs about 25 men in the mine and mill, and the rock is extremely rich for milling. The Pool mine, two miles below the Haley, promises to develop into one of the richest mines in that section. The owners, at present, have only an arastra to use for prospecting, but if the present rich indications hold out they will soon build a large mill.

Monterey.

COAL MINES.—Monterey *Cypress*, Feb. 11: Mr. Bassett bought from the Sur Chiquito coal mine, the other day, several chunks of that excellent coal, one chunk being about two feet wide and four feet long and weighing over 100 pounds. Mr. Bassett stated to a *Cypress* reporter that the old tunnel is being cleaned out as rapidly as possible with a view of developing the vein, which, judging from present indications, will average about four feet and will furnish tons upon tons of this valuable fuel. The Sur Chiquito coal mines are situated about nine miles south of Monterey. The coal resembles more the celebrated steel shale found in England than any other coal on this coast; it is a bright shiny black and falls in flakes when struck with a hammer. This coal has been tested for gas and is pronounced equal to the best English article. For burning qualities it has no superior, all being consumed to white ashes, not a particle being wasted. When the roads leading to the mines have been properly repaired it is expected that coal sufficient to pay the running expenses of developing the mine will be shipped. This coal brings two dollars a ton more than any other local coal in the market.

LOS BURROS.—Monterey *Democrat*, Feb. 16: Mat Shadley, who had been sluicing his canyon claim and finding some fine nuggets, has had to abandon the work for lack of water. Phillips & Co., who have the contract for putting a tunnel into the Grand Pacific, are at work with three shifts of men, and expect to complete the job about the first of July. The tunnel commences in and is an extension of the Mars claim tunnel, which is now in 100 feet, and it is expected that before striking the ledge in the Grand Pacific the tunnel will have to be put in a further distance of 800 feet, or 900 feet from the mouth. The Mars claim, through which the tunnel has to pass before reaching the Grand Pacific, retains nine-tenths of all the ore taken out. The timbers used in this tunnel have to be hauled about a half mile, down one hill and over another to the mine. They are hauled by horses, with a sled on one end of the timber and wheels at the other.

Nevada.

NORTH BANNER CON.—Grass Valley *Union*, Feb. 12: The North Banner Con. Tunnel Co.'s mine is looming up as grand as the old mountain where it is located. The cleanup for the run of last week was 135 ounces of retorted gold. The mill has only 10 stamps and they are kept running night and day. Since the new mill has been started none of the sulphurets have been worked, and in consequence thereof there is now on hand about 30 tons of sulphurets worth at least $150 per ton, waiting to be worked. The Banner is a "fixed fact," and will be the means of developing the section of the country in which it is located.

THE NEW EUREKA.—*Transcript*, Feb. 13: Good progress is being made in the development of Messrs. Walrath, Skinker & Co.'s New Eureka quartz claim just this side of Grass Valley. The shaft is being steadily sunk, and several stringers of rich ore have been encountered. The vein fissure is wide and clearly defined. The New Eureka is just west of the famous Crown Point, and gives every indication of proving itself to be one of the most productive mines in that district where millions of dollars have been extracted by the Idaho, Old Eureka and other companies.

RICH ORE.—Nevada *Transcript*, Feb. 20: The Neversweat Mining Company are having 30 tons of very rich ore crushed at the Nevada County mill. Messrs. Rickard, Rowe and Parr have taken out several tons of ore from a claim at Canada Hill. They think it will pay $50 a ton. William Woolcock and Richard Webb are taking out quartz on tribute from the old California ledge. They have out a few tons of good-looking ore.

A MINE BONDED.—Grass Valley *Union*, Feb. 14: The Cassidy Consolidated quartz mining ground, which is located between the Empire and Pennsylvania Consolidated, on the western slope of Ophir Hill, has been bonded for $15,000, and work is to be commenced immediately.

SPENCEVILLE.—*Tidings*, Feb. 12: C. C. Bitner of Spenceville has resumed work on his mine, the Champion, a promising property. A number of Grass Valleyans have been inspecting claims in the same locality. The hoisting works on the Spenceville copper mine have been started up again.

Placer.

AROUND NEW CASTLE.—*News*, Feb. 13: Since operations on a large scale have begun in the Hathaway mine, a general revival in mining seems to have begun in this portion of Placer county. For some years past quartz mining has been decidedly on the decline; in fact but little attention was paid to the development of quartz. The Hathaway, which is now yielding up its wealth, was only operated in a hap-hazard manner, no effort being made to explore or work it systematically, and it was consequently of no material benefit to its owner or to the neighborhood in which it is located. Exploration carried on systematically has demonstrated that the Hathaway is a paying property that it will take years of labor to exhaust, and from which not only those immediately interested will derive benefit, but the county also. Hoisting works and a fine 10-stamp mill have been erected on the mine, and though work in earnest has only just commenced, the returns have been entirely satisfactory, and the property will be worked for all it is worth. The ore body is well defined, is extensive, and carries a paying body of free gold; also a heavy percentage of sulphuret ore that is very rich. At present about 25 men are employed on the property. It is stated upon reliable authority that just as soon as legal complications are settled the Gold Blossom mine will also be started up. This mine has yielded some fine ore in days gone by, but owing to the fact that the ore was base it was not worked up to a very high percentage. It is the intention of those interested to build smelting works, and if this is carried out there is no reason why the property should not become a dividend-paying enterprise. Messrs. Hartly & Co., Minnesota capitalists, are opening several quartz mines on what is known as the Hawkins Ranch, about four miles from Newcastle, all of which look well. They are all being opened through the medium of shafts, and so far as work has progressed the showing is good. They are operating a five-stamp mill on the ore extracted from one of the mines, and from what can be ascertained the ore is yielding well. The Chicago mine, near Penryn, will also be started up in a short time. The superintendent is expected up every day to commence work. From the fact that all the properties mentioned are within a radius of less than four miles of Newcastle, it is reasonably certain that our growing town will receive additional support from this source.

GRAVEL MINES.—Placer *Herald*, Feb. 16: The *Herald* is indebted to Mr. A. Clark for the following mining news: The last cleanup at the Mayflower yielded 1696 ounces or about $30,528 for a run of 30 days and 10 hours. The amount of gravel washed was 1665 tons, which would give an average of about $18 per ton for the run. An upraise has been made in the main tunnel, whence a drift has been run in a southerly direction through gravel that looks as rich as that in the main breast. The track is being extended down the canyon to the Live Oak mill, which has been leased and will be started as soon as water comes. The company will then have 30 stamps at work, and the output will be materially increased. The mine now gives steady employment to 110 men. At the Hogsback mine a second shaft, 100 feet farther back in the hill than the first one, has been sunk to the depth of 97 feet without striking bedrock. As bedrock was struck in the first shaft at 66 feet, this would indicate an abrupt decline in the bedrock, and the company may be saved the expense of running a second tunnel. The Red Point and the Breece and Wheeler mines are still paying well. The Eureka company, whose claim is nearly opposite the Red Point, after running a tunnel 700 feet in length, have been compelled to start a second tunnel 110 feet lower than the first, which is now in 80 feet. The Dardanelles is still paying very comfortable dividends.

BLUE GRAVEL.—Placer *Argus*, Feb. 16: The Live Oak Co. has struck blue gravel of the same character as the gravel in breast No. 3 in the bedrock drift, the bedrock still pitching.

Shasta.

POCKET AND SEAM.—Shasta *Courier*, Feb. 16: The pocket and seam miners in this neighborhood appear to meet with considerable success "at intervals," as one of them from Rock creek neighborhood said a few days ago, when he showed about two ounces of pure gold for that many days.

Sierra.

YOUNG AMERICA.—Sierra *Tribune*, Feb. 16: The Young America mine never looked better than it does at present. Good cleanups may well be expected each month. William Busch, the foreman, was down last Sunday and he says that there will be enough water to run the mill a month longer without any storm; but it is a pretty sure thing that we will have a storm before that time, and it is here now.

BUFFALO.—The Buffalo Co. has not started up the mill yet, and will not until they have sufficient water to run it with, or until they can put in an engine and boiler, which cannot be accomplished until spring.

Siskiyou.

QUARTZ.—Yreka *Journal*, Feb. 13: We learn that several good prospects in quartz have lately been found on the headwaters of Scott river, above Callahans, and that considerable work will be carried on during next spring and summer in sinking shafts and tunnels on various ledges lately discovered. Mr. R. J. Strode has lately discovered a valuable quartz ledge on Hungry creek in the Siskiyou foothills, the quartz from which at cropping assays about $50 to the ton, and about ten feet down, assays $90. If it will only mill one-quarter of the assay the mine will prove a big thing. The Scott Bar *Graphic* says the Quartz Hill Co., which suspended some time ago, will, we understand, resume operations Monday, on a more extensive scale than ever. McCook and three other miners are now making preparations to commence work on the Punch creek mine at Humbug, from which they obtained such good prospects last summer. They want to be ready for business as soon as the spring rains set in, to furnish plenty of water in melting the snow on the mountains at present, and more anticipated before February closes. Humbug creek promises to be one of the liveliest mining camps in the county this season, especially in quartz, as numerous new ledges will be opened as soon as spring weather is at hand to permit easier work in digging shafts and tunnels.

SCOTT BAR.—Cor. Yreka *Journal*, Feb. 16: Times are improving here. Quartz Hill mine and mill, at the upper end of town, are in full blast, going night and day.

San Bernardino.

CALICO MINES.—Los Angeles *Herald*, Feb. 16: News comes from the Calico district of the discovery of new and rich mines in that vicinity, and unusual activity in their development, it is said, is to be the order. The new finds are adjoining the well-known mines Waterloo, Josephine, Hebe and Grande. Mr. R. H. Cole, formerly of St. Louis, but engaged in the real estate business in Los Angeles for the past two years, has just purchased a mine in the district above mentioned, for which he paid $15,000. Mr. Cole, who has just returned from Calico, speaks in glowing terms of the future of that district. He says that he will fully develop his mine and will leave shortly for the East to obtain necessary the machinery for that purpose. He has procured the services of Mr. T. T. Andrews as superintendent, who is well known on the coast as an expert, and from his connection with celebrated mines on the Comstock and at Eureka, Nevada. Mr. Andrews is very enthusiastic over the new discoveries and pronounces them the biggest prospects in Southern California. There is plenty of water to work the new locations and they are handy to the railroad. Daggett is the nearest railroad point. The specimens of ore shown the *Herald* representative were very fine and the assays of ore, as taken from the bucket, show 40 ounces of silver to the ton, while selected ore has ranged as high as 109 ounces.

San Diego.

STONEWALL.—Julian *Sentinel*, Feb. 8: We understand that the richest ore ever found in this camp has been struck on the 370-foot level of the Stonewall.

REMOVED.—The hoisting-works of the Owens mine have been moved from the old shaft to the new one.

TUNNEL.—Robt. Gardner reports good headway with the new tunnel he is running in the Big Bend.

Tulare.

COAL.—Visalia *Times*, Feb. 7: The coal mines formerly owned by Robinson & Rawlins, on the west side, three miles from Colinga station, but which now belong to an incorporated company, are being worked night and day. Twenty-five men are employed by the company, and the daily output of coal is about half a carload. For heating purposes it is said that the product of these mines is unexcelled.

Tuolumne

A BONANZA.—Tuolumne *Independent*, Feb. 16: Another rich pocket has been found in the Bonanza mine, near the Episcopal church, in Sonora. It was struck on Saturday last, and finally cleaned out on Wednesday evening, the yield being about $65,000 in four days. In cutting out the pocket, one piece about 14 inches long, 8 wide and 6 in thickness, contained $15,000. This celebrated mine has yielded nearly a million of dollars, the original owners, Divoll, Clark & Bray, getting about $400,000. Later another pocket of $90,000 was found; still another of $60,000, and many others of smaller amounts. The mine is easily worked, only requiring the labor of three or four men. The probabilities are that still richer pockets may be found, as the mine is only developed in a small degree. The mine was leased about a year ago to J. P. Dart, Dave Oliver, M. B. Harriman, E. Keil and A. P. Johnson, all of Sonora. These men took the mine with an agreement to give the owners 20 per cent of what was made out of the work, the balance to be divided among the lessees. The interests in the mine are held by J. G. Divoll, who owns three-eighths of the property; Mrs. Divoll of Sonora, one-fourth; J. B. Bacon of San Francisco, one-fourth; and E. A. Rodgers, one-eighth.

MILLS.—Sonora *Democrat*, Feb. 14: The ten-stamp mill at the Platt & Gilson at Soulsbyville is rapidly nearing completion and will soon be grinding out the precious metal. The new 20-stamp mill on the consolidated Eureka mine at Summersville was started up Monday morning.

Yuba.

A PAYING DRIFT MINE.—Nevada *Transcript*, Feb. 19: At the Blue Point drift mine, Smartsville, nearly $4000 a month is being taken out with one arastra and 20 men. Another arastra, a rock-crusher and hoisting works are to be put up immediately. The force of men will be increased to 40, and it is expected $10,000 a month will then be produced.

NEVADA.

Washoe District.

CROWN POINT.—Virginia *Enterprise*, Feb. 16: No. 3 east crosscut, 800 level, is out 68 feet, having advanced 20 feet during the week. The face is in soft ground, composed principally of clay.

HALE AND NORCROSS.—On the 400 level west crosscut No. 1 is now advanced 70 feet. On the 500 level have started an upraise in the ore body from the north drift, which is now up 52 feet and continues in good quality of ore. The winze below this level is now down 68 feet. The bottom is in ore mixed with porphyry. The stopes above this level continue to yield ore of good quality. The stopes from the 600 to the 700 level are supplying the usual quantity of fair-grade ore. On the 700 level the upraise from the north drift is now advanced 50 feet in low-grade quartz. On the 1300 level the north drift is now advanced 165 feet. This drift shows stringers and bunches of high-grade ore. Have hoisted during the week 1048 tons of ore; have shipped to the Mexican mill 978 tons, and milled 990 tons. Average battery assay, $20.26 per ton.

SAVAGE.—During the week hoisted 672 tons of ore, shipped to the Rock Point mill 442½ tons and milled 500 tons. Average battery assay, $20.65 per ton. Total number of tons milled last month, 1900; gross bullion yield, $20,848.06.

CONSOLIDATED IMPERIAL.—East crosscut No. 2 on the 1100 level (Yellow Jacket) is being repaired. Some repairs are also being made to the main north lateral drift on the same level.

BELCHER.—Have started the drift east from the joint south drift on the 1100 level. Are now in 44 feet. Will probably start the winze from the end of it to-morrow.

YELLOW JACKET.—Everything is again in good mining order and the extraction of good white rock and shipments to the Santiago mill resumed as usual.

BALTIMORE.—The ore struck well out west on the 300 level last week continues to show improvement, and is considered very important by the management.

CHALLENGE CON.—Have shipped to the Brunswick mill for reduction 68 tons of ore, the average battery sample of which shows a value of $28.19 per ton.

CHOLLAR.—The prospecting drifts on the 550, 650 and 750 levels are still in favorable vein material. The Nevada mill is crushing the usual amount of ore.

SEGREGATED BELCHER.—Started the east drift from the joint south drift on the 1100 level and have advanced it 44 feet.

JUSTICE.—The ore-producing sections of the mine continue to look well. The mill is kept in constant operation.

SILVER HILL.—Opening and timbering a station at the 100 level. Shaft cleaned out to 400 level.

CONFIDENCE.—In consequence of an accident to the Yellow Jacket machinery the mine was shut down for five days, so that very little work has been

done during the week. Have shipped during the week 210 tons of ore, the average battery sample of which shows a value of $28.19 per ton.

OVERMAN.—The mine was worked six days and extracted 276 tons of ore and shipped to the Brunswick mill 333 tons.

ALTA.—The mine continues to look well, and the mill reduces about 30 tons of ore daily, yielding satisfactory results.

ANDES.—Repairing and cleaning out drifts on the 275 level, preparatory to further explorations.

POTOSI.—The exploring drifts on the 650, 750 and 850 levels continue in vein porphyry.

BULLION.—Work of exploration continues steadily in the vein.

NEW YORK.—Drifting north on the 800 level in vein material.

SCORPION.—Still crosscutting on the 300 level.

Cedar District.

LOOKING WELL.—*Silver State*, Feb. 11: E. N. Clark, who is engaged in mining in Cedar district, in the Antelope range, reports the mines looking well and some of them producing considerable ore. The Mohawk mine has been bonded to M. H. Sunderland of Rye Patch.

Cherry Creek District.

BULLION.—White Pine *News*, Feb. 16: The Merrimac Co. shipped one bar of bullion last week valued at $1700, $700 of which was gold.

Columbus District.

MT. DIABLO.—Esmeralda *News*, Feb. 16: The Mt. Diablo mine continues to yield all the ore, ranging from $50 to $100 per ton, necessary to keep the company's 20 stamp mill at Soda springs in operation continually.

Eureka District.

THE DIAMOND TUNNEL.—*Sentinel*, Feb. 16: The Diamond tunnel is now in a little over 140 feet. The ground is growing softer since the cutting of an iron streak a few feet back. Three eight-hour shifts have again been put on and good progress is expected from this time forward. It is believed that the tunnel will be completed in 70 days.

Garfield District.

BULLION.—Esmeralda *News*, Feb. 16: The Garfield mines, during the month of December, produced $10,200; 318 tons of ore were crushed, and the operating expenses were $8400.

Golconda District.

ADELAIDE COPPER MINE.—*Silver State*, Feb. 18: Work on the main shaft of the Adelaide copper mine at Golconda has been diligently pursued during the past two months. The shaft has reached a depth of 77 feet, and has been run in ore all the way. Ten feet above its present depth a body of high-grade oxides and sulphurets came in on the footwall. This ore assayed 22 per cent copper, and from $20 to $40 in silver, and has followed the foot down. In the bottom the black and yellow sulphurets assay 32 ounces in silver and $10 in gold. Water is looked for every day in the creek. On its arrival, with a large ore dump at the furnace, and coke and fluxes at hand, there is no reason why a successful run should not be made in the near future.

Jackson District.

PENNSYLVANIA MILL BURNED.—*Silver State*, Feb. 18: Dan Le Barron arrived here Saturday, bringing news of the burning of the Pennsylvania mill at that place. The mill comprised ten stamps, two pans, one settler and four concentrators. It was owned by the Pennsylvania M. Co., a S. F. corporation. The mill was discovered to be on fire on the evening of the 13th. A man named Albert Munroe slept in the mill, but at the time the fire was discovered was at Le Barron's place, a quarter of a mile from the mill. There was no person known to be at the mill at the time, and the origin of the fire is a mystery. The mill was insured last year for $10,000, but it is believed that the policy was not renewed.

New Pass District.

ON A GOOD LEDGE.—Reese River *Reveille*, Feb. 16: E. E. Starret returned to New Pass to-day. He tells us his mine is looking way up and that his men have 50 tons of ore on the dump, and the ledge stripped, ready to take out 50 more. He says his men, 14 all told, work with a will since they are now on a good ledge. These mines are worked more for the gold than for the silver which the ledges contain.

Reese River District.

THE PLYMOUTH SHAFT. — Reese River *Reveille*, Feb. 14: We sauntered up to the Plymouth shaft this bright day to see what the boys were doing on Lander hill. The Plymouth hoisting works and machinery look as bright as a row of new pins bought from a store. Wm. O'Donnell has charge of the forces timbering and from him we learn that there are three shifts of eight hours each, fitting new sets of timbers from the collar of the shaft downward. At noon to-day they had just put in a set at the 260 station, the limit of the present advance, and it will not be long before they reach the bottom, 400 feet in depth. The hoisting machinery was made by the Fulton Iron Works, and runs as easy as a clock—the best hoisting machinery on the hill. The Fulton Iron Works can show the machinery off for inspection any day and never get caught out, as it gives the best of satisfaction. The hoisting works is complete in every detail, forge, furnace and all.

Tuscarora District.

BELLE ISLE. — *Times-Review*, Feb. 15: South drift from east crosscut, 250-foot level, has been extended 11 feet.

COMMONWEALTH.—100-foot level: No. 2 east crosscut from main south drift has been advanced 19 feet; face is showing low-grade ore. West intermediate drift from No. 4 chute has been extended seven feet and continues to expose high-grade ore. North drift from No. 8 chute, to connect with west intermediate, has been advanced 11 feet, developing fine ore the entire distance.

FOUND TREASURE.—Prospect shaft has encountered the vein at the depth of 12 feet from the surface. The chloride ore is two feet thick at this point. Sufficient work has not been done yet to disclose the full extent of this chloride ore body, but so far as explored it appears of considerable extent and value.

NEVADA QUEEN.—The concentrating works were started again on the 13th inst. The ore chutes have been enlarged, the water tanks moved, and some of the machinery altered, all now being in good condition and doing better work. There is little or no change in the stopes. They look about the same and continue to yield the usual quantity of concentrating ore.

NAVAJO.—East crosscut from west vein, 350-foot level, extended 11 feet. The formation looks very favorable for ore. West crosscut from south drift from No. 4 crosscut extended 15 feet. The usual amount of ore has been extracted and sent to the mill.

GRAND PRIZE.—300-foot level: East drift, footwall vein, has been extended 10 feet; face shows a good vein of low-grade ore. East drift, hangingwall vein, extended seven feet; face showing bunches of rich ore.

NORTH BELLE ISLE.—No. 1 winze below 400-foot level, has been sunk six feet. Everything put in shape for crosscutting. The rock is harder, and an increased flow of water.

NORTH COMMONWEALTH AND DEL MONTE COMBINATION SHAFT.—The shaft has sunk to the depth of 160 feet. The rock is harder and the formation favorable for ore.

ARIZONA.

IMPORTANT STRIKES IN TOMBSTONE.—*Epitaph*, Feb. 16: Two important strikes of rich ore were made this week and at points some distance from each other, proving that the rich ore of this camp is not confined to a small area. The most important one, and on which the most work has been done, was in the Nicholas mine, which is near the Emerald and owned by Mr. Van Burt of San Francisco and R. C. Pearson of Los Angeles. The mine came into their possession something over a year ago, and since then they have sunk a shaft 100 feet deep, and it was while drifting on this level that the rich ore was encountered, which was some three weeks since. Samples of the ore were sent to Mr. Van Burt in San Francisco, the assays of which produced the astonishing average of 4032 ounces of silver to the ton. Mr. Van Burt immediately came to Tombstone to inspect his fortune and found a 12-inch ledge of this rich ore. He will have the ore sorted and shipped to San Francisco, the richest by express. The other strike has been made in the Equinox mine, which is about half a mile east of the San Diego smelter. Work has also been prosecuted on this mine in a desultory manner for some time and some fine ore taken out a few weeks since. Recently the mine has come into the possession of Mr. Joseph Bignon and he has had men at work on it and at present has an incline shaft down to a depth of 35 feet. Yesterday he received the returns of the assay of three samples of ore, which went respectively 16, 60 and 500 ounces in silver to the ton, the latter being from the bottom of the shaft where the ledge is 10 inches in width. These discoveries should have the effect of giving hope and putting energy in the owners of claims hereabouts to go ahead and develop their properties.

HARQUA HALA. — Prescott *Courier*, Feb. 16: There are a number of old shafts and workings in the Harqua Hala district, showing conclusively that mining has gone on there at some remote period in the past. A prospecting party discovered the skeletons of two men and three horses a few miles from that camp. The Tombstone *Prospector* has interviewed an old miner from the district, who says a well of good water has been struck near the rich find. That there is an old Spanish woman named Carmelita, living at Harrisburg, who, for the past three years has been locating everything in the shape of a ledge in the district, and that a slip of paper bearing her name is a very common find in the district. That the bonanza mine of the camp and most of the others are in litigation. The original discoverers of this camp were four men who pooled issues on a prospecting trip and went out, and while three of them remained in the mountains the fourth man was sent back for supplies. While he was gone the rich mines were discovered by the three, who proceeded to leave the fourth man out and to ignore any claim of his to the discovery. The fourth man is now trying to discover what sort of a partnership arrangement this is, and hence the property is in litigation and has not been bonded.

A BIG SALE.—*Journal-Miner*, Feb. 14: A sale of one-half interest in the Hillside, Eureka district, was closed a few days ago. The property consists of the Hillside group of mines, of which the Hillside and Seven Stars are the principal ones. They are situated in Eureka district 80 miles west of Prescott. The consideration, $100,000, was paid Mr. B. T. Riggs by Messrs D. Levy and J. Q. Stephens, for his one-half interest. The richness and extent of the mines are undoubted, and there is no mistake that the new proprietors have secured a great bargain. There have been more than 3000 feet of shafts and tunnels run on the property, everywhere showing the marvelous richness of the deposits, which are of a free milling character. During the past year over $50,000 have been taken out of the Hillside, Mr. Lawler, who retains his one-half interest, will continue to superintend work on the mine as heretofore. It is proposed to shortly place 60 or 70 men at work and put on several ten-mule teams to haul the ore to Prescott. It is the intention in the near future to erect reduction works.

CROWNED KING. — Prescott *Courier*, Feb. 12: The Crowned King mining properties are destined to soon come to the front as the most remarkable yet discovered in the Southwest. The owners, Messrs. Shekels & Place, have quietly developed this valuable property, but, as a result of their labors, it may now be stated that there is a tunnel of 600 feet in the Crowned King which runs the entire distance through a vein of rich gold-bearing ore six feet in width, which assays as high as $230 to the ton. This is a continuous, well-defined fissure vein. They have enough ore on the dump to completely bury a good-sized quartz mill out of sight, and it would keep a 40-stamp mill steadily at work to keep up with the output of the mine. When the weather settles, all the stopes will be filled with men. Machinery for the mine is now on the road.

COLORADO.

LAMARTINE.—Georgetown *Courier*, Feb. 14: The output of the Lamartine mine for the month of January amounted to $10,000. The mine has been producing about 50 tons of ore a month for the past year, the total value of which was about $40,000. Thirty-five men are employed. The output of the Colorado Central mine for the month of January was 251,373 pounds of ore, valued at $19,185.15. The property is in condition to about double this production but for the lack of power on account of the scarcity of water. A thousand dollars was offered for a sixth interest in a lease on the Colorado Central. It couldn't be bought for $5000. There are three men employed in the lease, but on account of the lowness of the water and the inability of the company to furnish the necessary power, they can work but about three hours a day, but manage to take out about $1200 worth of ore each week.

IDAHO.

CŒUR D'ALENE.—Wardner *News*, Feb. 9: There never was a season in any mining country with a more promising outlook than is now presented in Cœur d'Alene, and although the South Fork region leads in important disclosures of rich ore-bodies, still there have been many important showings recently made in other portions of the camp that go to prove that the early discoveries which created so much excitement were but promises of what was to come. There have been some remarkably rich developments made of late in several of our leading mines, and all locations on which any reasonable amount of work has been done are showing up finely. In nine cases out of ten the results have been better than could have been expected, and wherever disappointments have existed they invariably have been found to arise from other causes than from any failure of the mining property to fulfill its promise. Cœur d'Alene affords to-day the grandest field for exploration and investment of any country in the Northwest.

LALANDE DISTRICT.—F. W. Frank, who has held a bond on the San Francisco mine on Canyon creek, sold that property last week to a Montana syndicate. Mr. Frank returned from Helena on Tuesday and on that day made the first payment on the purchase to Charles A. Pearson, the former owner. Work will be continued on the mine by the newly formed company and operations on an extensive scale will be commenced immediately.

YREKA DISTRICT.—The Nellie Wood mine is more than holding its own and has improved vastly in appearance of late. On the Alpharetta a rich body of ore has been struck and the addition of new machinery and additional stamps to the mill has become a necessity. Ten stamps will be added to the 20 now in use and preparations are being made for the erection of new hoisting-works.

MONTANA.

THE SAN FRANCISCO.—Butte *Inter-Mountain*, Feb. 16: A Butte mining man who returned to-day from Phillipsburg and who is an entirely reliable mining authority, states that the report of a great strike in the San Francisco Con. in that camp was founded on facts. The strike was made in the 400 west and has been opened up for a distance of 80 feet, the ledge averaging four feet in width. The ore assays from 20 to 40 ounces in silver and from $120 to $150 in gold. The gold occurs in iron pyrites. Specimens of these pyrites separated from the gangue assay as high as $500 in gold. The melting-furnace for casting bullion at the Bi-Metallic was started up this morning. The 50-stamp mill of this company is running smoothly and more than meeting the expectations of the builders.

BIG MINING SALE.—*Inter-Mountain*, Feb. 12: The Parrot M. Co. yesterday perfected the purchase of the Rialto claim and its neighboring fraction, paying therefor the sum of $125,000. The Rialto was owned by Jas. A. Murray and A. J. Davis, the former holding three-fourths of the claim and the latter the remaining one-fourth. Mr. Murray makes $75,000 by the transaction and Mr. Davis gets $50,000. The Rialto adjoins the Parrot mine on the north and the fraction adjoins the Parrot on the northwest. The property is patented and is developed only by a 100-foot shaft.

RISE IN VALUE.—"The sales illustrate the rapid advance in value of Butte mining property," said Mr. Murray to an *Inter-Mountain* reporter, this afternoon. "Two years ago that property could have been purchased, all of it, for less than $50,000, and together with it would have gone another piece of property I sold for $65,000 also. There could be no better testimonial than that to the permanency of the camp. I have never known real estate and mining property so active as they now are in Butte."

NEW MEXICO.

SMELTER.—Silver City *Enterprise*, Feb. 12: W. G. Waring, superintendent of the Flagler reduction works, has returned from the East, where he was successful in interesting capital in the erection of a new smelter and sampling works. The works will either be here or at Deming. Last week a force of men was put to work on the Rose mine by J. R. Johnson, and are now busily engaged in pumping out the water. The mine will be cleared in a few days, when exploiting will be commenced. The stamps of the Mimbres mill will commence dropping on regular time on the 4th day of March. The mill is now in fine condition for business, having been completely overhauled, and will now turn out on an average from $1200 to $1500 in silver bullion daily for months to come. Thos. B. Pheby, the company's manager, has a large amount of ore on the dumps and in the bins at the mill, and is of the opinion that another shut-down will not be necessary this year. Thomas Foster of Gold Hill has secured an option and bond on several of the best claims in that camp, and the probabilities are that there will soon be a grand consolidation of interests, and the erection of a larger plant.

AROUND LAS CRUCES.—Rio Grande *Republican*, Feb. 9: Gibbs & Moody are still taking ore from the Comstock. John Thompson has a very fine showing in the Crescent City. It yields high-grade ore. Frank Arnett has been at work this winter on his claims in the Black mountain. They are showing up fine. The Bennett produced 600 tons of ore in the month of January, and declared a dividend of over $4000 net profit. Two cars of Bennett ore have been sent to Denver, where a proposition has been made to treat it for nothing, as it is a valuable fluxing ore. Adams & Co. are driving a tunnel on the Wall Street to tap the contact at a depth of about 100 feet. This property is being worked under lease and there is considerable low-grade ore in sight.

OREGON.

THE BIG ALECK.—Bedrock *Democrat*, Feb. 11: Supt. J. N. Williams of the Big Aleck mine recently purchased by the White Star M. Co. of Boston, last Monday paid over to Messrs. Ed. Hardy and E. H. Mix the sum of $10,000, the purchase price of the mine. In conversation with Mr. Williams the reporter was informed that it is the intention of the White Star Co. to commence active work on the Big Aleck in a few weeks. Mr. Williams' latest advices were to hold himself in readiness for orders to prepare the grounds for a large milling plant, probably two Huntington mills with 20 tons capacity each every 24 hours. Boarding-houses, lodging apartments and a blacksmith-shop will be built at once.

UTAH.

BEAVER COUNTY.—Cor. Salt Lake *Tribune*, Feb. 15: The mines in Beaver county are looking up, especially the Talisman, Red Warrior (Victory), Copper King, Massachusetts and some others that I have not been able to see of late. The Red Warrior has now a large body of low-grade but fine fluxing lead-silver ores in sight. The Talisman mine is a rich bonanza, in fact, to look at it will prove the truth of my assertions. I have seen it of late, and was agreeably surprised, and it has proved the fact that in west camp of Star district can be found true contact veins of high-grade ores The copper deposits of Star district are also proving good. The Copper King mine is increasing its force of miners. Dr. J. M. Bailey, who, with two others, leased the Antelope mine near Marysville a short time ago, reports to me that he has struck it big.

BULLION.—Salt Lake *Tribune*, Feb. 15: The receipts in this city for the week ending Feb. 13th, inclusive, were to the total value of $86,166.26, of which $45,878.61 was in bullion, and $40,287.65 was in ore. For the previous week the receipts were $66,187.89 in bullion, and $46,364.35 in ore, a total of $112,552.24. The Ontario product for the week was of bullion, 20,814.04 fine ounces; from ore sales, $9873.19; an approximate total of $30,687.23. The Horn Silver is pushing its shaft quietly, and selling a little ore. The Hanauer smelter produced during the week bullion valued at $10,500. Ore receipts in this city for the week amounted to $9873 by Wells, Fargo & Co.; $26,100 by McCornick & Co., including $2500 Queen of the Hills; and $4314.65 by T. R. Jones & Co.

PARK NOTES.—*Record*, Feb. 16: The old Sampson company's property which was absorbed for debt last fall has undergone a change for the better. The old company's reorganization was perfected practically in Salt Lake on Thursday. The Alliance Company's property includes the Sampson's valuable ground and a few adjoining claims. This is a strong company and it is promised that with the opening of spring developments will be again inaugurated. James McCune has obtained on favorable terms a lease and bond to run five years on S. P. Hoyt's Wasatch and May property, two patented claims in Blue Ledge district. Several claims in the surrounding hills have been located and relocated lately. The Anchor drain tunnel is now in about 6000 feet and only about 600 remain to be driven through. It is understood that work on the Glencoe property will be resumed with the opening of spring. The usual small force is kept at work on the Morgan property. The McCune tunnel is now in upward of 1100 feet and lately the formation has changed favorably. On account of the poor condition of the roads, which prevents hauling, no Ontario, Daly or Crescent ore has been sent to market the past week. No Daly bullion has been shipped from the Marsac mill this month. However, large quantities of sulphides of silver, the result of treating the ore by the Russell lixiviation process, are on hand ready for shipment as soon as satisfactory rates can be had from the railroad company.

ORE AND BULLION SHIPMENTS.—During the week the Mackintosh sampler received only one lot of ore 552,500 pounds of Woodside leasers' ore. The Ontario bullion shipments for the week were 36 bars, containing 18,810.20 fine ounces of silver.

WASHINGTON TERRITORY.

CONCONULLY MINES.—Ellensburg *Capital*, Feb. 14: Confidence in the Conconully mines has increased with the developments made during the winter. Although the means for developing them was extremely limited, the work accomplished has been quite extensive and shows the veins to be as large and permanent as any yet discovered in the Northwest. With the mines thoroughly developed and opened up, the question of increased transportation facilities is the next to be considered. The line opened by way of Ellensburg last season proved successful, and is therefore no longer an experiment. Additional steamers will be put on this season and the line improved from Ellensburg to the Columbia to meet the increasing demands of traffic and travel. The miners of Conconully are also moving toward the improvement of the roads from the steamer landing to the mines, and anticipate having them in excellent condition in a few weeks. The ores of the district will find ready market in either Tacoma or San Francisco.

THE ARLINGTON.—Cor. Spokane Falls *Herald*, Feb. 16: As a big proposition the Arlington mine stands without a rival in the Okanogan country, as can be proven by a few facts obtained from one of the owners, who recently arrived from Portland—the headquarters of the company. Two hundred feet in depth, the vein will average five feet wide. From this level the south drift is in 25 feet with four feet of ore averaging 75 ounces of silver and $2 gold per ton. The north drift extends 45 feet, with 2½ feet of ore averaging 178 ounces of silver. There are now at the depot at Spokane Falls 300 sacks of mineral from this mine which will be shipped to Park City, Utah, for the purpose of treatment by the Russell process. There is no doubt but that the Russell machinery will be put in at the Arlington next summer at a cost of $50,000. A Portland syndicate paid $28,000 for the "prospect" less than 18 months ago, and at a recent meeting of stockholders an offer was refused embracing half a million dollars for the Arlington mine.

SCIENTIFIC PROGRESS.

Diatoms—A New Discovery.

Diatoms form a pet subject with most microscopists. A diatom is a single-celled plant, bearing a singular relation to the animal and even to the mineral kingdom, being considered by some as partly belonging to the latter, and regarded as a vegetable crystal, differing only from minerals in having the power of locomotion, and of multiplying through separation. The study of diatomaceæ is most interesting. Their extreme and varied beauty is a source of constant pleasure to the microscopist.

The beauty of diatoms consists in their color, their general form or sculpture. These delicate markings are seen under the microscope to be process, knobs, bosses, concavities, ribs, groovings and lines, so minute that the highest power obtainable by the most skillful optician is required to see them. There are more than 4000 distinct species of diatoms which have been classified.

Of all diatomaceous earths, the one which is most famous and contains so many varied forms of beauty is the "Santa Monica," which was found by Thomas B. Woodward of the United States Coast Survey in 1876.

It was found by itself, and there was no other sign of a deposit of the earth in the vicinity. The deposit from which it came is not known. Slides of this material grace the cabinets of microscopists in all parts of the world, and it is prized above gold. Search has been made in different parts of the globe by scientists, but no rival or equal of the "Santa Monica" has been found.

At a recent meeting of the San Francisco Microscopical Society, Prof. Hanks submitted a newly discovered specimen of diatomaceous earth which attracted much attention and was considered of great scientific value. The scrapings of the earth examined were unwashed and the powers used were not sufficient to determine whether the specimen was a "Santa Monica" or not.

A number of the members discussed a great number of resemblances, but were unwilling to pronounce judgment on so important a subject to the scientific world without giving the specimen a detailed and scientific study.

It was decided to cut the specimens into vertical sections and submit them to a most thorough microscopic inspection. If they in any way approach the "old Santa Monica," parts of the specimen will be sent to leading microscopical societies of the East and Europe.

A Novel Signal Rocket.

Engineering of London describes a newly invented rocket, brought out by a London company, the distinguishing features of which are that no stick is required and there is no back fire. The rocket takes the form of a metal cylinder seven inches long and two inches in diameter, in the base of which is the propelling charge. Above this is a charge of tonite, and above this again is a star composition. The rocket is placed in a phosphor-bronze socket, which may be screwed or let into the rail of a ship. The propelling charge is fired by simply pulling a lanyard, and the signal is propelled upward at one impulse. The wire fuse by which the detonating charge is exploded is at the same time ignited, and this burns until the rocket has reached the maximum hight, which is 600 feet.

The stars are thrown out, giving a brilliant illumination, and the tonite charge then explodes. The noise of the explosion is equal to the firing of a six pound gun; but being high, is heard at a great distance; indeed in one instance a disabled vessel brought another to her assistance from a distance of 12 miles. These rockets are so portable and easy to fire—no match or port fire being required—that they are very suitable for boats, and doubtless many lives would have been saved had they been in use in cases where shipwrecked crews have had to take to the boats. The Board of Trade has authorized its surveyors to pass these rockets distress signals in lieu of both guns and rockets, so that many lines of steamships have landed their guns and use these signals instead.

WHO DISCOVERED HYDROGEN?—In the current number of *Le Revue Rose*, there is a long article by M. E. Meyerson, written to prove that the French doctor, Theodore Turquet de Mayerne, who became physician to Charles II, was the only true discoverer of hydrogen. In that case all our books must be wrong. They teach that Cavendish first discovered hydrogen, calling it "inflammable air," in 1766; and that, in 1781, he first proved water to be a compound of oxygen and hydrogen. They teach also that Paracelsus in the 16th century obtained an inflammable gas by the action of dilute acid or certain metals.

A STUPENDOUS MYSTERY.—Proctor declared that few, even among scientific men, appreciate the amazing mystery of the force we call gravity. Wonderful as is the familiar attraction of bodies to the earth, gravitation is altogether a greater mystery when considered as a property possessed by matter. The universality of the property, which belongs not merely to this or that substance, but to every substance—solid, liquid or gaseous—and not to such and such aggregations of matter, but to the ultimate molecules and atoms, is an amazing, if not an appalling, mystery. Here is matter, which men call inert, not merely possessing inherent force, but with its whole texture instinct with inherent, unexplained, probably inexplicable, power. But if the universality of gravitation and the infinite range of the force thus exerted by all matter are wonderful, infinitely more wonderful is the instantaneous nature of its operation. This quality of universal gravitation is, indeed, so wonderful that few who hear of it for the first time can even admit that it is possible. Yet the astronomer has been able to demonstrate that the interval of time required for gravity to extend its action from one body in space to any other body, even if separated by a distance so great that light at 187,000 miles per second takes thousands of years to cross it, is less than any interval which can be measured.

PASSIVITY OF IRON.—It has been observed that iron which has been treated with concentrated nitric acid assumes a passive state and refuses to be acted upon by the common or diluted acid, but the cause of the property has not hitherto been satisfactorily explained. M. Louis Varenne reported recently to the French Academy of Sciences that he had remarked that passivity was destroyed and the metal could be made to yield to the solvent action after a shock or jar was given to it, or a current of carbonic acid or hydrogen gas was passed over it. He was led to believe that an envelope of gas was formed around the metal which protected it, and, on examining some passive iron, found that it was actually covered with a layer of gas. The metal was then placed in a receiver and a vacuum was produced, with care not to touch the iron or disturb it in any way, after which it was plunged into the diluted acid, when it was readily attacked. The nature of the protecting gas was ascertained by introducing a little air into the exhausted receiver, when the orange color characteristic of the nitrous vapors was observed. The gaseous sheath is, therefore, chiefly composed of the deutoxide of nitrogen.

A DREAM OF THE ALCHEMIST.—It was lately announced that Dr. Kruss, a chemist of Munich, has succeeded in decomposing cobalt and nickel, both of which have hitherto been supposed to be elementary substances. The New York *Times* interviewed Prof. Chandler and Mr. A. R. Ledoux, an analytical chemist, to get their opinions as to the results of this discovery. Prof. Chandler doubted the truth of the statement, but said that if it was true it only helped to substantiate the theory that all of our supposed elementary substances are mere compounds and alloys. Mr. Ledoux said that further details would be awaited with great interest. He thought it might be some new process, the application of which to other elements would produce like results. If the statement is true, there would seem to be the opening up of a new field that, scientifically, might prove of intense interest. It would bring us a step nearer to a demonstration of the dreams of the ancient alchemists, that the precious metals were alloys and interchangeable. If this were so, gold might be manufactured just as rubies are now manufactured, by a chemical process.

THE DISCOVERY OF THE MICROSCOPE.—M. Govi, an Italian savant, has presented a paper to the French Academy of Sciences, in which he claims for Galileo the distinction of having discovered the microscope as well as the telescope. He has found a book, printed in 1610, according to which Galileo had already directed his tube fitted with lenses to the observation of small near subjects. The philosopher himself stated shortly after this date that he had been able to observe through the lens the movements of minute animals and their organs of sense. In a letter written in 1614 to a Signor Tarde he states that he has with his microscope "seen and observed flies as large as sheep, and how their bodies were covered with hairs, and they had sharp claws." The date usually assigned to the discovery of the microscope is 1621, and the invention is attributed to Cornelius Drebble, a Dutchman; but, according to M. Govi, the date must be thrown back 11 years, and the credit of the first construction awarded to Galileo.—*London Standard.*

THE PLANET VENUS.—Walter H. Smith, president of the Astro-Meteorological Association of Montreal, has been making special observations of the planet Venus by the aid of a reflecting telescope. He reports that the rapid changes in the shape and outlines of the horns are due to the planet's rotation, which brings the mountain ranges to the edge of the disc. A peculiar dentation has been seen at the north horn, similar to the observations made by Divico Pastorf and other astronomers. Three spots are believed to be continents, and are similar to those seen by the Roman College of Italy.

EFFECTS OF MERCURY ON PLATINUM.—Thin platinum foil is unattacked by cold mercury, but after long boiling in a flask sealed to prevent the admission of air, the foil is gradually corroded. The platinum is only partially dissolved by the mercury, the greater part of that which disappears separating in the form of a black powder, which is nearly all held in suspension. The surface of the mercury remains clean, but if a current of air be drawn through it the platinum powder collects together, and if the mercury be then distilled, a very small residue of platinum is found.

MECHANICAL PROGRESS.

The Suppression of Smoke.

The suppression of smoke, especially bituminous coal smoke, has long been the earnest desire of the residents of cities, and the effecting of this result by some practicable means has long occupied the attention of experts and inventors in Europe as well as in America. The late Sir William Siemens gave much thought to this important question, but died before perfecting any method.

The results thus far attained in Europe are summed up in the following, from the report of the London Inspector of Factories, viz.: "The Smoke Prevention Exhibition in London stimulated a wholesome activity in regard to smoke-consuming apparatus, but the results have been disappointing."

The same, we believe, says the Chicago *Journal of Commerce*, is true, with one exception, with reference to every device thus far invented and fully tested in America. The fact that a large number of devices have been invented, and all have either failed utterly, or work satisfactorily only under certain conditions too ideal for practical use, has led many steam-users to settle into a conviction that a smokeless furnace is, like perpetual motion, impossible of practical realization.

The one exception noted above is a device invented by Mr. Thomas Murphy of Chicago, who, it is thought, has come nearer to accomplishing the desired object than any other inventor.

The efforts in this direction have almost universally been to *consume* the smoke. These attempts have been, as all such always will be, failures, because *burning* smoke is not only practically but also scientifically impossible. Another class, acting on a more intelligent basis, have sought to *prevent* smoke. The efforts along this line have given practical proof of the very obvious fact that the way to do away with smoke is to secure perfect combustion of the gases as they are forced out of the coal and before becoming transformed into smoke. Numerous devices have been invented with this object in view, and many of them, in fact most of them, have been successful to a greater or less degree. The great difficulty seems to have been that in securing perfect combustion the arrangement has made expensive or slow firing necessary, and thus the system failed when put to practical test, because it either increased the cost of fuel or labor, or both, or failed to develop the horse-power capacity of the boiler. These devices, while theoretically valuable, are nevertheless worthless for practical use.

The device referred to as really practical, is not described in the article before us, but reference is made to a previous description.

The following paragraph, however, will give some idea of the principle upon which the device is founded:

"The arrangement for feeding the coal is over an extended coking-plate, every foot of which is exposed to the full force of the heat of the furnace, and the admission of hot instead of cold air along the line where the heat of the furnace, forcing the gases out of the coal, admits of the coking of the coal and simultaneous burning of the gases with any desired rapidity. This is the core of the secret of his success. By the arrangement of the fire-box a saving is effected of the heat from the consumed gases ordinarily allowed to escape and waste as smoke."

The feeding is done automatically, as well as the cleaning, effecting a considerable saving of labor as well as additional effectiveness of the furnace.

The journal further says: "While we know there have been a few instances where the Murphy has been tried and declared 'wanting,' we know there are more than 300 in successful operation, nearly 100 of which are in Chicago, and we are convinced that in every case where there has been an apparent failure, it was not in any case due to any organic defect in the Murphy furnace, nor because of an impossibility to adapt it to the desired use."

THE DIRECT PROCESS AT BREWSTERS.—The Coneley Rummill Iron and Steel Co. of Brewsters, N. Y., will put up 20 retorts to manufacture iron direct by the Blair process, modified. The company uses concentrates from the Theall mine, operated by the Cheevers, mixes them with ground charcoal, and exposes them to the proper temperature in horizontal cast-iron retorts in which rotates a hollow water-cooled arm provided with plow blades. In three hours and a half the ore is reduced. Formerly it was shot into closed cars, allowed to cool, and was mixed with pitch and poured into barrels, to be shipped in that form to crucible and open-hearth steel manufacturers. The charge is about 1200 pounds. The company is getting ready to put up two double puddling furnaces, to use for balling the product.

BEHAVIOR OF TEMPERED STEEL.—B. Pensky, after experimenting with two steel rods 100mm. in length, observed that they exhibited an increase in volume after they had been tempered by heating to redness and plunging in water. This he attributes to the fact that the external layers solidify first, and consequently prevent, to a certain extent, the contraction of the interior mass during cooling. The length of the rods under these circumstances showed a variable behavior, inasmuch as one of the rods, 27mm. thick, in[illegible] the bucket, 0.083mm.; while the [illegible] while selected creased in length 0[illegible] seem that a rod, when [illegible] er or shorter accordi[illegible] surface to volume is [illegible] in this camp certain limit. Subsequ[illegible] of the Stone-both rods became gradu[illegible] nary temperature, the [illegible] Owens amounting to 0.032mm. and [illegible] new ively. When they were re[illegible] they underwent a further dimi[illegible] amounting to 0.015mm. and [illegible] further exposure to the same temp[illegible] duced no alteration in the length. On the other hand, by subjecting the rods to successive rising temperatures, continued shortening was observed. Very hard steel disks suffered similar decrease in the length of their diameter, gradually at ordinary temperature, but more rapidly after being heated.

ORIGIN OF THE SHOT-TOWER.—There was once a mechanic at Bristol, Eng., whose name was Watts. He was by trade a shotmaker. Watts had to take great bars of lead and pound them out into sheets of thickness about equal to the diameter of the shot he desired to make. Then he cut the sheets into little cubes, which he rolled in a revolving barrel until the corners were worn off from the constant friction. The Chicago *Mail* thus relates the rest of the story: Watts, after an evening spent with some jolly companions at the alehouse, went home and turned into bed. He dreamed he was out again with the "boys." They were all trying to find their way home when it began to rain shot. Beautiful globules of lead, polished and shining, fell in a torrent. In the morning, when Watts arose, he remembered the dream, and wondered what shape molten lead would take in falling a distance through the air. At last he carried a ladleful of the hot metal up into the steeple of the Church of St. Mary, of Redcliffe, and dropped it into the moat below. Descending, he took from the bottom of the shallow pool several handfuls of perfect shot, far superior to any he had ever seen. Watts' fortune was made, for he had conceived the idea of the shot-tower, which has ever since been the only means employed in the manufacture of the little missiles so much used in war and sport.

ELECTRICAL POWER DIRECT FROM COAL.—The Chicago *Tribune*, in commenting on the report that Mr. Edison is working on an invention by which he hopes to convert coal into electrical energy without resorting to any intermediate process, says: If he is able to convert into electric energy the power that lies in the carbon and hydrogen of coal, he will have given to man the greatest gift that man can ask of Nature, unless it be the control of the winds and rains. He will have multiplied by ten the present capacity for work of every ton of coal in the world. He will have revolutionized the world of machinery. What the Corliss engine is to the primitive water-wheel of the Egyptian of the days of Pharaoh, that will Edison's device be to the present steam engine. Steam engines and gas engines will all go to the junk-shops, and new plants—what we cannot yet tell—will take their place. Should Edison make such a discovery, all we ask of him is that he will be moderate, and that he will not charge so high a royalty as to heap up for himself a fortune of more than a thousand million dollars during the life of the patent.

PATENTS IN ENGLAND IN 1888.—The total number of applications for patents in England in 1888 were larger than ever before, being 19,070, as compared with 18,051 in 1887, or more than three times as numerous as in any year before the passing of the Patent Act in 1883. That this upward tendency indicates a real amount of industrial progress, it would be impossible to deny, though there is, combined with the rise in numbers, a slight fall in the average value of the inventions, as indicated by the smaller proportion which pass beyond the earliest stage. Very little more than half the applications become completed patents, and the percentage has been gradually, though slowly, declining as the total numbers have increased. Judging from the experience of the previous law, not a quarter of these completed patents will outlast the first period of four years. Under the old system, about 30 per cent were not completed, and of those that were completed about 70 per cent dropped at the end of the first stage (then three years).

AMERICAN MACHINES IN ENGLAND.—Messrs. Charles Churchill & Co. of 21 Cross street, Finsbury, London, have just issued a new catalogue of the American machines and tools imported by them. It is well illustrated, and runs to some 50 pages demy quarto, the cuts being accompanied by ample descriptive matter. The machines and tools include lathes, milling machines, shaping machines, grinding machines, drills, vises, chucks, mortising machines, cutting-off tools, and a host of smaller tools and apparatus, all of the most modern type and from the best American makers.—*English Paper.*

GAS EMANATIONS.—A single plate of perforated zinc about a foot square, suspended over a gas jet, is said to retain the noxious emanations from burning gas, which it is well known destroys the binding of books, tarnishes the gilding and vitiates the atmosphere for breathing.

done during ... week 210 tons of ... which shows a val...

OVERMAN.—The ... extracted 276 tons o... wick mill 333 tons.

ALTA.—Th... mill reduces abo... isfactory results...

ANDES.—...

HEALTH.

Bad Meat Can Do.

...read with much inter... the present discussion ... in relation to diseased ... Norfolk gives the following ...unt of what a layman would ... attack: "I received into my ...ile empty, a small morsel of septic ... a short time a sickening, sinking ...ion was experienced, with copious secre... of hot, frothy mucus, swimming in the head, and great nervous prostration. Placed under circumstances which rendered it impossible to use emetics or any other medicaments, I rode for 15 miles in great torture. Procuring a draught of fine domestic wine, I was enabled to complete my ride, reaching home late at night, after a ride of more than 20 miles since eating the poisoned meat. Not having eaten anything since early morning, I ate supper and retired. My night was one of great trouble, oppression and anxiety—frightful dreams tormenting me through all its dreary hours. I arose next morning, weak, sick, tremulous, feeble, and with a frightful vertigo. I ate a light breakfast and hastened to visit some ill patients. I returned about midday, with a sense of sinking which seemed to me to be the prelude to death. I drank a large draught of water and soda, threw up a quantity of nauseating, foaming fluid, and felt as if every support were gone and I could survive but a few moments. Seeing a mixture of salicylic acid and bicarb. soda on the mantel, I called for it and took a dose, repeating it every 15 minutes. I distinctly felt it pervade my whole economy, giving force to the heart, clearing up the brain, throwing off the incubus, and affording the most delightful relief. It soon began to operate on my kidneys, and a very copious flow of urine followed. It was evident the medicine had neutralized the septic agent and caused its rapid discharge by the kidneys. Here was a single morsel of diseased meat, exceedingly minute, but which in 20 hours had so transformed and poisoned all the fluids as to place me in imminent peril."

Many of the most malignant diseases are caused by eating diseased meat.

At Naples, in 1617, over 60,000 persons died from eating the meat of animals that had died of malignant murrain. The same grievous murrain affects our cattle to this day in all tropical and semi-tropical climates.

Dr. Most cites the following cases: A man contracted a malignant fever and died after salting the meat of an ox which had been sick with murrain.

A family died after eating the meat of a hog which had been sick with angina.

In Marburg, Steirmark, several persons died of hydrophobia who had been eating meat from cattle which had been bitten by a mad dog.

To avoid poisoning or parasitic infection from meat, always procure fresh, wholesome meat and thoroughly cook it, to destroy the life of the parasitic embryo.—*The American Lancet*

COFFEE AND ITS EFFECTS.—The great virtue of coffee is that it stimulates and refreshes, these properties being due to caffeine. It also contains gum and sugar, fat, acids, casein and wood fiber. Like tea, it powerfully increases the respiration, but, unlike it, does not affect its depth. By its use the rate of the pulse is increased and the action of the skin diminished. It lessens the amount of blood sent to the organs of the body, distends the veins and contracts the capillaries, thus preventing waste of tissue. It is a mental stimulus of a high order and one that is liable to great abuse. Carried to excess, it produces abnormal wakefulness, indigestion, acidity, heartburn, tremors, debility, irritability of temper, trembling, irregular pulse, a kind of intoxication ending in delirium and great injury to the spinal functions. Unfortunately, there are many coffee-tipplers who depend upon it as a drunkard upon his dram. On the other hand, coffee is a sovereign efficacy in tiding over the nervous system in emergencies. Coffee is also, in its place, an excellent medicine. In typhoid fever its action is frequently prompt and decisive. It is indicated in the early stages before local complications arise. Coffee dispels stupor and lethargy, is an antidote to many kinds of poison, and is valuable in spasmodic asthma, whooping cough, cholera infantum and Asiatic cholera. It is also excellent as a preventive against infectious and epidemic diseases. In districts rife with malaria and fever, the drinking of hot coffee before passing into the open air has enabled persons living in such places to escape contagion.

HUMAN HEART-BEATS.—In the human subject the average rapidity of the cardiac pulsation of an adult male is about 70 beats per minute. These beats are the general rule in young children and women, but there are variations within certain limits in particular persons owing to the peculiarities of organization. It would not necessarily be an abnormal sign to find in some particular individuals the habitual frequency of the heart's action from 60 to 65 or 75 to 80 per minute. As a rule, the heart's action is slower and more powerful in fully developed and muscular organizations, and more rapid and feebler in those of slighter form. The range is from 25 to 45 in the cold-blooded, and 50 upward in the warm-blooded, animals, except in the case of a horse, which has a very slow heart-beat, only 40 strokes a minute. The pulsations of men and all animals differ with the sea-level also. The work of a healthy human heart has been shown to equal the feat of raising five tons four hundred-weight one foot per hour, or 125 tons in 24 hours. The excess of this work under alcohol in varying quantities is often very great. A curious calculation has been made by Dr. Richardson giving the work of the heart in mileage. Presuming that the blood was thrown out of the heart at each pulsation in the proportion of 69 strokes per minute, and at the assumed force of nine feet, the mileage of the blood through the body might be taken at 207 yards per minute, 7 miles per hour, 168 miles per day, 61,320 miles per year, or 5,150 880 miles in a lifetime of 84 years. The number of beats of the heart in the same long life would reach the grand total of 2,369,776,000.—*Medical Journal*.

THE GERMAN ALPHABET.—Their grotesque alphabet is making the Germans a nation of near-sighted people. Defective vision is not only acquired, but it appears to be handed down to offspring. Cohn found over six per cent of elementary pupils in Germany considerably myopic; while in Antwerp Dr. De Mets finds only two per cent slightly affected. Still Bismarck persists in refusing to allow the use of the Roman alphabet.

THE TONGUE.—The following facts about the tongue may interest some people: A white tongue is said to denote febrile disturbance; a brown, moist tongue, indigestion; a brown, dry tongue, depression, blood-poisoning, typhoid fever; a red, moist tongue, inflammatory fever; a red, glazed tongue, general fever, loss of digestion; a tremulous, moist and flabby tongue, feebleness, nervousness.

SPRAYING IN TOOTH-DRAWING.—Drs. Henoque and Fredel, in a communication made to the Biological Society of Paris, state that the extraction of a tooth may be rendered painless by spraying the neighborhood of the external ear with ether. The anæsthesia of the trigeminus so produced extends to the dental nerves, and thus renders the production of the general anæsthesia needless.

A LONG SLEEP.—Mrs. Emma Althores of Attica, N. Y., recently awoke from a long sleep or trance, which continued 35 days. She was very weak and could not speak, but was able to take light nourishment. Her mind was clear.

USEFUL INFORMATION.

Manure From Basic Slag.

The basic slag from the steel works of England is being largely used for manure. A recent English letter says:

Our basic steel-masters are preparing to get more profit than hitherto out of their slag rather than let the clever Germans continue to get the lion's share of such profits. The North-eastern Steel Company is proceeding rapidly with the erection of an extensive grinding plant for grinding its slag for agricultural fertilizing purposes instead of continuing to export it to Germany, there to be reduced to powder and to be reimported as now into the Thames at about 30s. per ton. At present something like 1000 tons of slag a week are being exported to Germany, but home steel-masters hope soon to have a good deal of the trade in their own hands. The Carlton Iron Co., in the north of England, has already erected a grinding plant, and now the Staffordshire Steel & Ingot Iron Co., Wolverhampton, has started a grinding plant. It is very similar to that employed in grinding superphosphates and is of Lancashire make.

The process of pulverizing the slag is divided into three stages: First, the slag is fed into the preparing-mill in its rough state and is reduced to about 3 16 inch, and any pieces of steel larger than this dimension are taken from the mill, generally about once an hour. During this primary reduction a quantity of fine material is produced, and is extracted by Wood's patent separator before the reduced material passes to the second stage in which a magnetic separator extracts the small pieces of steel.

The last stage reduces the slag to such a fineness that it has the appearance of flour, and can be passed through a mesh with 10,000 holes per square inch, a very obvious advantage considering that the value of the slag depends upon its fineness. I fear it will be some time before our methods for making the most out of the slag are as complete and scientific as in Germany, where I need scarcely add that they are not only grinding it, but likewise treat it chemically with hydrochloric acid to obtain phosphate of lime for manurial purposes.

THE CAT AS AN INSPECTOR.—According to the *Hospital*, it was a stroke of genius to find an occupation in life for that lazy though useful household pet, the cat. The happy inspiration came to a gentleman who had reason to suspect that his house drains were defective. He threw the entire establishment open to the inspection of his cat and then poured a strong infusion of valerian into the pipes. The plot succeeded to a marvel. Puss, who is as fond of perfumes as any client of Mr. Rimmel's, soon discovered three leaks, at each of which she established herself in turn to enjoy the pungent odor at her leisure. Thus not only were the householder's suspicions confirmed, but the actual situation of the leaks was revealed as accurately as if they had been indicated by a sanitary inspector.

LARGE TELESCOPES.—In an item in the PRESS recently, mention was made among the nine refracting telescopes exceeding 20 inches in aperture, one at "Buckingham Palace, London, England." Mr. W. B. Murdoch of this city calls our attention to the fact that this is an error, as the instrument referred to belongs to James Buckingham of London, formerly of the Council of the Royal Astronomical Society. Mr. Murdoch says: "Having named this self-educated man of science, I embrace the opportunity of saying that he not only made the telescope at his own expense in pursuit of his favorite study, but it may be added that he did the mechanical work, all but the casting of the glass, with his own hand, at a time when these large glasses were rarer than now. How much that means is known best to those who know the difficulties attending the polishing of large discs. The tube of that telescope is 36 feet long, or 39 with the dew-cap on. It is not only a large instrument, but one of the finest in the world."

THE SOFT BRONZE COLOR OF METALS is obtained by rubbing with a mixture of bloodstone and graphite, applied with a brush. Antique green effects are secured by dipping the metal into a solution of ten parts by weight of salt, ten parts cream of tartar, ten parts of acetate of copper, thirty parts of carbonate of soda, in two hundred parts of vinegar. The satin finish is produced by green vitriol of copperas and subsequent treatment with wax, while old green is obtained by several coats of acid and a final coat of wax, and a grayish green is produced by the use of sal-ammoniac.

A SPEED RECORDER for railway trains is the invention of a Chicago German. An indicator may be placed in a passenger car and the speed of the train at any time is shown upon its face. The connection is made with the locomotive engine by the steam pipes. The cost of the instrument is about $130. One was tried the other day on a train between Chicago and New York. There were brief times when the wheels of the car stopped and did not revolve, and then the indicator dropped quickly to zero, as the instrument is governed by the revolutions of the wheels.

ORIGIN OF THE POUND WEIGHT.—It is said that the old English pound was originally derived from the weight of 7680 grains of wheat, all taken from the middle of the ear and dried. Then came the Troy pound. Henry VIII introduced the avoirdupois pound, containing 7000 grains. At one time the pound weight of silver was really a pound of silver divided into 20 shillings. The word pound has gradually become separated from its original meaning, and is now used in several different senses, as applied to money as well as weights.

PAPER LEATHER MADE TO IMITATE CALFSKIN. In the last 12 months, says the *Revue des Cuirs*, a paper leather to imitate calfskin has made its appearance, and seems likely to play an important part in the manufacture of portfolios and albums. It can be used for a variety of purposes, for toilet articles, bookbinding, etc. Real calf is expensive, but of great durability. This imitation calf is cheap, although it can hardly be expected to wear well.

MONTANA presents the fact that her production of gold, silver, lead and copper last year was worth $40,000,000—an increase of $10,000,000 over 1887—as a point of some value in her claim to be admitted to full fellowship in the Union as a State. Her cattle trade is also of enormous value, and altogether the exported surplus of her productions will probably largely exceed that of several of the older and more populous States.

TO REMOVE STAINS FROM MARBLE.—An equal quantity of fresh spirits of vitriol and lemon juice will remove stains from statuary marble. Put in a bottle and shake up well, wet the spots with the mixture, and in a few minutes rub with a soft linen cloth till they disappear.

THE THISTLE ROOT.—The thistle at the antipodes seems to attain a most vigorous growth. Its root penetrates to a depth of from 12 to 20 feet, and this root, even when cut into small pieces, retains vitality, each piece producing a new plant.

THE miners of Scotland have formed an Order called the "Sons of Labor." This is a better name and not so high-sounding as the "Knights of Labor," the big labor Order of the United States.

TO SOFTEN LEAD.—There is no better way for softening lead than by recasting. If it is pure, it should be soft. Otherwise, use it for other purposes than those which require the pure metal.

RAISINS.—The people of the United States eat more raisins than the people of any other country—44,000,000 pounds per year.

The Acorn and the Oak.

(*Continued from page 12*)

from the subjection of such an acorn to their power, when can such life be said to be created?

Is it when the flower, from which the germ starts, is fructified, or when the acorn, fully developed and incased within its protective armor, drops from the parent tree? Or does creative power patiently wait until by chance the accidents of acorn, heat and moisture all comtine together, and then interpose its creative fiat?

Without being able, perhaps, to answer a great many questions which may and doubtless will arise in attempting to pursue speculations or formulate even approximately clear ideas on these interesting and important subjects, it seems plain that the oak grows from the acorn by virtue of natural laws inherent in the substances of which the oak and the acorn are respectively composed; and that in the uncounted and uncountable successions of generations since the first acorn sprouted and the first oak reared its limbs toward the heavens, there has been no new creation or exercise of creative power of any kind.

It is not proposed at present to enter upon the question of what may be called the original creation of the primeval germs. But if the oak be produced by virtue of forces inherent in matter, it seems to follow that there must have been a primeval germ of some kind or other. If so, whether such germ were brought forth by a divine act of creation or were merely the natural and necessary result of a certain aggregation of matter, however brought about, it must have preceded both the acorn and the oak. If such were the case, the question before mentioned, as to whether the acorn originally came from the oak or the oak from the acorn, does not present any very great difficulty. The answer clearly is, that neither originally came from the other, but that both were evolved *pari passu*, side by side, by gradual development from earlier forms, commencing with the primeval germ.

When the oak dies, as in the space of a comparatively small period of time it does, it turns again to dust and eventually to inorganic dust, substantially similar to the inorganic matter of which, by virtue of its wonderful assimilative powers, it originally built itself up. The leaves which, from season to season, performed their functions and appropriated and assimilated their appointed portions of carbon, just as regularly after their work was over, first turned yellow and then brown, then fell off, rustled for awhile over the ground, drifted into hollows, and in time rotted into mold. The wood of the tree lasts longer; but it, too, eventually must succumb to the same fate. If it be cut into cords and thrown into the oven, the change is more rapid than if it be left to lie in the forest until it returns to its original elements; but in both cases the process is essentially the same. Under any and all circumstances, whether it be by the rapid consumption of fire, or the slower process of parasitical dry-rot, or the long and tiresome disintegration of gradual decay, there is, and in the end there must be, in every case, a disruption and dissipation of the molecules as if they had never been united in a living body.

A New Church Structure.

A very noticeable feature in the growth and prosperity of San Francisco is the character of the buildings erected during the past few years. The residences are improving in style and finish, and the commercial buildings are now largely made of stone of various kinds, with better architectural features than formerly. Among fine buildings completed of late is the new Unitarian church, an engraving of which we give herewith.

The new edifice on the southwest corner of Geary and Franklin streets faces the east. It is a fine structure of a mixed style of architecture inclining to the Romanesque, and as most of our churches are of brick or wood, the one in question is particularly noticeable, being as it is built of stone taken from a quarry on our own peninsula. It has been built at a cost of $60,000 upon a lot 120x137½ feet, for which $31,000 was paid out of the money realized from the lot on Geary street, where the late church stood, and which was bought by a Boston man for $120,000. The new church is truly an ornament to the city, and one we may justly feel proud of. The interior is in the antique style, making a charming harmony with the exterior. The hundred and ten pews are of antique oak and were manufactured in the East. The walls are tinted and the ceiling is an open timber one. The roof is of slate. There is a small parlor in front with a bay-window, and a large parlor back of it. Then comes the Sunday-school room. The three connect by folding-doors which can be thrown open for entertainments. Next to these come the library and two smaller rooms, one for the choir and the other for the sexton. The old pulpit, the font and the railing in front have been utilized. The organ, purchased for $4000, is a magnificent instrument. The three rose windows looking to the north, south and east are worthy of all praise, giving the interior a warm, cheery appearance. The handsome bell is very superior in size and quality and is on the key of F. Its weight is 4000 pounds. It was purchased in Troy, N. Y., for $1200 and donated by John Perry, Jr., who was one of the early promoters of this, the only Unitarian church in the city.

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SAN FRANCISCO
Saturday Morning, Feb. 23, 1889.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Reduction Works on Deer Creek, Nevada City District; Wartsila Furnaces, 127. The New Unitarian Church, San Francisco, 129. Precipitating Vat with Machine Storer and Filters, 135.
EDITORIALS.—Nevada City Mines, 127. Passing Events; Mineral Lands on Railroad Grants; Wyoming Mines; Scrub Timber on Public Lands; Aliens and Mineral Lands; The Late J. C. Flood; Iron and Steel Direct from Ore, 134. Precipitating Vats; The Electric Power at Big Bend, 135.
CORRESPONDENCE.—Moths, Gnats and Skeeters, 128.
MISCELLANEOUS.—The Acorn and the Oak, 128 A New Church Structure, 133.
SCIENTIFIC PROGRESS. — Diatoms—A New Discovery; A Novel Signal Rocket; Who Discovered Hydrogen; A Stupendous Mystery; Passivity of Iron; A Dream of the Alchemist; The Discovery of the Microscope; The Planet Venus; Effects of Mercury on Platinum, 132.
MECHANICAL PROGRESS.—The Suppression of Smoke; The Direct Process at Brewsters; Behavior of Tempered Steel; Origin of the Shot Tower; Electrical Power Direct from Coal; Patents in England in 1888; American Machines in England; Gas Emanations, 132.
GOOD HEALTH.—What One Morsel of Bad Meat Can Do; Coffee and Its Effects; Human Heart Beats; The German Alphabet; The Tongue; Spraying in Tooth Drawing; A Long Sleep, 133.
USEFUL INFORMATION.—Manure from Basic Slag; The Cat as an Inspector; Large Telescopes; The Soft Bronze Color of Metals; Origin of the Pound Weight; Paper Leather Made to Imitate Calfskin; To Remove Stains from Marble; The Thistle Root; To Soften Leather; Raisins, 133.
MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 130-31.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 138.

Business Announcements.

[NEW THIS ISSUE.]

Sheet Iron Pipe—Francis Smith & Co.
Safety Valves—Standard Valve Works, Oakland.

Passing Events.

The collapse of the unfinished 14-story building in Chicago this week will doubtless have the effect of calling attention to the danger of such high structures when built on small ground-space. In the Eastern cities the buildings erected of late have been very high, and no one has yet fixed the limit; but there will be more care exercised in future.

The U. S. Senate Committee on Mines and Mining is now considering the Alien Mineral Land bill, and the question of miners using scrub timber from Government land. Both these questions are of great importance to the mining community.

A very important decision was rendered by the Supreme Court this week relating to mineral and agricultural lands on railroad grant. The decision says that, in the eyes of the Government, all the land embraced in the grant is agricultural, and that this view cannot be changed by any decision of courts as to the character of the lands. It has always been understood that mineral lands were reserved from railroad grants.

The famous Keystone mine in Amador county, opened in 1850, and which for 39 years never failed to pay its regular dividends, is about worked out. A number of men have been paid off and half the mill closed down. The company will continue to sink from the 1500 to the 1700 level and prospect, but they now only have a small ledge on the 1500.

Mineral Lands on Railroad Grants.

A very important decision has just been rendered by the Supreme Court concerning mineral lands on railroad grants. It affects many settlers in California who have secured their homes by the homestead or pre-emption law. It seems to give all the mineral, as well as agricultural lands, to the railroad company in their grant, and still further narrows down the field for prospecting in this State,

The case is the first of the kind to be settled by the Supreme Court. The action was brought by John Gale against S. M. Best et al. to recover possession of certain lands. The lower court gave judgment for the plaintiff, and an appeal was taken from the judgment and an order made denying defendant's motion for a new trial. The land in dispute lies within the limits of the grant of lands by Congress to the California & Oregon Railroad Company. The Central Pacific succeeded the above company, and in 1875 the Government issued a patent to them. The plaintiff took possession and held the land under the Central Pacific Company. In December, 1885, the defendants entered upon the land, located a mining claim, dispossessed the plaintiff and began mining, claiming the right to the possession of the land on the ground that it was mineral land and that all mineral land was reserved in the grant by Congress to the railroad. At the trial that part of the defendant's answer which set up this claim was, on motion of plaintiff, stricken out, and an objection to their offer to prove the land was mineral was sustained. Upon these two points the appeal was taken.

The court's opinion is lengthy and exhaustive, and numerous precedents are cited to sustain it. In the closing paragraphs the following is the language :

Our opinion is that where a patent issues for public land under a law which provides for its distribution as agricultural land—either to a railroad company or to pre-emption of homestead claimants—and there is no reservation in the land except a general one of mineral lands, and no reservation at all in the patent, then the land must be considered as agricultural.

Wyoming Mines.

In conversation this week with a gentleman from Evanston, Wyoming, we learn that the coal-mining interests of the Territory are in a good condition, and likely to be enlarged. There is some talk of opening up a large coal-field on the Oregon Short Line at Twin creek.

The Twin Creek section is on the divide between the Green River and Bear River watersheds. The Oregon Short Line has a tunnel through the hill near there, so there is plenty of opportunity for transportation. There has been more or less litigation for some years, keeping back development, but some parties from New York intend taking hold and working the mines in the coming spring. An extraordinary series of veins is found there, about 30 distinct veins having been discovered. One of these is over 100 feet thick, two or three will run over 30 feet, and a dozen or more show 10 feet in width. The strike is about north and south, and the dip about 25 to 30°. The coal is soft, but compares favorably with that in the same neighborhood. There are very few "bands" in the veins. The coal burns clear, with very little ash. The U. P. R. R. Co. formerly did some mining at this point, but stopped work on account of litigation.

A great deal of coal is being shipped from Rock Springs, some coming to San Francisco. About 800 tons a day go to Butte, M. T., and it is expected when the Twin Creek beds are worked, some of the trade will go to that company. The coal at Almy is not good for shipping. It is too dirty. The Central Pacific Co. has a mine at Almy, and is now supplying the Union Pacific with some coal from there.

There are some placer mines in the central portion of Wyoming, and recently there are reports of the discovery of silver ores.

MANUAL LABOR on the mines in Cauca valley, U. S. of Colombia, costs from 15 to 40 cents per day. There are many rivers, so there is plenty of water for gravel mining.

A NEW kind of water-jacket furnace is being tried by the Boston & Montana Co. It has one continuous air-chamber to maintain the blast.

Scrub Timber on Public Lands.

It will be remembered that the Eureka Consolidated mine of Eureka and other companies have been sued by the United States for cutting timber on public lands, and as a result these companies have stopped mining work. In the examination of Commissioner Stockslager before the Senate Committee on Mines and Mining several days ago, in regard to the suits recommended by him to be prosecuted against certain mining companies in Eastern Nevada for cutting scrubby timber from the public lands for mining purposes, the Commissioner could not answer the question as to whether the special agent sent to investigate the matter had given the defendants an opportunity to state their side of the case. He also refused to produce certain correspondence from Henry Rives of Eureka, assistant counsel for the Government, on the ground that it was private and confidential.

Senator Stewart received a letter from the Commissioner this week, in which he states that the special agent did not give the mining companies an opportunity to state their case, because he was advised not to do so by Rives, notwithstanding it has always been the rule of the Department to give the defendants such a hearing. Senator Stewart will have Commissioner Stockslager subpenaed and will compel him, if possible, to produce the correspondence of Hayden, the United States District Attorney of Nevada, and also of Rives, upon which his proceedings were based. The action of the Department in bringing these suits against the mining companies is looked upon with great disfavor by the mining community all over the coast.

Aliens and Mineral Lands.

The people in the Territories are anxious to have Congress come to some decision as to the sale of mines to aliens. It will be remembered that when the Alien Act was passed, preventing aliens from holding lands in the Territories, it was found that it prevented people selling mining property to aliens also. A bill was then introduced changing the law in this respect, so that aliens could hold mining properties in the Territories. A committee was appointed by the U. S. Senate to investigate the subject of ownership of mines by aliens in the Territories and recently finished this investigation. But so far no conclusion has been reached. On Monday, in the U. S. Senate, a memorial from the Legislature of Montana was presented, urging action on the bill now pending relative to the sale of mineral lands to aliens. The memorial states that mining is the chief interest in the Territory and there are unlimited fields for the investment of capital, and to that end free, untrammeled introduction of foreign capital should be permitted for the development of the mining industry.

The Late J. C. Flood.

J. C. Flood, the California mining millionaire, and well known as one of the Bonanza firm, died at Heidelberg on Thursday. Mr. Flood laid the foundation of his great fortune during the bonanza days of the California and Virginia mines on the Comstock. In the early days of this State he occupied a humble position, but rose through his mining ventures to be one among the very wealthy men of the world. His residence on California-Street hill in this city is the finest building on the Pacific Coast, and he had also in San Matéo an elegant country-seat.

Mr. Flood's name is everywhere known among mining-men from his connection with the Comstock mines. Of late years he has paid little attention to this branch of business, confining himself to duties connected with the Nevada bank. Mr. Flood will be sadly missed by the poor of this city, for he was one of the most generous of men. His gifts to public charities were about $25,000 a year, and including these, he annually gave away in charity about $100,000. No other of the California millionaires was as liberal as he in this respect. He was a man of domestic habits, devoted to his family, and had a wide circle of friends. He had been for some time in Europe, where he went in the hope of improving in health.

THE *Lower Californian* says there is sulphur enough on the peninsula to supply the world.

Iron and Steel Direct From Ore.

F. L. Garrison of Philadelphia some time since visited the iron works of Count Stroganoff at Dobransky, Perm, Russia. He also saw the Wartsila iron works in the eastern part of Finland, near Lake Ladoga, and described the furnaces in use at the latter place, which have double walls of soft iron plate, and are very effective. Favorable results are accomplished by the peculiar circulation of the blast through the hollow walls of the furnace and by the insertion of the tuyeres into the hearth itself.

The walls of the Wartsila furnace (see engraving) are of wrought-iron plate, the whole being enveloped by a second wall or shell, extending from the hearth to the throat, thus forming a series of zones, divided by spiral partitions, making a continuous spiral flue, coiled, as it were, around the furnace. The blast, passing through this, is heated under ordinary circumstances from 150°–250° C. (302°–482° F.), though sometimes running up much higher. By means of a system of dampers t and pipes r, r', r'', r''', r'''', the circulation of the blast through these chambers or flues can be regulated with the greatest ease. If the blast is too hot, the upper and middle chambers are shut off; if, on the contrary, it is too cold, the upper chambers, which are frequently not used at all, are opened. This contrivance, together with the movable hearth, gives a most effectual control over the operation of the furnace. To check loss of heat by radiation, the outer shell is coated on the outside with a four-inch layer of fire-clay.

The other most important improvement made in the Wartsila furnace was the insertion of the four tuyeres directly into the movable hearth. There are four tuyere holes c in each of the two opposite sides of the hearth, the lower being three inches and the upper six inches from the bottom. When a fresh hearth has been inserted and a new loupe is beginning to form, the tuyeres are inserted in the lower holes; as the loupe increases in size their inclination is lessened, the object being that the blast should just impinge upon the surface of the loupe. When the loupe has grown up nearly to the level of the lower tuyere holes the tuyeres are removed, placed in the upper holes, and the lower ones stopped with clay. The same operation is then repeated until the loupe reaches the level of the upper holes, when the tuyeres are taken out and the hearth is removed and replaced with a fresh one.

Thus the operation is practically continuous, the blast being stopped for about five minutes while the hearth is being replaced. The hearth stands upon a vertically moving platform which can be raised and lowered a few inches, thus permitting a tight joint being made between the furnace proper and the hearth, the crack of about an inch between the two being first carefully luted with clay before the hearth and platform are raised. The slag is tapped off into a car running under the hearth by a series of four holes (l), one above the other. The hearth containing a fresh loupe, after being replaced with another, is revolved on the axis b, over the cast-iron arms, a.

COLORED MINERS.—After three years' experiment in working white miners in the Northern Pacific Coal Company's mines at Roslyn, Kittitas county, Washington Territory, during which there have been four strikes, the company shut down the mines two months ago and have been collecting colored miners in Illinois and Indiana since that time to take the places of the strikers. A train arrived at Roslyn last week with 400 colored miners and their families. It is the intention of the company to replace all the white men with negroes. The white strikers number 450 men, and are of 15 different nationalities, many of them owning their houses in Roslyn.

MARIPOSA GRANT.—Additional men are working in Bear valley on the Mariposa Grant cutting a ditch and preparing pipe for the air-compressor to work the Burleigh drills in the Pinetree and Josephine mines. The owners are trying to sell the mines on the grant to English capitalists.

SUPT. MCCURDY of the Paradise Valley Mining Co., Nev., requests the *Silver State* to say that no more miners can get work at the Paradise mine; in fact there are more men in Spring City now than are needed.

Precipitating Vats.

In last week's PRESS we gave a sketch of Ottokar Hoffmann's complete trough-lixiviation plant from a paper read by him before the American Institute of Mining Engineers. On this page are shown figures which illustrate his precipitating vats used in the process, and also a very convenient arrangement of filters for the precipitate. The tanks are provided with a machine-stirrer of the construction indicated in the drawings.

In these Fig. 1 is a vertical section of Fig. 3. Fig. 2 is a horizontal view of Fig. 3. Fig. 3 is a precipitating vat with machine-stirrers and filters for Hoffmann's trough lixiviation. Fig. 4 is a horizontal view of the filter frame; and Fig. 5 is a section of Fig. 4.

The stirrer *s* (Figs. 1 and 2) has to make about 30 revolutions per minute if the diameter of the tank is not more than 8 or 9 feet. It is set in motion or stopped by working the friction-clutch *f* (Fig. 1). The wings *g* (Fig. 2), which reach near to the bottom, are about three inches wide, and are kept in position by triangular pieces of boards. They break the violent current around the periphery and throw the solution toward the center, thus causing a strong whirling motion. In Figs. 2 and 3 *a* is the discharge pipe for the clear solution, and *b* for the precipitate. Pipe *d* passes in front of all the precipitating-tanks, and conveys the calcium or sodium-sulphide solution from the reservoir to the tanks. The branch pipe *c* reaches above the rim of the tank, and ends in a rubber hose, which is provided with a clamp. In precipitating, the stream of calcium sulphide can be regulated, and the operator, by observing the color produced by the precipitant in the moving solution, can, after some practice, finish this operation in a very short time, and much more easily than by using buckets.

The machine-stirrer does also good work in discharging the precipitate. After the clear solution has been decanted within a few inches of the precipitate, the stirrer is set in motion, and the discharge pipe *b* opened. The stirrer agitates the precipitate until nearly all is discharged into the filters or into the vat from which the filter press is supplied. Thus the cleaning of a tank can be done in a very short time.

Where the filter press is not used, a filter arrangement, as shown in Figs. 3, 4, and 5, will be found very convenient. Two rows of filters are so arranged that they are in communication with each other by depressions cut into the divides of the frame. By allowing the precipitate to flow into one filter, all the adjoining filters will gradually be filled one after the other, without requiring the attention of the operator.

The filters are shallow and the precipitate will thus be spread in a comparatively thin layer over a large filtering surface. Under each row of filters is placed a trough *n* which receives the filtrate and conveys it to the pump-tanks *P* below the floor. These filtrate frames are placed in front of the precipitating-tanks, and one can be made to contain quite a number of filters. Owing to the shallowness of the filters and the large filtering surface, the solution will draw off fast, and in five or six hours the precipitate will be stiff enough to be charged with a hand shovel into the furnace.

FIG. 1.

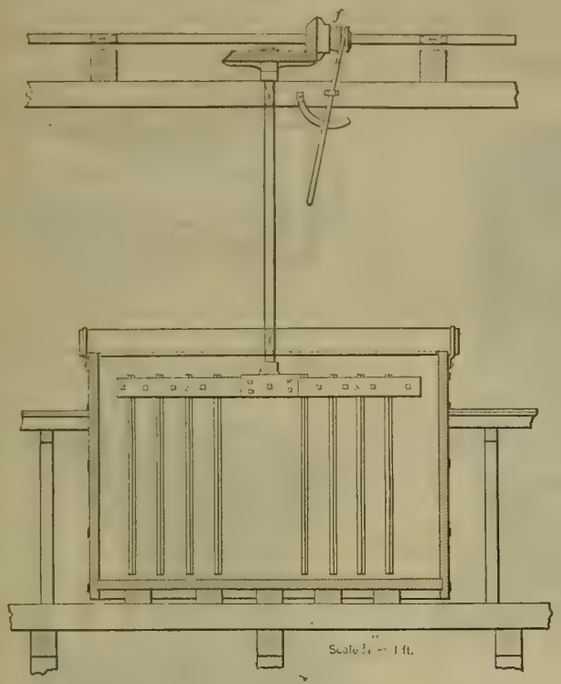


FIG. 2.

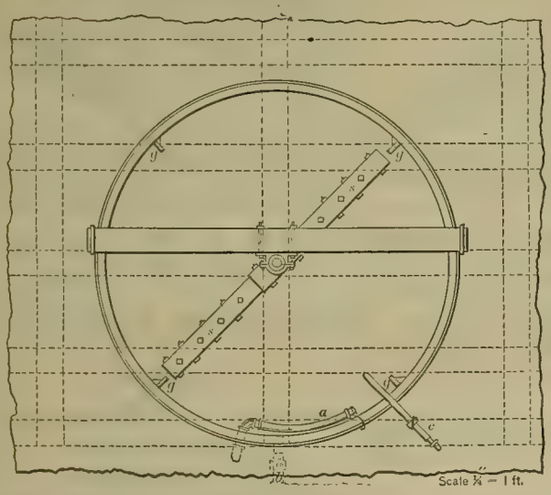


FIG. 3.

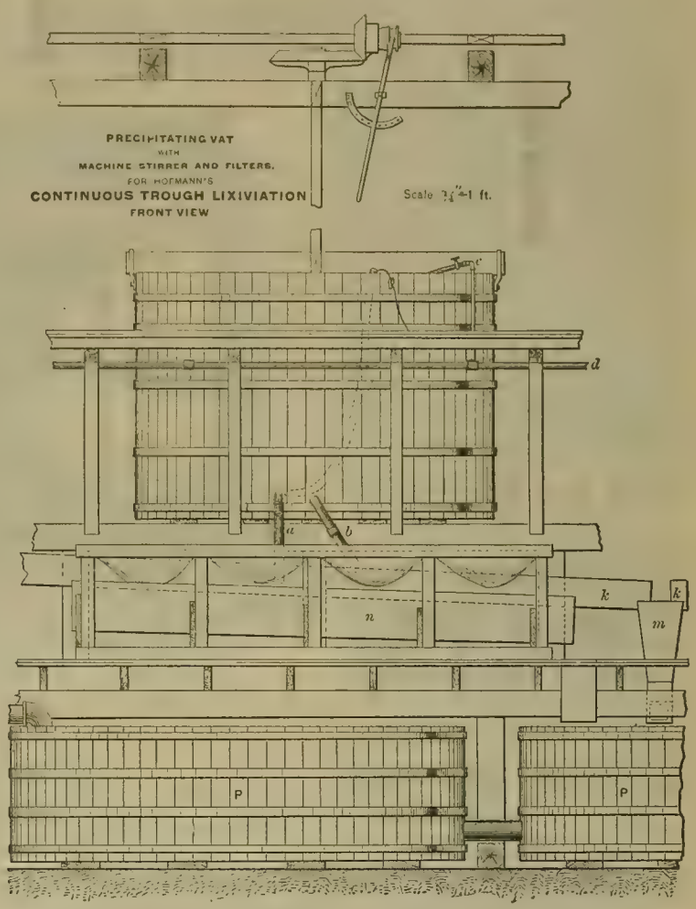


FIG. 4.

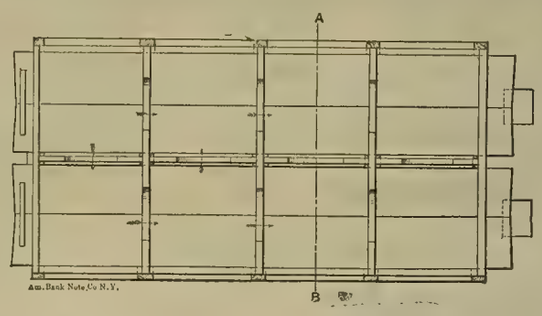
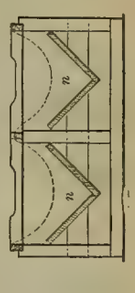


FIG. 5.



PRECIPITATING VAT WITH MACHINE STIRRER AND FILTERS.

The Electric Power at Big Bend.

Some time since an electric transmission plant was put up at the Big Bend Tunnel Co.'s property, Butte county, in this State, for furnishing power for pumping and removing boulders when the bed of the river should be laid bare by the water being turned through the tunnel. Not very long after it was put to work the electric plant was taken out, and the supposition was that it was unsuccessful. This, however, was not the case. As publication of the error did the Sprague Electric Railway & Motor Co. some injustice, we publish the following extract from a letter to the California agent of the company, written by R. V. Pierce, president of the Big Bend Tunnel & Mining Co. He says:

"The difficulties in operating your motors at Big Bend were entirely outside the electric plant. No proper government had been provided for the water-wheels with which they were driven, and as the work was such that the loads were very suddenly thrown off, and in doing the hoisting of boulders, gravel, etc., it permitted the potential of the current to run up to such a degree as to burn out some of the armatures. This danger to the armatures was overcome by the better regulation of the speed of the water-wheels, obtained through the application to them of deflecting nozzles, but would have been more completely controlled had we been able to stop the work and apply proper governors to the wheels. The fact that the plant had been taken out was not due to any fault in the electric machinery whatever, but simply for the reason that, on account of vast quantities of boulders developed by our mining excavations, we found we could not work the ground profitably.

"It is only just to the Sprague Company that I should make these statements in refutation to the false statements circulated with respect to their machinery. A similar statement has been sent to the Sprague Company at New York, and which you are at liberty to use as you may think proper."

WAVE POWER.—The Wave Power Co. of San Francisco has petitioned the supervisors for the use of a portion of the western part of the City cemetery, not to exceed 70,000 square feet, near Point Lobos, for a salt-water reservoir, to be used in further demonstrating the utility of their wave-power motors. The company ask also that the rent of the premises be made nominal, alleging as a reason therefor that the carrying out of the enterprise will add greatly to the prosperity and health of the city.

THE past two years the South Yuba Canal Company has been running a bedrock tunnel to get into the old blue-lead cement gravel channel that was thought to run through their ground. They have, however, struck gravel which prospects well. This is a good thing for the old camp of You Bet.

JOHN CLAFFIN, a New York member of the Pioche Mining Company, has sent to the miners of the camp as the nucleus of a library 500 volumes of carefully selected and valuable books.

EXTENSIVE GOLD MINE FOR SALE.

To be sold at public auction by the undersigned, at the Merchants' Exchange, in the City of Halifax, on Thursday the Fourteenth day of March next, at twelve o'clock noon, that extensive, valuable and well-equipped GOLD MINE known as the Dufferin GOLD MINE, situate on the Atlantic coast, about ninety miles east of said city. Daily mail from Halifax. Telegraph office at Salmon river, four miles from the works. Salmon river harbor never freezes, and is safe and easy of access. The mine embraces 342 areas, each 150x250 feet, all in one block. The entire area measures fifteen hundred feet in width across, and eight thousand five hundred and fifty feet along the lodes. The leases have nearly fourteen years to run, and can at any time be renewed for a period of twenty-one years, upon payment of two dollars per area. Within this area is a belt of veins dipping on each side of an anticlinal. They have been found by tests made on the surface to extend upwards of 4,000 feet. The ore has been partially removed to a depth of 200 feet over a distance of about 700 feet, and to a depth averaging about 70 feet over an additional 1,000 feet in length or thereabouts. The veins are of various width, the largest averaging about ten feet of solid quartz.

This mine was discovered in the Autumn of 1880, but was not worked to any extent until the Autumn of 1881. It has yielded up to the end of November, 31,012 ounces of gold from 64,503 tons of quartz, according to the sworn returns made to the Mines Office. The gold can be produced at a cost which will leave a very handsome margin of profit.

The mine is operated by machinery worked by water power, the power being transmitted by a line of wire rope running from the water wheel to the mine—a distance of about 4,750 feet—and lying parallel to the outcrop of said veins, at a distance therefrom of about fifty feet. The Salmon river crosses the property twice. It supplies the hoisting and pumping power, and the same water is afterwards used to drive the crusher. The latter has thirty-eight stamps, and there is ample water power to operate three times that number. Sixty stamps can be operated with present machinery. Of the 120 horse-power existing for pumping and hoisting only about twenty-five is used. There are about 700 acres of well timbered and well watered land owned with the mine. This partly covers the areas, and where it does not immediately adjoins them. It is also provided with a steam plant to operate hoisting gear and pumps in case of accident to the transmission power, a sawmill, sufficient for the requirements of the property, a tramway from the mine to the crusher for carrying quartz, and stables, offices, and boarding-houses, sufficient to accommodate a large number of employees.

The mine is owned and has been operated by a partnership, and owing to the death of one of the principal owners it has to be sold to enable his estate to be settled. A good title will be given.

Terms, ten per cent cash, balance within thirty days from day of sale. The deposit to be forfeited in case the purchaser fails to complete the purchase within that time. Further particulars can be had on reference to N. H. MEAGHER, Q. C., Bedford Row, Halifax, or to JAMES DUGGAN & SONS, Auctioneers, Bedford Row.

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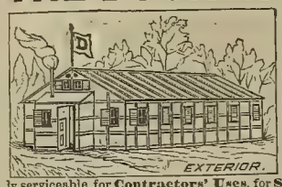

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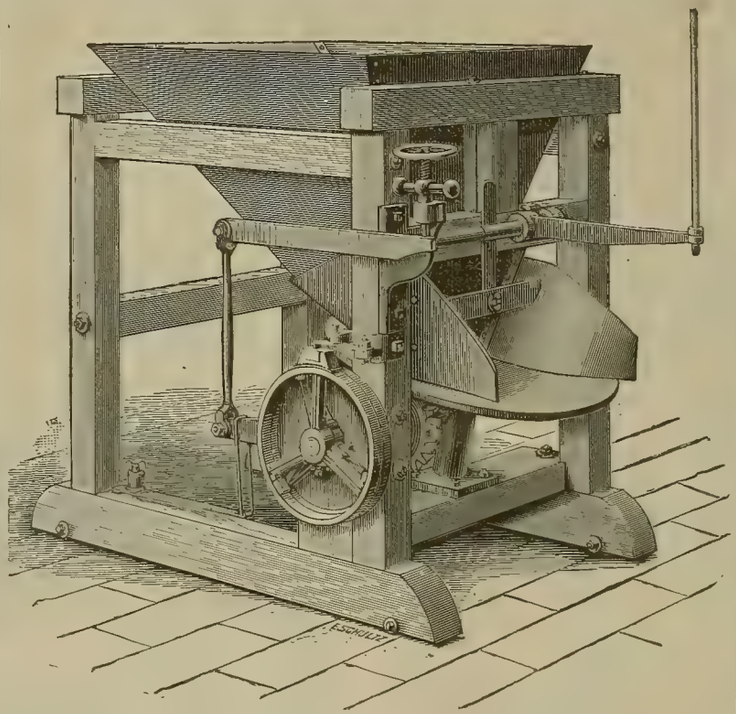

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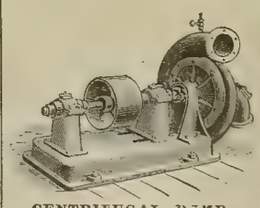

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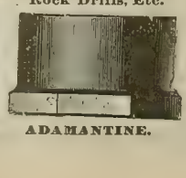

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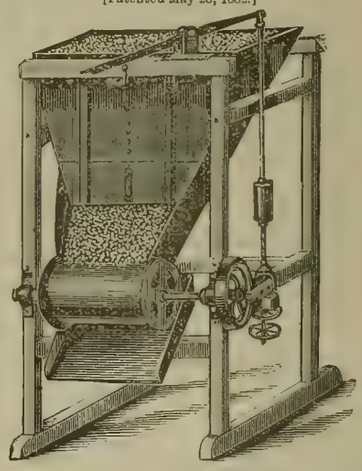
[Patented May 28, 1882.]



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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING FEB. 12, 1889.

397,580.—HANDLE FOR CROSSCUT SAWS — M. Bennett, Eureka, Cal.

397,581. — ORE-WASHER — Henry G. Blasdel, S. F.

397,691.—FRUIT-PITTER — Briggs & Cavallaro, San Jose, Cal.

397,584. — TRACK-CLEARER — G. W. Cook, Mountain View, Cal.

397,542.—ORE-SEPARATOR—E. L. Giroux, Albina, Ogn.

397,551.—HAY OR GRAIN UNLOADER—Wm. G. Hunter, Traver, Cal.

397,753.—GOVERNOR FOR GAS ENGINES—D. S. Regan, S. F.

397,604.—BRICK MACHINE—J. Morhard, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

HAY OR GRAIN UNLOADER.—William G. Hunter, Traver, Tulare Co. No. 397,551. Dated Feb. 12, 1889. This invention relates to that class of unloading devices in which the hay or grain is contained within a net placed in the bed of the wagon, and is operated by means of ropes which roll it and its contents out of the wagon-bed and up on the top of the stack. The patent covers certain constructions and combinations of devices. The object is to simplify the unloading process by avoiding the employment of the usual complicated system of ropes and the inconvenience of their rearrangement after each operation, and to provide an ordinary header-wagon with a simple and readily applicable unloading mechanism.

ORE-WASHER. — Henry G. Blasdel, S. F. No. 397,581. Dated Feb. 12, 1889. This invention consists in an endless traveling belt having its working surface formed of corrugated or riffled portions alternating with plain or smooth portions, providing a belt capable of doing more and better work than the ordinary smooth-surfaced belts, or a belt completely corrugated or riffled. It is mounted at an inclination and the ore-pulp and water are fed upon its surface, whereby the lighter and worthless particles of the ore are washed down the incline, while the heavier and precious particles—such as sulphurets and free gold—are carried up by the belt, clinging to its surface, and are washed off in a tank below.

TRACK-CLEARER. — George William Cook, Mountain View, Santa Clara Co. No. 397,584. Dated Feb. 12, 1889. This invention relates to the class of swathers, the object of which is to prevent the cut grain or grass from falling over on to the standing grain or grass and to direct it properly into the swath or path of the sickle, thus keeping a clear track. The object of the invention is to provide a simple, practical and easily adjusted swather adapted to be fitted o the shoe of any mower.

FRUIT-PITTER.—John G. Briggs and Frank Cavallaro, San Jose, Cal. No. 397,691. Dated Feb. 12, 1889. This invention consists of an endless belt formed of transverse slats united together by links, so as to be driven around drums at each end of a horizontal table. These slats have cup-shaped sockets, in which the fruit is received, with holes in the bottom of the sockets for the escape of the pits and slots through which vertically reciprocating knives pass, so as to cut the fruit around the stone, and in combination with this of a punch by which the stone is forced out. The flesh of the fruit is discharged from the end of the machine into a receptacle for the purpose.

COIN-CONTROLLED LIFTING MACHINE.—Jos. G. Kearney, S. F. No. 397,295. Dated Feb. 5, 1889. This invention relates to the class of machines for testing the lifting powers of the operator, in which the lifting force is directed against or upon the spring, the compression of which is indicated through suitable mechanism upon a dial or register. In this machine when the nickel coin is dropped into the slot, an electric current is completed and frees the pull-rod so the amount lifted can be registered. After this is done, the coin drops into a receptacle, and the pull-rod cannot be again lifted until the electric circuit is again made by means of another coin.

MINERS at Castle camp, Montana, are very angry because the Cumberland Co. does not pay their wages. The sale of the bullion took place at a time when there were $6000 worth of labor liens on it. The attachments of the other creditors also covered this bullion. When the sale was concluded, $7400 being realized, this money was turned over to the merchant creditors and none paid to the miners. Naturally the men were furious. The mine has closed down.

Legislative.

The bill to establish a State Reformatory or School of Industry at Ione, Amador county, appropriates $160,000 for its establishment and maintenance. It is to be managed by a board of directors. Boys under 18 years of age may be committed by a Superior Judge upon complaint of any authorized person who shows to the satisfaction of the Judge that it will be to the best interest of the boy to have him sent to the school. The board also has the power to discharge or parole a boy. Any fugitive from the institution may be arrested and returned on the written order of the superintendent.

The bill provides for the payment of the expenses of each inmate, and requires the superintendent to furnish a per capita statement of expense. The building must not exceed $40,000 in cost, the barns, sheds and work-shops, $10,000, and the tools and machinery, $10,000. Habits of industry and thrift are to be encouraged, and every comfort of the inmates is to be assured, and their moral and physical advancement taken into consideration. This is the first State institution established on the mineral belt of the State.

The Senate has passed the bill appropriating $50,000 to purchase a site for the Home for Feeble-Minded Children within Santa Clara county, and $120,000 for the erection of buildings.

It has also passed a bill appropriating $30,000 to the State Board of Forestry.

Hamill's Senate Water Meter bill was passed, but owing to a flaw in the title, it was ordered re-engrossed. The bill provides that water companies must put in meters at their own expense. The consumer may require the company to test the meter every three months at the company's expense. No meter can be used at all until tested by the official gas and water inspector.

HARTSFELD FURNACE FAILURE.—A Montana mining paper having published notices of the merits of the Hartsfeld portable smelter, at Milo, Idaho, Mr. Horace F. Brown writes that it is a failure. He says: "No man there will now claim any merit for the furnace. No man with the least practical knowledge of the matter ever believed a word of the specious claims of the Hartsfeld outfit, but because it was supposed to be cheap and within the reach of men of moderate means who had a small mine, several have been sold with the same result, a total loss to the purchaser. The only other furnace of the type in the West was erected at Cooke City, and proved a more disastrous failure than this one, because a more persistent effort was made to use it and much greater expenses incurred."

INDUSTRIAL EXHIBITION. — The Mechanics' Institute will open its 24th Industrial Exhibition in this city on Aug. 27th, and close it October 5th. Medals of gold, silver and bronze, with an engraved diploma, will be awarded to such articles as may be found to merit special distinction, and competent jurors will be appointed to examine and report on the same, unless the owner shall, at the time of their reception, give notice they are for exhibition only. The Department of Machinery will be enlarged and specially prepared for machinery in motion, for which ample steam and power will be furnished, including water.

ASBESTOS.—J. D. Hoff and F. T. Botsford purchased from Murray & Co. of San Diego what is known as the asbestos mines on the desert. These mines are situated in San Diego county, between Dos Palmas and the Cuyamaca ranch, on the line of the Cuyamaca railroad. For about three months Mr. Hoff has been negotiating for these mines. The asbestos being very long fibered, some of it two and three feet long, is of very fine quality. The asbestos has to be carried on mules and wagons for 36 miles.

ACADEMY OF SCIENCES.—At the last meeting of the Academy a paper was read by Dr. Geo. Heuston on "Crinoids or Sea-Lilies." Some specimens of fossil ivory were exhibited by J. H. Burnham, the Folsom banker. The specimens were found by M. P. D. Eckhardt in a placer mine situated three miles from Folsom, near the old camp of Prairie City, and were found in a bed of gray gravel, 22 feet below the surface. The pieces, five in number, form an almost perfect elephant's tusk.

COST OF OPERATING A MINE.—The cost of operating the Con. Cal. and Va. mine for the month of January was $150,724.14, and included $43,080 for salaries and wages, $23,232.26 for mine supplies, $72,324 for reduction of ores, $510.32 for transportation and hauling, $10,332 for royalties to the Sutro Tunnel Co., $550 for water rent, $367.60 for compressed air, and $1639.47 for assaying.

STANDARD MINE.—At the annual meeting of the Standard Mining Co. of Bodie, the following officers were elected for the ensuing year: Aug. Pettibone, Pres. and Gen. Manager; Jos. Tate of New York, Vice-Pres.; and T. C. Grant, Act. Pres.; W. H. Oscanyon of New York, P. N. Lilienthal, A. P. Brayton, and John Mason, directors. J. W. Pew was re-elected Sec'y. The secretary's report showed a cash balance of $20,723.97.

THE Coloma people will provide refreshments for the legislators on March 2d, on the occasion of the unveiling of the Marshall monument.

Nevada City Mines.

(*Continued from page 127.*)

and salt. Sulphuric acid is bought in tanks, which effects a saving in freight and breakage as compared with carboys. The ore is exposed to the action of chlorine during 48 hours. The gold is precipitated from the leach by solution of sulphate of iron.

Dimensions of roasting furnace, inside, 70 by 10 feet; capacity of roasting furnace, 3 tons in 24 hours; consumption of wood for roasting one ton, three-fourths of a cord; number of gassing tubs, 4; number of gold-precipitating tubs, 3; number of silver-leaching tubs, 3; number of silver-precipitating tubs, 3; dimensions of gassing tubs, inside diameter, 80 inches; dimensions of gassing tubs, inside depth, 30 inches; capacity of gassing tubs, 3 tons; dimensions of precipitating tub, inside diameter, 72 inches; dimensions of precipitating tub, inside depth, 36 inches; time of charge in chlorine, 48 hours; consumption of chemicals to one ton of ore: manganese 6 pounds; salt in furnace, 40 pounds; salt in generator, 6 pounds; sulphuric acid of 66 degrees B., 20 pounds.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco.

VALLEY LUMBER CO., Feb. 9. Capital stock, $300,000. Directors—T. K. Prescott, C. S. Pierce, F. P. Hooper, C. A. Hooper, C. F. A. Talbot, A. P. Talbot and W. H. Talbot.

UNITED STATES BREWERY CO., Feb. 12. Capital stock, $1,000,000. Directors—Frederick Kronenberg, Philip Rohrbacher, Markus Schwab, Ferdinand B. Koenig and Robert H. Countryman.

PALACE BATHING CO., Feb. 13. Object to furnish salt-water baths. Capital stock, $100,000. Directors—Alonzo Trueworthy, Albert E. Ridley, Francis F. Du Rose, John S. Marshall and Charles J. King.

GOLDBERG, BOWEN & CO., Feb. 13. Object, to do a general grocery business. Capital stock, $200,000. Directors—Jacob Goldberg, Charles R. Bowen, Daniel L. McShane, Henry A. Bowen, Hugo D. Keil and George W. Whitney.

MORTON-BROWN CUTTER AND CUTTER-BAR CO., Feb. 15. Object, manufacturing and selling cutters and cutter-bars for mowers, reapers and headers, and all other kinds of agricultural implements. Capital stock, $100,000. Directors—W. F. Goad, John W. Coleman, Lloyd Tevis and C. B. Stone.

OBED CHART AND LAND ASS'N. Object, to acquire and dispose of lands in the city and county of San Francisco. Capital stock, $500,000. Directors—George Mearns, George Hearst, J. de Forest, J. B. Lewis, G. W. McNear and W. H. Rouse.

FOX PLATFORM AND COUPLING CO., Feb. 19. Object, to manufacture and deal in car-platform couplings, etc. Capital stock, $500,000. Directors—Frank A. Fox, Lyman C. Parke, Benjamin T. Lacy, William B. Wilshire and Squire Mooney.

N. C. CARNALL CO., Feb. 19. Object, mercantile purposes Capital stock, $100,000. Directors—N. C. Carnall, Wm. M. Fitzhugh, Geo. W. Hopkins, M. W. Bell and Alexander Gordon. Capital stock, $100,000, in 1000 shares.

Mining Share Market.

The market in mining shares has been rather more active this week than for some time past. As the lack of ore-crushing power has been cited as the cause of the long era of depression in Comstock share values and trading, now that that cause is removed, the long-promised revival in both prices and business volume should come.

In speaking of the long-continued depression on prices of shares, the Virginia *Enterprise* says: How long this state of affairs will continue is beyond our ken, but it will doubtless keep on until some very important ore strike is made in some one or more of our leading groups of mines. The long-drawn dry spell of weather has had something to do with this, of course, but not all. An immense stream of water has been fooling around a Pelton wheel at the Nevada mill, and distressing electric motors, which could have been used to crush 250 tons of ore daily at the California mill if the condition of the mine warranted it—and the management was willing. Stock operators have put these facts together with their private information, and they have been wary to tackle a market supported by mines whose ores were worked at a decided loss. The generous snowstorm, which has prevailed here for the past 24 hours, cannot fail to give a better tone to the market, of course. But that would seem to be dependent upon the opening up of valuable ore bodies in our mines, in the fact that a power is created to reduce the ore, for we are not much better off with ore and no water than we are with water and no ore.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Lexington, Feb. 15, $23,216; Cons. Cal. and Virginia, 16, $56,684; Savage, 10, $24,848; Challenge (for January), $15,781; Overman, 16, $7476; Hale and Norcross, 19, $16,800; Alice, 13, $25,480; Moulton, 12, $12,834; Hanauer, 13, $1850; Justice, 20, $2925; Hanauer, 14, $2250; Standard, 20, $5727; Confidence, 20, $16,407; Hanauer, 15, $2450; Bluebird, 14, $16,244.

SILVER DISCOUNT.—The Alice mine of Montana produced last year $487,242 on silver reckoned at $1.29 per ounce, the old standard value. The discount, however, was $134 971. The loss on silver was greater than during any other period, President Walker estimating the average selling price at 93.87 per fine ounce.

THE fire in the Calumet and Hecla mine is once more on the increase, and there is serious danger of it spreading into No. 2 shaft.

Iron Railroad Ties Wanted.

Some time ago an official of the Erie railroad is reported to have said:

"Railroad ties need renewing every three years. In building a new road the estimate is 2700 ties for each mile. It is safe to say that it will require 300 ties per mile per year to keep a road in repair. From 12,000,000 to 15,000,000 new ties are required by the railroads of the United States every year. In building the great Western railroads the contractors in many cases purchase outright the timber along the routes or as near to it as possible. In that case they pay from $20 to $25 an acre for the land. If they contract simply for the ties they pay from 10 to 12 cents apiece for them to the owner of the land for all the ties taken out. The average price paid to the tie contractor is 35 cents apiece, although we have paid as much as 50 cents for the best oak ties. Hewn ties are better, in our estimation, than sawed ones, and we use no others. Some companies think as well of sawed ties as of the hewn ones. The theory of our people is that the hewn tie lasts much longer than the others. It is only within the past few years that hemlock has been used to any extent in making railroad ties, but we find that it can be used to advantage in many instances on sidings and sections of track where the traffic does not require constant repairs. This road pays to the tie contractors along the line about $400,000 a year. Stone, iron, paper, and even glass have been used in making railroad ties, with the hope that they could be practically adopted as a matter of economy in that department of the expenses of railroads, but none of them have yet been utilized with satisfactory results. The annual clearing off of a quarter of a million acres of timber to supply railroads with ties alone is something that should direct the attention of those who are interested in the important question of protection to forests to the finding of some practical substitute for wooden ties. Fame and fortune await the inventor who will discover such a substitute."

Geo. W. Thompson, formerly a rancher and partner with one of the proprietors of this journal in a 220-acre ranch near Oakland, who is now at Sag Harbor, N. Y., has made what he believes to be a practical and valuable improvement in metal railroad ties. The drawings and descriptions of the same can be seen at this office. It will soon be illustrated in the MINING AND SCIENTIFIC PRESS, in order that its merits may become widely known.

Mr. Wanamaker's Testimony.

There is too much impartial testimony as to the value of advertising to allow of the impeachment of the value of a newspaper's advice on the subject.

The words of John Wanamaker of Philadelphia ought to have weight with men engaged in mercantile business. He says: "I spend $5000 a week in advertising, and I pay a skillful man—a former newspaper editor, and a good one—$1000 a month to do it for me. I make money by it. Advertising is the leverage with which this store has been raised up. I do not see how any large and successful retail business can be done without liberal advertising. I advertise in every issue, except Sunday, of every daily paper in Philadelphia. Continuous advertising, like continuous work, is the most effective."

Now, what has been the experience of this man, to make him so appreciative of the value of printer's ink? Mr. Wanamaker began life without a cent to his name. His father was a bricklayer and he himself went into a clothing store as a clerk when he was 14 years old. From that humble beginning he worked himself up by dint of energy and enterprise until now he is proprietor of what is probably the largest retail store in the United States.—*Waterbury Republican.*

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

MINE TAXES IN COLORADO.—The case of the Iron Silver M. Co. of Leadville against the Treasurer of Lake county, Colorado, to restrain him from collecting taxes on their property, upon the ground that the mine-tax law of 1887 was unconstitutional, has been decided by Judge Goddard, whose decision fully sustains the constitutionality of the law.

THE eight Chinese hydraulickers in the Yuba county jail owe an aggregate of 2119 days' service, having served less than half their term. Friends are negotiating for their release on the payment of money, but the Yuba authorities have decided that to accept less than a dollar for a day would be to commute the sentence and hence illegal.

COPPER.—A correspondent writes us from Hollister, San Benito county, that copper has been found lately near Tres Pinos, and there is quite an excitement about the claims, which promise well. Several parties from San Francisco and San Jose have been investigating the find.

STEPHEN THOMAS has been appointed foreman of the Sierra Buttes quartz mine. W. M. James, superintendent, has gone to Shasta county, temporarily, to look after mining property there, recently purchased by the Sierra Buttes Co.

THE Pennsylvania Mining Company's mill at Jackson Creek, Nev., was burned last week. It was valued at $15,000.

H. P. GREGORY & CO.

Cor. Fremont and Mission Sts., - - San Francisco, Cal.

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SOLE AGENTS FOR

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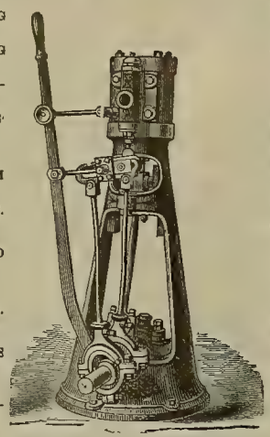
WEBBER CENTRIFUGAL PUMPS.
PERIN BAND SAW BLADES.
STURTEVANT BLOWERS AND EXHAUSTS.
SHIMER MATCHER HEADS.
BRAINARD MILLING MACHINES.
TURBINE WATER WHEELS.
BRADLEY CUSHIONED HAMMERS
MASSEY'S STEAM HAMMERS.
SCHLENKER'S BOLT CUTTERS.
HOLLOWAY FIRE EXTINGUISHERS.



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LANE AND BODLEY SAW MILLS.
H. W. JOHNS' ASBESTOS PACKING, PAINT, ETC.

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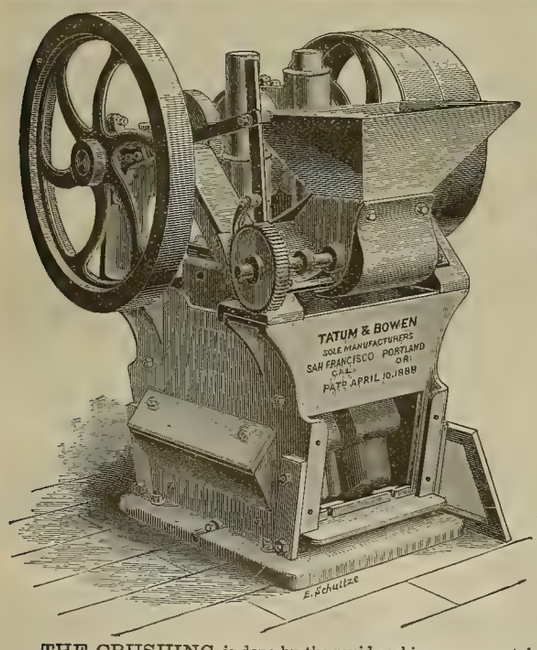
FROM 2 TO 100 H. P., ALWAYS IN STOCK

MILL SUPPLIES AND LUBRICATING OILS.



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PERFECTED DOUBLE Economic Quartz Mill.

Attached to each Mill is an effective

Automatic Ore Feeder.

THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

IMPROVED ROCK BREAKER.

Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address:

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34 and 36 FREMONT ST., SAN FRANCISCO, CAL.,

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MANUFACTURERS OF MINING AND SAW MILL MACHINERY.

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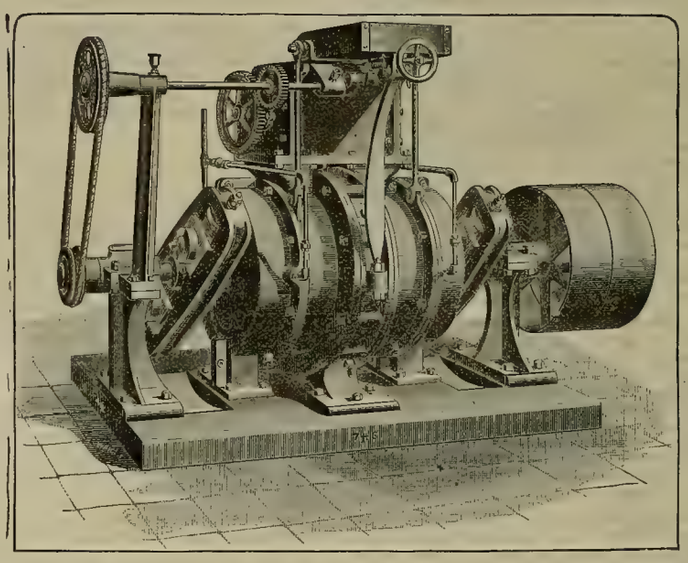
Shafting, Pulleys, Hanger and Boxes, Etc.

Special machinery of all kinds. We have a large list of Standard Patterns, Gears, Pulleys, Boxes, etc. REPAIR WORK SOLICITED.

FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; is in successful operation and we guarantee its work as represented.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

FRISBEE-LUCOP MILL COMPANY,

GIDEON FRISBEE, Manager, - - - 461 Howard St., San Francisco.

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RAND ROCK DRILLS

AND AIR COMPRESSORS.

Of the Machine-Mined Mineral in the U. S., in 1887, three-quarters of the Iron Ore and two-thirds of the Copper Ore were mined with Rand Drills.

THE HIGHEST AMERICAN TUNNELING RECORD.

THE STANDARD

American Rock Drilling Machinery

For Mines, Tunnels, Quarries, Sewers, Grading, etc.

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AMALGAMATING MACHINERY.

Stamp Mills for Wet or Dry Crushing. Huntington Centrifugal Quartz Mill. Drying Cylinders. Amalgamating Pans, Settlers, Agitators and Concentrators. Retorts, Bullion and Ingot Moulds, Conveyors, Elevators, Brückners and Howell's Improved White's Roasting Furnaces, Etc.

CONCENTRATING MACHINERY.

Blake, Dodge and Comet Crushers, Cornish Crushing and Finishing Rolls, Hartz Plunger and Collom Jigs. Frue Vanner & Embrey Concentrators, Evans', Calumet, Collom's and Rittenger's Slime Tables. Trommels, Wire Cloth and Punched Plates. Ore Sampler Grinders and Heberle Mills.

FRASER & CHALMERS,

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Improved Corliss and Slide-Valve Steam Engines,

Boilers--Horizontal, Vertical and Sectional,

IMPROVED STEAM STAMPS.

Hoisting Engines, Safety Cages, Safety Hooks, Ore Cars, Water and Ore Buckets, Air Compressors, Rock Drills, Etc. General Mill and Mining Supplies, Etc.

Pumping Engines and Cornish Pumping Machinery, Improved Water Jacket, Blast Furnaces for Galena and Copper Ores. Slag Cars and Pots, Roots & Baker Pressure Blowers, Suspended Tramways.

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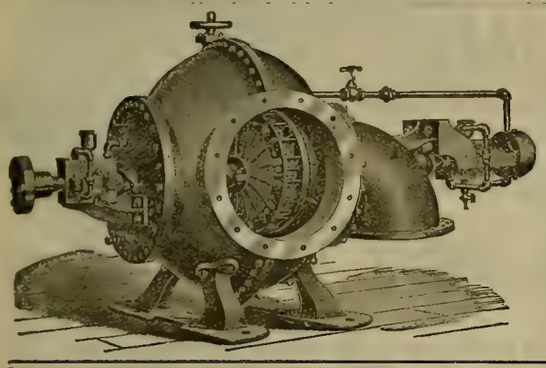

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

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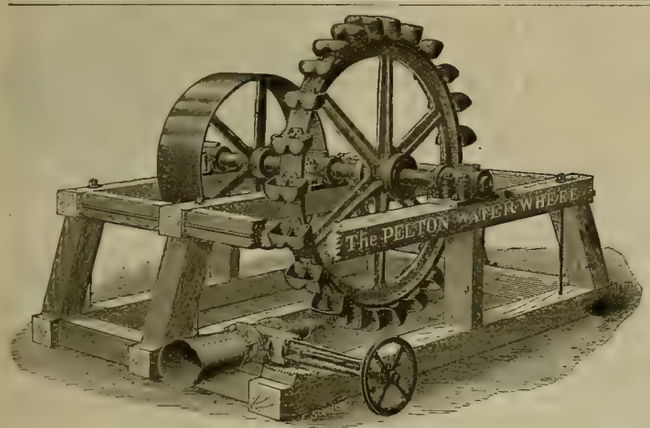
Springfield, Ohio, or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents, Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal.



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A MARVEL OF ENERGY AND POWER.

Over 600 in use on the Pacific Coast alone, aggregating upwards of 50,000 Horse Power.

It is not only most economical of water, but the most simple and reliable power for Quartz Mills, Compressors, Hoisting, Pumping, or any other purpose where water power can be used.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long distances with small loss, and it is now being extensively used in this way in all parts of the country for producing both light and power.

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This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, $5, post-paid. For sale by DEWEY & Co., Publishers, 220 Market St., San Francisco.

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WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

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Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

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We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we fee confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

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Ores worked by any Process.
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Working Tests (practical) Made.
Plans and Specifications furnished for th most suitable Process for Working Ores.
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Mining Engineers and Metallurgists

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JOHN W. QUICK, Proprietor.

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MARKET REPORTS.

Local Market.

SAN FRANCISCO, Feb. 21, 1889.

General trade is steadily improving. About all the traveling salesman are on the road, and, with few exceptions, their reports are of a favorable character. They tend to show that in the agricultural districts the cooler weather has, for the present, allayed fears regarding the crops, and with timely, well-distributed rains, the grain yield of the State will be the largest for years. The outlook for wool is good, as are the prospects for a large crop of fruit, and also for other farm products. Immigration continues to set this way, creating a good demand for farming land and settling up the many sparsely populated localities in several of the counties. In the local money market, it is stated that the demand continues good for accommodations on country realty, which, to some extent, is met by the savings banks in this city. On city realty there is only a fair inquiry. From merchants the demand for accommodations is only fair. From the speculative interests the call was lighter from operators in cereal options, owing to the general bear influences on the market. The same can be said of mining stocks. The general public, it is said, have very little faith in the stability of the latter, believing that the present move is only made to make a few short fills. While this may be so, every indication warrants the assertion that stocks appear to be bought up by strong parties, whether for a deal or for other purposes, is, as yet, a mystery. From the mining districts, our advices are quite favorable. Large deposits of snow in the mountain ranges are reported to have been made within the past fortnight, with more snowstorms looked for within the next 30 days. The deposit of snow insures a longer supply of water, and therefore a reasonable assurance that mining will be extended well into the summer months. This, perhaps, is more particularly the case with the mines on the Comstock lode, Virginia City, where the fear of a scarcity of water has exerted a decidedly unfavorable influence, notwithstanding the news from the work going on in the leading mines indicates important developments at an early day. Much of this work the MINING AND SCIENTIFIC PRESS gave in its last two issues, but which is only now finding its way into the columns of our daily cotemporaries. In Crown Point they expect to soon commence stoping out ore from the rich deposits left from the "Bonanza days," as soon as a mill for crushing is secured, for which negotiations are now said to be pending. With better air connection in Crown Point, Belcher and Seg. Belcher, which is about completed, active exploration of the 1300 level will be commenced. In Challenge, Yellow Jacket, Alpha, Con. Imperial, Gould and Curry, Best and Belcher, and the North End mines very important work is under way, although air connection in the near future must be made in the Union from the drift known as the 146 foot Ophir drift. In the Middle mines the work is progressing well, with an improvement reported in two. In Con. Virginia a further improvement is reported on the 1650-foot level. From the Tuscarora, Bodie and Quijotoa districts our advices continue favorable.

Later advices than given above, received from a reliable source, state that there was quite an improvement in Alpha the past week, while in Mexican good milling ore was run into on the 1465-foot drift. From the same source we are informed that a crosscut will be started next week on the 1465-foot level, near the north line of Mexican, and one in Union near the south line.

Con. Virginia, Confidence and Hale & Norcross, it is claimed by those who should know, will pay dividends in next month.

Exchanges on European money centers and also on New York are very strong, but the impression prevails that after next week the rates will slacken off, for the idle money generally sent out of the State to avoid assessment will be recalled, when there will be more sellers than buyers of exchanges.

The London *Money* of January 19th says that the value of the silver exported to the East last year from that city was £7,807,400, and the average price for the year was 42⅞d., the lowest average yet recorded, the average for 1887 being 44⅝d.; for 1886, 45⅜d.; and for 1885, 48⅝d. The amount of bills and telegraphic transfers drawn in England on Indian Governments last year was £13,964,700, against £15,394,000 in 1887.

SILVER—The market has exhibited a firm, strong tone, with a slight advance secured. It now looks as if New York is exerting a stronger influence than ever before on the market. The fluctuations in silver will no doubt cause the metal to attract more attention for speculative purposes. The feeling that exchanges will shade off has a direct bearing on silver in our market, causing the latter to lose the premium above the New York parity. The supply of silver with us is still light, but there is every assurance that the output of the mines, now that more water is had, will be largely increased within the near future. The price, at the close, in this city, is given at 93¼c bid, although an advance on this was paid for spot parcels for shipment by to-morrow's steamer for China.

QUICKSILVER—The market was inactive at a shading in prices. As there has been quite a deposit of snow the past fortnight in the mountain ranges on this coast, an improved call for quicksilver is looked for.

LEAD—The inquiry for Alaska and Columbia river, noted last week, is continued, although not so marked. Prices are without essential change.

TIN—The market for plate shows a steady tone for both spot and early arrival. Pig is weaker. Alaska and Oregon are now drawing their spring supplies.

IRON—The market for spot is slow, with holders living in the hopes of an improved call at an early day. The stock in the warehouses is large, but to arrive, it is small.

COPPER—The market appears to be shaping into better position, but no decided advance in prices is looked for, owing to the large mine-owners and also the syndicate apparently working to keep values down at as low a paying basis as possible, so as to keep outside mines from being developed to any great extent.

COAL—Spot coals are lower, but for just shipped or to be promptly shipped, holders are firm. There is a feeling that a further reduction in prices is not at all likely, but this opinion obtained before the last decline. There is no denying but there is a strong selling pressure or competition on the part of some of the coast mine-owners.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Best & Belcher M Co	Nevada	42	25	Jan 10	Feb 15	Mar 7	L Osborn	309 Montgomery St
Baltimore S M Co	Nevada	4	25	Feb 4	Mar 8	Mar 26	A R Grim	402 Montgomery St
Belcher S M Co	Nevada	37	50	Feb 19	Mar 25	Apr 12	J Crockett	327 Pine St
Con Pacific M Co	California	10	15	Feb 5	Mar 11	Apr 2	F E Luty	330 Pine St
Gould & Curry M Co	Nevada	61	30	Jan 10	Feb 14	Mar 7	A K Durbrow	309 Montgomery St
Gray Eagle M Co	California	11	03	Jan 23	Feb 26	Mar 19	O H Bogart	327 Pine St
Julia Con M Co	Nevada	23	10	Jan 30	Mar 7	Mar 28	J Stadfeldt Jr	309 Montgomery St
Martin White M Co	Nevada	22	25	Jan 19	Mar 6	Mar 26	A B Cooper	325 Montgomery St
Mayflower M Co	California	44	50	Jan 14	Feb 18	Mar 11	J Morizio	328 Montgomery St
Nevada Queen M Co	Nevada	4	50	Dec 21	Jan 26	Feb 25	H Deas	309 Montgomery St
North Belle Isle M Co	Nevada	16	50	Jan 3	Feb 6	Feb 27	J W Few	310 Pine St
New Coso M Co	California	22	30	Feb 5	Mar 14	Apr 1	J L Hunt	808 Montgomery St
Overman M Co	Nevada	59	25	Jan 15	Feb 19	Mar 12	G D Edwards	414 California St
Occidental Con M Co	Nevada	3	25	Dec 27	Jan 31	Feb 25	A K Durbrow	309 Montgomery St
Puget Sound Iron Co	Wash Ter	13	1.00	Dec 29	Feb 2	Feb 25	A Halsey	328 Montgomery St
Peer M Co	Arizona	7	10	Jan 28	Mar 5	Mar 28	A Waterman	309 Montgomery St
Piedmont M Co	Nevada	1	05	Jan 28	Mar 6	Mar 27	J J Scoville	309 Montgomery St
Savage M Co	Nevada	72	50	Jan 7	Feb 11	Mar 4	E B Holmes	309 Montgomery St
Superior M Co	Nevada	24	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
S F Natural Gas & Oil Co	California	1	25	Jan 3	Feb 4	Feb 28	J Scoville	309 Montgomery St
St Louis M Co	Nevada	2	05	Jan 14	Feb 18	Mar 16	W E Dean	309 Montgomery St
Scorpion M Co	Nevada	24	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
Scotch Bar M & M Co	California	2	10	Jan 23	Feb 28	Mar 19	H Pink	318 Pine St
Union Con M Co	Nevada	37	25	Jan 4	Feb 8	Mar 1	J M Buffington	303 California St
Western Belle M Co	Nevada	1	20	Jan 24	Mar 1	Mar 21	J H Sayre	328 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DAT
Guascaran & California M & M Co		T H Day	26 Mint Ave	Annual	Mar 5
North Peer M Co	Arizona	H Deas	309 Montgomery St	Annual	Feb 25
Spring Valley G M Co	California	H Pichon	320 Sansome St	Special	Feb 26

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Jan 10
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	Nov 26
Candelaria Con M Co	Mexico	C T Givens	221 Market St	50	Nov 12
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Idaho M Co	California		Grass Valley	.50	Feb 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Dec 10

Eastern Metal Markets.

By Telegraph.

NEW YORK, Feb. 21, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42⅝	93	$16 65	$3 65	$21 35
Friday	42 9-16	93	16 60	3 65	21 20
Saturday	42 9-16	93⅛	16 60	3 65	21 25
Monday	42⅝	93¼	16 60	3 66¼	21 50
Tuesday	42 11-16	93¼	16 50	3 65	20 90
Wednesday	42 11-16	93¼	16 50	3 67½	21 05

Quicksilver is quiet at 60@61c. Borax—Steady, with small sales. Refined and powdered California, 6¾@9⅜c; concentrated, 7¾@8¼c. The iron industry is not satisfactory. Steel rails are extremely dull, with no positive improvement. January's foreign export was better than for that of the same month for the previous two years. Copper is dull and quotations nominal. Tin is firmer at the decline. Lead has a steadier tone at the close.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, $21.80@22.00; Billiton Tin, $22.25@——; Banca Tin, $22.25@23.50; Baltimore Copper, ——@——; Orford Copper, $16.00@16.25; P. S. C. Copper, ——@——; Foreign Lead, $4.75@5.00; Foreign Spelter, $5.95@6.00; Antimony, Hallett's, $11.25@11.37½; Cookson's, $13 @13.25.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Feb. 21, 1889.

ANTIMONY—	13 @	14
BORAX—Refined	7½@	7¾
Powdered	7½@	7¾
Concentrated	6½@	7¼
COPPER—		
Bolt	26 @	27
Sheathing	26 @	—
Ingot	18 00 @19	00
Fire Box Sheets	— @	26
IRON—Glengarnock ton	27 @	—
Eglinton, ton	26 @	—
American Soft, No. 1, ton	— @31	00
Oregon Pig, ton	— @30	00
Clay Lane White	— @24	50
Shotts, No. 1	— @28	50
Bar Iron (base price) ₱ lb	2½@	3
Chrome iron ore, ₱ ton	00 @10	00
LEAD—Pig	4½@	—
Bar	5 @	—
Sheet	8 @	—
Pipe	7 @	—
Shot, discount 10% on 500 bags Drop, ₱ bag.	1 55 @	—
Buck, ₱ bag	1 75 @	—
Chilled, do	1 95 @	—
STEEL—English, ₱	16 @	20
Canton tool	9½@	—
Black Diamond tool	10 @	16
Pick and Hammer	8 @	10
Machinery	4 @	5
Toe Calk	4½@	—
TINPLATE—Coke, prompt shipment	4 85 @	4 95
Coke on spot	5 10 @	5 15
Charcoal, 14x20	6 75 @	7 25
do roofing, 14x20	5 50 @	5 62
Pig tin, ₱ lb	22½@	—
QUICKSILVER—By the flask	42 00 @42	50
Flasks, new	1 05 @	—
Flasks, old	85 @	—
COKE—English, ton, spot	20 00 @	—
Do, do, to arrive	13 50 @	—

Coal.

TO ARRIVE

	Per Ton.		Per Ton
Australian	$ 6 50 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	10 00 @10 50	Lehigh Lump.	9 50@17 00
West Hartley	11 00 @11 50	Cumberland bk	16 00@16 50
Scotch Splint	11 00 @11 25	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Sydney	$ 9 00
Scotch Splint	9 00	Gilman	7 00
West Hartley	10 00	Seattle	7 00
Greta	9 00	Coos Bay	6 00
Westminster	9 00	Cannel	10 00

NATHANIEL GRAY has given property valued at $10,000 to Mills college, to be used in the erection of a building devoted to the natural sciences. It will be known as the Nathaniel Gray Hall of Sciences. Mr. Gray had already given a scholarship of $3000 to the college.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 31.		WEEK ENDING Feb. 7.		WEEK ENDING Feb. 14.		WEEK ENDING Feb. 21.	
Alpha	1.95	2.30	1.90	2.20	1.75	2 00	1 55	2.10
Alta	2.25	2.40	2.00	2.35	2.15	2.50	1.95	2.20
Andes	1.05	1.15	1.05	1.10	.85	1.05	.80	.95
Argenta	.10	.15	....	.10	.05	.10	....	....
Belcher	3.25	4.80	3.50	4.55	2.30	3.65	2.65	3.15
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	5⅛	6¼	5.50	6¾	4.75	5.50	4.25	4.90
Bullion	1.15	1.30	1.10	1.25	.95	1.10	.80	1.05
Baltimore	....	.35	.20	.30	.20	.35	....	.20
Belle Isle	....	....	....	.40	....	.35	....	.35
Bodie Con	1.55	1.80	1.60	1.75	1.60	1.70	1.50	1.60
Benton	3.30	3.50	3.00	3.50	....	3.50	....	....
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.50	.55	.50	.60	.50	.55	.45	.50
Con. Va. & Cal	7⅞	8.50	8.00	8⅝	7.50	8⅝	7.50	7⅞
Challenge	4.25	4.50	4.30	5.00	4.10	4.60	3.80	4.10
Champion	....	....	....	....	....	....	....	....
Chollar	3.15	3.35	3.15	3.50	2.55	3.10	2.35	2.80
Confidence	12⅝	13	13	15½	13⅜	14½	13	14
Con. Imperial	.70	.75	.70	.80	.70	.75	.60	.70
Caledonia	....	....	.40	.45	.35	.45	.35	.40
Con. Pacific	....	.05	....	....	....	....	....	....
Crown Point	4.90	5.50	4.75	5⅝	4.45	5.25	3.80	4.90
Crocker	.85	1.10	.90	1.10	.70	.85	.50	.75
Central	....	....	....	....	....	....	....	....
Dudley	....	.15	....	....	....	.15	....	.15
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	2.25	....	....	....	2.00	....	....
Exchequer	1.00	1.15	1.05	1.15	.90	1.05	.80	1.00
Grand Prize	1.10	1.25	1.05	1.15	1.05	1.20	1.00	1.30
Gould & Curry	2.70	2.90	2.70	2.85	2.55	2.85	2.55	2.85
Hale & Norcross	4.85	5.00	4.85	4.95	3.90	4.75	3.75	4.10
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	.35	....	....	....	....	....	....
Julia	....	.35	....	....	.25	.30	....	.25
Justice	1.95	2.10	2.00	2.05	1.85	2.00	1.50	1.75
Kentuck	2.00	2.10	2.05	2.25	2.00	2.20	1.90	2.10
Lady Wash	.45	.50	....	.45	.40	.50	.35	.40
Martin White	....	....	....	....	....	....	....	....
Mono	1.20	1.25	....	1.20	1.00	1.20	....	1.00
Mexican	3.30	3.60	3.40	3.50	3.05	3.65	2.80	3.60
Mt. Diablo	....	2.25	....	....	....	....	....	....
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.55	1.65	1.50	1.60	1.40	1.50	....	1.45
North Belle Isle	2.40	2.50	2.25	3.00	2.50	2.80	2.00	2.75
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	3.35	3.70	3.15	3.35	2.90	3.15	2.80	2.95
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.05	1.55	1.65	1.75	....	1.50	1.65	....
Ophir	5⅜	5⅜	5.25	6⅜	5⅜	5.75	4.90	5.50
Overman	1.25	1.40	1.25	1.45	1.15	1.30	1.00	1.45
Potosi	2.35	2.45	2.35	2.55	2.10	2.35	2.00	2.40
Peerless	1.20	1.35	1.05	1.15	.85	1.05	.65	.85
Peer	....	.40	....	.35	.25	.35	.25	.30
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	.10	....	....	....	.10
Savage	2.85	3 20	2.90	3.10	2.75	3.30	2.75	3.15
S. B. & M	2.75	3	2.85	3.35	2.85	3.20	2.85	3.20
Sierra Nevada	2.95	3.05	3.05	3.3⅜	3.10	3.25	2 80	3.25
Silver Hill	.75	.80	.75	.80	.75	.80	.65	.70
Silver King	1.00	1.30	1.25	1.30	....	1.05	....	....
Scorpion	.45	.50	.45	.60	....	.55	.50	.55
Syndicate	....	....	....	.10	....	....	....	.10
Union Con	2.60	2.75	2.70	3.30	2.85	3.20	2.80	3.15
Utah	....	1.25	1.40	1.50	1.20	1.35	1.15	1.30
Yellow Jacket	4.10	4.75	4.40	4.60	3.90	4.40	3.50	3.90
....	....	....	....	....	....	....	....	....

Sales at San Francisco Stock Exchange.

THURSDAY, Feb. 21.

100	Alta	2.20	
200	Andes	1.00	
100	Alpha	2.20	
410	Belcher	3.35	
100	B. & Belcher	5	
200	Bullion	1.05	
100	Buiwer	50c	
300	Chollar	3.00	
575	Con Va & Cal	8¼	
200	Con. Imperial	75c	
735	Crown Point	5⅜	
550	Crocker	65c	
50	Challenge	4.50	
200	Caledonia	40	
300	Exchequer	1.15	
550	Grand Prize	1.10	
200	Gould & Curry	2.95	
1000	Hale & Nor	4.15	
150	Justice	1.75	
300	Julia	30c	
225	Mexican	3.40	
300	New York	40c	
100	Nev. Queen	2.80	
100	N Occidental	90c	
5	150	Ophir	5⅞
600	Overman	1.50	
50	Occidental Con	1.75	
150	Potosi	2.45	
1100	Peerless	70c	
100	Peer	25c	
450	Savage	3.35	
100	Sierra Nevada	3.35	
850	S. B. & M	3.20	
200	Scorpion	55c	
150	Utah	1.40	
150	Union	3.25	
500	W Comstock	45c	
100	Weldon	35c	
220	Yellow Jacket	4.25	

THE cleanup of the Young America Company, Sierra City, for January, was $27,200, and a dividend for the past month of $10,000 has been declared.

Sampling Works for Sale.

The works are situated at Daggett, Cal., in the Calico Mining District, and on side-track of the Atlantic & Pacific Railroad. They contain a first-class Engine and Boiler with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPY & CHILDS, 123 California street, San Francisco.

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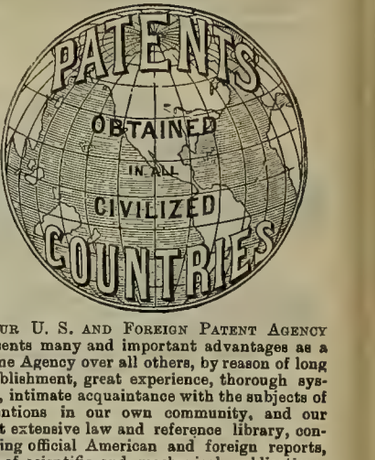

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Books on Working Ores.

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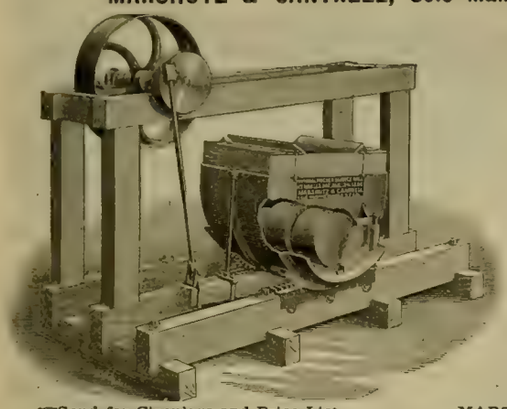

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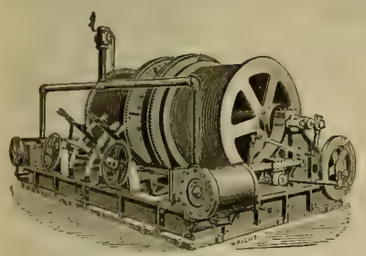

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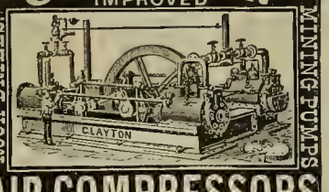

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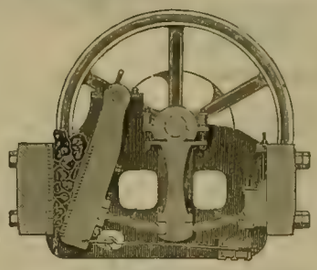

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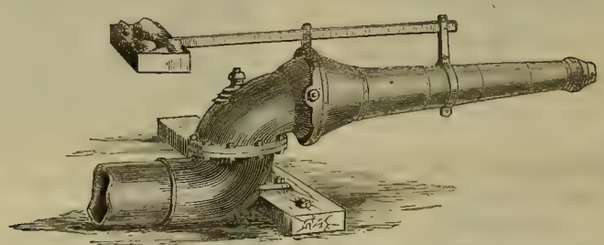

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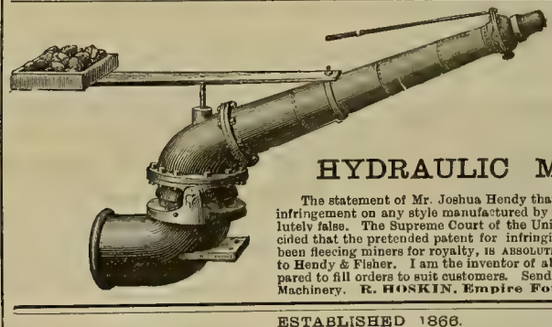

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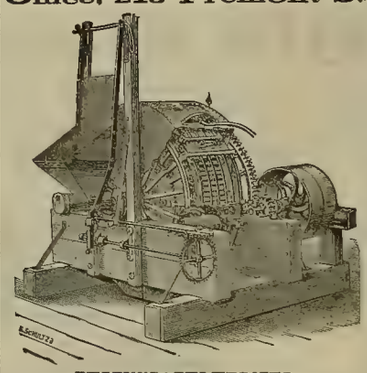

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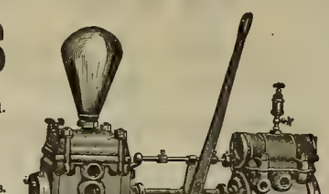

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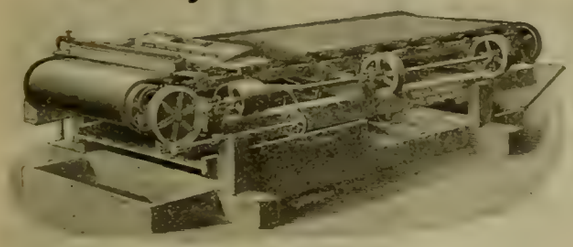

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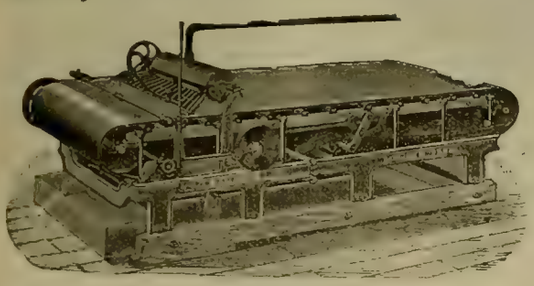

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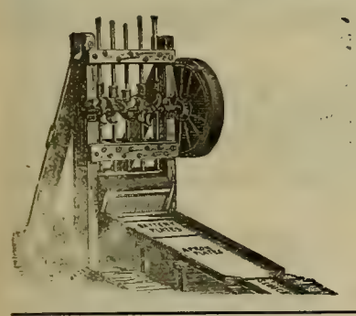

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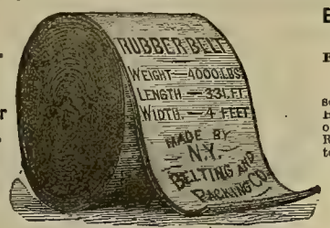

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SQUARE FLAX PACKING,

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SAWMILL MACHINERY.

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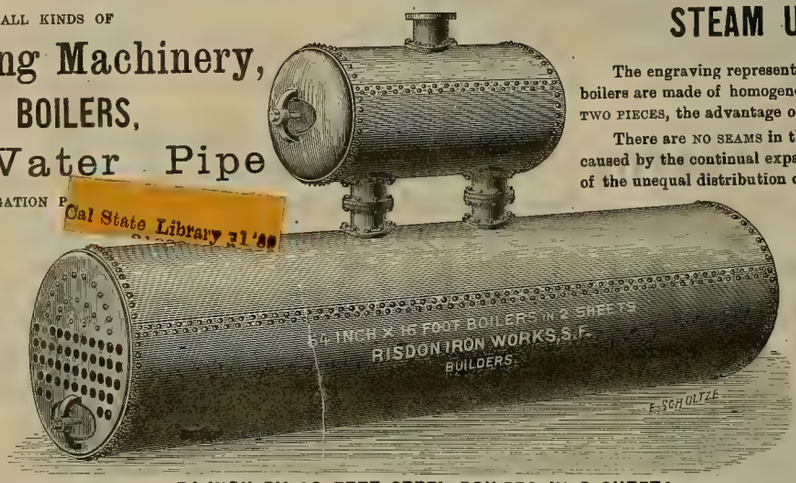

54-INCH BY 16 FEET STEEL BOILERS IN 2 SHEETS.

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STEAM USERS, ATTENTION!

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There are NO SEAMS in the fire to leak, nor loose rivets to contend with, caused by the continual expansion and contraction of the plate on account of the unequal distribution of the heat under the boiler, the bottom presenting a smooth, even surface which can be easily cleaned. We place a manhole at the back end above the tubes, and one in the front end under the tubes.

The FRONT MANHOLE gives free access to the sheet over the fire, THE VITAL PART OF EVERY BOILER. This point is often overlooked by purchasers, and boilers are supplied with a small hand hole, and the remaining space filled with tubes which allows absolutely no access for cleaning, and in a short time tubes and sediment are one solid mass, and instead of gain in efficiency by a few feet of tube surface, the result is a positive loss.

SPECIFICATION OF BOILER AND FIXTURES:

1 Boiler, 54 inches diameter by 16 feet, with 46 3½-inch tubes; Shell, 5-16; Heads, 7-16.
1 Steam Drum, 36 inches diameter by 72 inches long.
1 Breeching.
1 Smokestack, 30 inches by 60 feet, Nos. 12 and 14 Iron.
300 feet galvanized strand for Guys.
1 C. I. Front, complete.
1 Foundation Plate for front.
1 Set Grate Bars for coal or wood.
1 Back Bar Bearer.
1 Ash Cleaning Door and Frame.
1 Back Arch Plate.
1 Set Binder Braces and Bolts for Brickwork.
1 Stand for back end of Boiler.
1 Steam Gauge and Syphon.
1 Glass Water Gauge, complete, with column and 3 Gauge Cocks.
1 Safety Valve.
1 Stop Valve.
1 Feed Valve.
1 Blow-off Valve.
1 Check Valve.

These Boilers are tested to 150 pounds hydrostatic pressure and are intended for a working pressure of 100 pounds. Total weight of Boiler and fixtures, 17,000 pounds.

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THE GATES CRUSHER

Is beyond all question the most important improvement that has ever been made in this class of mining machinery. It will do more than twice the work with a given amount of wear than any other Crusher made, besides crushing so much finer that for mining uses, the capacity of the mill is greatly increased. It has the same relative superiority for macadamizing purposes, affording the cheapest and most reliable machine for this use.

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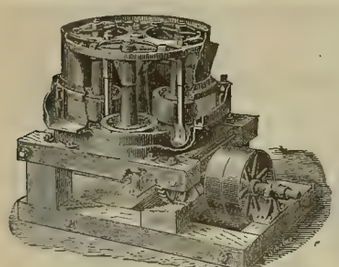

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MANUFACTURER OF

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Mining Machinery of Every Description,

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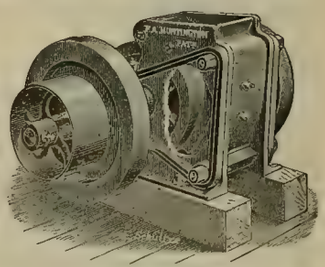

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SAN FRANCISCO, SATURDAY, MARCH 2, 1889.

VOLUME LVIII.
Number 9.

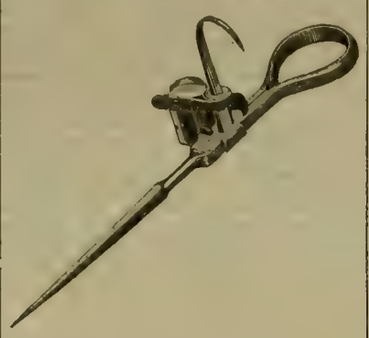
A Miner's Candlestick.

Gabriel Werntz of Placerville, El Dorado county, has invented a candlestick for miners' use which has several improved features. The handle portion, as shown in the engraving, is bent around into the form of a ring, the two ends being extended parallel with each other. The inner adjacent faces of the two sides are channeled in V form, so that as they lie together the channels form a square or diamond shape in cross section, into which the correspondingly shaped inner end or shank of the spear will slide and fit. A hole is made through one of the sides, and a corresponding notch is formed in the shank of the spear, so that a transverse pin or key passing through will hold the spear firmly in place between the two sides. This key is shown as extended upward so as to form the hook, by which the device may be hung up whenever it is more convenient to secure it in this manner than by striking the spear into a wooden beam.

The candle is held in a tubular socket. This socket is made of spring steel bent into cylindrical form and having a projecting thumb-piece upon one side, by which it may be sprung open sufficiently to admit a candle. This socket may either be secured permanently on the side of one of the extensions, or may be provided with lugs, which extend down through one of the sides, passing through the V-shaped channel in that side, and having notches cut in them so that when the spear shank is inserted into its place between the two sides it will engage these notches, and thus lock the candle-holder lugs firmly in place.

The hook, having been inserted into the slot before described, will lock the spear in place, and the whole will be firmly held together. The length of the candle-socket is such that if the candle becomes broken it may be so placed in the socket that the broken place will be held within the length of the socket, and thus keep it in place until the candle is burned down to this point, and so prevent waste.

In order to prevent danger from accident, an automatic extinguisher is employed, which consists of a disk secured to the end of the arm, which is attached to or forms an extension of the spring, having a central hub, which fits over the square shank of the hook. The disk is drawn back when the candle is introduced into the socket, and its edge then rests against the side of the candle, the pressure of the spring being sufficient to hold it in this position with considerable force. When the candle has burned down to the disk, the latter will be forced across the candle, thus cutting it off and extinguishing it, so as to prevent accident. By this construction of the jointed and detachable spear the inventor is enabled to make a candlestick of greater length, so that there is not so much danger of the candle igniting dry wood which may be near it, and when it is desired to carry it away, it is easily separated by



Werntz's Miners' Candlestick.

removing the key, the extinguishing disk, and reversing the spear, placing the hook and disk upon the handle and holder.

When everything is conveniently packed up it can be put into the pocket and carried away. The inventor is desirous of disposing of the patent rights for the Pacific Coast.

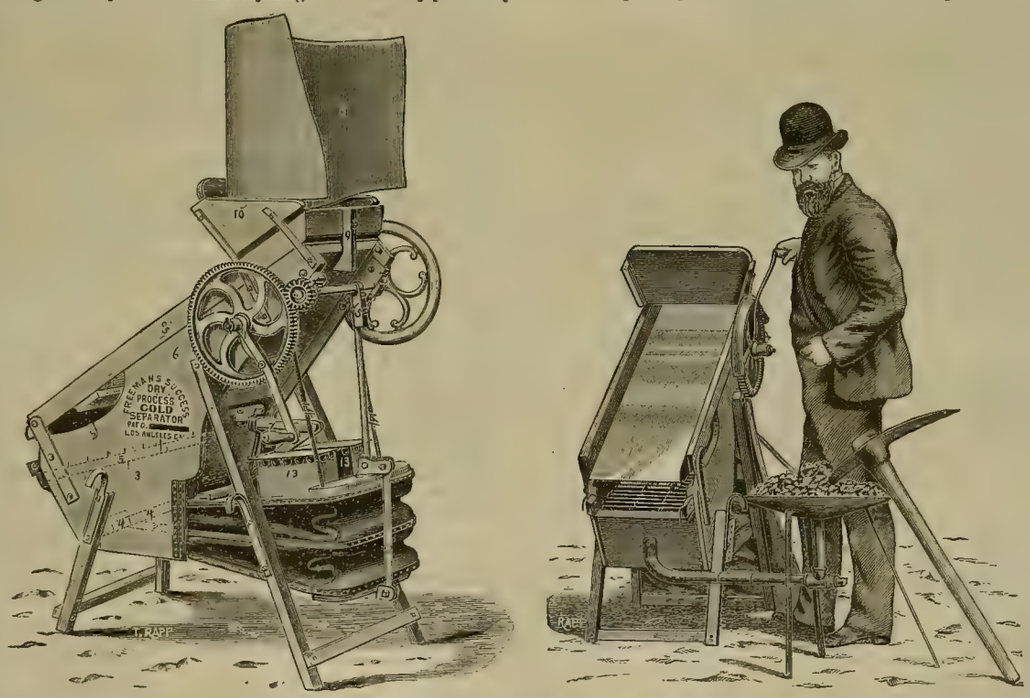
MECHANICS' INSTITUTE.—The election of the Mechanics' Institute on Tuesday was quite an exciting one, but the following trustees, all on the regular ticket, were elected by a large majority: Irwin C. Stump, Chas. F. Bassett, S. J. Hendy, John Mallon, David Farquharson, Geo. E. Dow, Carlton Newman. These will serve for two years.

BILLS have been introduced in Congress providing for the admission into the Union of Idaho, Wyoming and New Mexico.

Freeman's Dry-Gold Separator.

We have received a large number of letters from different parts of the country asking for a description of the Freeman Success dry process for obtaining gold from placers, gravel, sand, etc., without the use of water. This machine has been successfully operated at various places, and an item relating to its work at Osceola, Nev., brought out the inquiries referred to. The machine is intended to be operated by hand, but other power may be applied. It is so constructed as to withstand the excessive heat in hot climates without checking, and is easily taken to pieces so as to be packed on burros. The 50 ton machine, complete, weighs 120 pounds. This machine will require from five to six men to supply dirt to operate it to full capacity, but it can be worked to good advantage with two men. To produce a light machine of great capacity that will save the gold has been the object of the inventor, and this has been accomplished by producing a peculiar action of the air upon the debris, gravel or dirt.

The accompanying engravings illustrate the device. In operating the machine the debris is thrown into the receiving hopper (11) and falls upon the screen, which is jarred by the crank shaft striking the bumper (9) at every revolution. The large stones pass off and the finer material falls into the hopper (6), is fed on to the apron (5) by the valve (7), and is carried along and off the apron by the action of air. The top and lower bellows are connected with the iron strap (12). The dividing board (2) separates the bellows (1–1). The pitman strap (15) connects the bellows with the crank shaft. By reference to the cut it can be seen that in revolving the crank shaft, both bellows are forced downward at the same time, the top bellows ejecting the air through the valve (4) into the air-chest (3), while the lower bellows is receiving air. On the upward motion the bottom bellows ejects the air, while the top bellows receives it. By this means, at every revolution of the crank, two currents of air are forced into the air-chest, one at once following the other. On the top, and completely covering the air-chest, is placed the apron (5) containing the riffles for catching the gold. The feed valve (7) is operated by an adjustable lever held firmly to a ratchet bar fastened to the bellows. By this means the feed is increased or decreased as desired, and is also caused by the raising and falling motion of the bellows to open and close, thereby preserving an even flow of the debris to the apron. As the bellows are put in motion, rapidly succeeding currents of air are forced into the air-chest, and are there retained until a sufficient pressure is obtained to force the air out through the apron, which is of close mesh, being constructed with a layer of wire cloth of 120-mesh underneath, which is a layer of light canvas. This assures an even flow of air throughout the entire surface of the apron.



FREEMAN'S DRY PROCESS GOLD SEPARATOR.

Three distinct results are obtained by the action or pressure of air caused by the two bellows and the close mesh of the apron: First—The current of air passing up through the apron slightly raises the gravel and sand therefrom, and, as it passes through the debris, the particles of sand and gravel are crowded apart, making avenues for the gold to settle to the apron.

Second—At the first puff of air the debris is carried outward over the apron about one inch, when the crank shaft makes its dead center, it allows a momentary cessation of air and the debris is caused to pause but only momentarily, as the succeeding current o air at once picks it up and carries it along. There is imparted to the gravel and sand by this quick action in stopping and starting, a jerk which results in causing the gravel to roll, thereby creating a complete separating and parting of the debris, and allowing the gold to settle easily to the apron on which it is retained by the riffles.

Third: At the first puff of air, the debris is raised slightly from the apron by the force of air escaping. At the momentary cessation of air caused by the crank making its dead center, the debris pauses and starts to descend; but before reaching the apron, the succeeding current of air causes it to slightly ascend, thereby imparting an up-and-down movement to the debris while it is passing over the apron. It also prevents any rubbing or friction of the debris upon the wire cloth, for the reason that when the bellows are in operation the current of air buoys up the debris and prevents it from falling upon the apron.

The action obtained in this separator is pro-

(*Concluded on page 149*).

CORRESPONDENCE.

We admit unindorsed, opinions of correspondents.—EDS.

The Sprague Electric Railroad.

EDITORS PRESS:—I have read your editorial article on electric railroads in California, in the last number of your paper, with much interest. I agree with you in the main, but I think you do not give quite enough credit to successes in the East, as the article may be interpreted as giving your support to those who have doubts as to the success of any electric railway system.

I do not see how any one can doubt the success of the Sprague system, when it is so highly indorsed. Let me give some of the best indorsements. Here we have a hard-fisted old Quaker in Wilmington, Del., writing an unsolicited letter to the Sprague Company, in which, among words of praise, the following very plain statement is made:

"The system has been in operation here for three months, and from a practical experience during that time, we can pronounce it a complete success." While in Los Angeles I showed the copy of that letter to a gentleman who knows that old Quaker, and of whom he made the remark like this: "He squeezes a dollar for every cent there is in it, and when I see his name signed to such a paper, I consider it of value."

Then we have a letter from the Union Passenger people of Richmond, Va., in which are the following statements in regard to the Sprague equipment there: "The road, which you have equipped under most trying conditions, has been one of the most difficult, if not *the* most difficult, which could be met with in street-railway work. We must confess that we have sometimes shared the doubts that others have been so free to express as to the possibility of the successful completion of this work, and hence it is with the greatest pleasure that we acknowledge the successful fulfillment of all the terms and conditions of the contract and compliment you upon having achieved so signal a success." Mark in the above that all the conditions and terms of the contract were fulfilled.

Mr. Whitney, president of the West-End system of Boston, a system of over 200 miles of street railway, stopped in his preparations for putting cables on one of the branches of the system, visited Richmond and gave the road there a most thorough investigation, returned to Boston and declared to the selectmen of Brookline that "it is a success in all respects," procured a franchise, and then contracted with the Sprague Company for the equipment.

Then may be cited the very rapid introduction in other places, due to the inspection of the system by other companies, and orders for additional equipments by companies already using the system, and for the equipment of roads in towns where our system has been in operation for some months. The latest indorsement of importance is from the Pennsylvania R. R. Co. It is recognized that this corporation is the best equipped road in America, and it is not likely that they would contract for anything that is not thoroughly reliable. Within the last few weeks they have entered into a contract with the Sprague Company for the equipment of their system of street roads in Atlantic City, N. J. The contract was signed after an investigation of the principal electric roads in this country, continuing over five months, by a committee of mechanical and electrical experts of high standing; and it was given on account of the demonstrated reliability and economy of running, together with excellence of mechanical and electrical details. I consider that this is as good an indorsement as could be given to any railway system.

When one considers that on Feb. 1, 1888, the Sprague Company had not completed a single road, and that to-day it has about 15 in operation and contracts for enough more to make over 30 when all are completed, it is very apparent that there must be something behind the reports of the great successes of the system.

I have yet to learn of an unsuccessful road equipped by the Sprague Company, and I am willing to leave the decision as to the successes to the officials of the roads which have been equipped, or to the city officials or the prominent citizens in any of the towns where Sprague motors are used.

The persons to whom you refer in your editorial must never have seen a Sprague equipment; perhaps their investigations were made before the completion of the first one. I will admit that the people of this coast have been unsuccessful in their electric railway ventures, and they have my sympathy in their financial misfortune, due to poor investments. To them I would say that the Sprague Company's experimenting—for of course it was necessary to experiment—was done at their own expense; but having excellent principles as the basis, it proved to be an excellent investment.

On the strength of the testimony which I have brought to bear, and the desire to have interested parties give our roads personal and careful investigation, can you not recognize as such a successful railway system, without doing an injustice to yourself?

JOS. L. JAYNE,
Agent Sprague Electric Railway & Motor Co.

How Powder is Made.

The California Powder Works.

[Written for the PRESS.]

Having had the pleasure of recently visiting the California Powder Works, and believing that a brief mention of the works, together with the process of making powder, may be interesting to some of the readers of the PRESS, I submit a few items as obtained through the courtesy of Col. B. Peyton, superintendent of the works, and his son William C. Peyton.

The works are located in the valley of the San Lorenzo, about three miles north from Santa Cruz. This site was chosen because of the abundant supply of water accessible and the splendid facilities for shipping; and their isolation from other public and private enterprises is quite a desideratum.

The canyon, or narrow vale in which they are located is thickly set with eucalyptus and the smaller growth of the historic redwood. Here the rollicking San Lorenzo is never silent, and in almost every direction the artful little flumes can be seen coursing their tiny way to the busy wheels. There are about

Five Miles of These Flumes,

Forming a pretty network, some under foot and some over head.

From beginning to end there are quite a number of processes in making powder, the machinery required for each being isolated from that of any other department. In company with Mr. Peyton Jr. and a lady friend, we visited the various departments and found none wanting in interest.

There are some 70 to 80 men employed at the works. A public school is maintained in the vicinity; the narrow-gauge branch of the S. P. runs hard-by, hence the employes are wanting in none of the ordinary privileges and comforts of other manufacturing communities—except, as we were informed, they must forego the pleasures of the large bonfires which usually illumine other less explosive parts during the political campaigns.

On the cliff surmounting the east bank of the San Lorenzo, at an altitude of nearly 400 feet, is Col. Peyton's elegant residence. The cliff is almost perpendicular, which enables Mr. Peyton to overlook the entire works at a glance from his residence.

Col. Peyton came to California 43 years ago, having been a resident of Santa Cruz 23 years, during which time he has established a manufacturing enterprise the product of which finds a market in

South America, the Sandwich Islands,

Throughout the United States and Alaska. He also ships to Kamtschatka. The product is about 10,000 kegs per month. The kegs, cans and flasks are all made at the works, the manufacture of which is within itself of no small interest.

During a period of 20 years there have been only five explosions, in all of which but five lives were lost.

The essential feature of manufacture is the mixing of three ingredients—charcoal, sulphur, and either nitrate of potash for sporting powder, or nitrate of soda for blasting powder. Three varieties of woods are used for making the charcoal—madrona, willow and alder. The latter makes the best charcoal, while madrona is used only for the low-grade powders. The desiderata for a good charcoal wood are three, viz.: Freedom from resinous matter, the absence of hard concentric rings of growth, and a minimum of deliquescent salts in the ash. The wood, before being charred,

Must be Thoroughly Dry.

The charring is done in cast-iron retorts, provided with exit tubes for the volatile constituents of the wood, and heated in furnaces specially prepared for them. This operation takes one day, and is conducted at a temperature of from 500° to 600° F.

Belgium sulphur is used altogether for making gunpowder, and is refined when it reaches the works.

The nitrate of potash, or saltpeter, comes from India, and when received is quite impure, containing, besides earthy matter, jute from the bags, etc., a large quantity of chlorides and sulphates. These chlorides are very objectionable, as they greedily absorb moisture from the air and would carry that undesirable feature into any powder in which the impure saltpeter might be incorporated. The saltpeter, together with some water, is placed in large copper tanks which contain a perforated worm connected with a steam pipe. The steam is turned on, and soon all the niter passes into solution, while the pieces of jute, straw, etc., come to the top and are carefully skimmed off. A solution of glue is then added and the steam again turned on. This glue goes to the bottom and forms an envelope around each particle of sand, dirt or grit and buoys them to the top of the solution, whence they are easily removed. The niter is now free from all deleterious substances except the foreign chlorides. The removal of these is the next operation, and is dependent upon the well-known facts that salt is equally soluble in both hot and cold water, while saltpeter is much more soluble in the former than in the latter. If, then, a boiling concentrated solution of these two substances be allowed to cool, the niter alone will separate out, while all the salt, together with a part of the niter, will remain dissolved. The hot liquor from the copper tanks is run off into large wooden crystallizing vats, and while cooling is constantly agitated to prevent the formation of large crystals which would occlude some of the saliferous mother liquor. The saltpeter as fast as it separates from solution is placed in hoppers, when it is allowed to drain, after which it is dried on a large iron plate heated from beneath. It is then pulverized between burr-stones and is then fit to be manufactured into the best gunpowder. It does not contain more than 1-6000 part of foreign salts.

The nitrate of soda, used solely for blasting powder, is of itself a deliquescent salt, hence it is only necessary to remove from it the grit and sand, the presence of which would be

Highly Dangerous

During the process of manufacture. It is obtained in bulk from Chili, where it is partially refined to remove the iodide of soda, an important source of the iodine of commerce. To purify the nitrate it is melted down in two large iron kettles, whence it runs into a third smaller kettle. The grit here settles to the bottom, while the pure nitrate is removed from the top by a wheel through which cold water circulates. A knife placed close to the surface of this wheel scrapes off the film of niter, which is then ground to an impalpable powder. It is thus not only freed from all grit but is also thoroughly dried.

The sulphur and charcoal, 10 parts of the former to 15 of the latter, are placed in iron barrels filled with gun-metal balls. These barrels revolve on horizontal axes and the balls crush the charcoal and sulphur to the proper degree of fineness. This mixture is then carried to the incorporating mills, where it is thoroughly mixed with 75 parts of niter. These mills consist essentially of two iron wheels, weighing seven tons apiece, which revolve upon a cast-iron bed. By the combined rolling and grinding action of these wheels, a very thorough incorporation is effected. This is at once the most important and the most dangerous part of the manufacture. It is the most important, for upon the thoroughness of the incorporation depends in great part the strength of the powder; it is the most dangerous because if the wheels should ever touch the bed

An Explosion Would Immediately Ensue.

This danger is in great part obviated by the presence of wooden plows, which, revolving with the wheels constantly, throw the powder in front of them. The time of incorporation varies greatly. For blasting powder it is but two hours, while for some of the higher-grade sporting powders it is as much as 12 hours. As a general rule, the longer the time, the more thorough the mixing and the better the powder. From these mills the powder goes to the press, where it is subjected to a pressure of 2000 pounds to the square inch. The powder is pressed in layers between copper plates, and when it comes from this mill it is very hard and in the form of plates two feet square and half an inch thick.

In the corning mill this "press cake" is passed, first between gun-metal rolls containing projecting teeth whereby it is broken up into lumps, and then between smooth zinc rolls by which it is crushed to the requisite degree of fineness.

The glaze contains large wooden cylinders, running upon a hollow shaft containing hot water. The powder from the corning mill is glazed by the attrition of one grain upon the other, and is at the same time dried. To the blasting powder, toward the end of the operation, is added a small amount of black lead, which gives it a very bright finish. This is not used for sporting powders, as it retard the rapidity of combustion.

The different sized grains are separated by passing through a series of superimposed sieves, those of larger sized mesh being on top, those of smaller mesh being on the bottom.

Nothing now remains to be done save to pack the powder and place it on the market.

W. C. PERSHBAKER and Magalia Gold Mining Co. intervenors ask that judgment in the case of Wm. Gregory and Wm. Singer vs. Pershbaker and M. G. M. Co., rendered in the Superior Court of Butte county, be set aside and a new trial granted, and that Gregory and Singer be enjoined from taking any gold from the mine in controversy.

THE Solano *Times* says: There are $100,000 worth of tools on the way from the East for the Mare Island iron-plating shop construction department, which will commence to arrive in about two weeks.

THE annual report of the Indian Department of Canada says there are encouraging indications that the Indian element will eventually become amalgamated with the general population of the country.

CATFISH are so numerous in Washoe Lake that the Nevada people want the Legislature to import a carload or two of alligator gars to thin out the catfish.

THE meeting of the Northern California publishers and editors at Sacramento is to be held March 18th.

THERE are four smelting companies in Butte, M. T., with about 65 caloine and matte furnaces altogether.

Electric Street Railroads.

At the first meeting of the California Electrical Society the following paper was read by John C. Henry of Kansas City, and more recently of San Diego, who is the inventor of the Henry system for electric roads:

In complying with the very complimentary request to prepare a paper on the subject of electric railways, to be read at one of the first meetings of the recently organized "California Electrical Society," I hesitate with these thoughts uppermost in my mind: What is to be the future of this society? Will its papers be preserved and scanned over by the coming electric historians? Can I, a humble worker in this fascinating field, pen anything worth preserving? Will the predictions made be verified? In anticipation of its prospective future, I regret that it must be a forced article, prepared without reference or proper consideration, by a visiting stranger in your city.

To give a preliminary history of the state of the art, and its gradual development, the chestnuts must fall.

The first historic reference to electricity is, I believe, to be found in the Bible: "Canst thou send the lightnings that they may go and say unto thee, Here we are?" The interrogation remained unanswered for many centuries, until "Franklin caught and tamed the horse which was harnessed by Prof. Morse." The discovery of the first process for making electricity is credited to Alessandro Volta during the year 1770. It is said to have come about in this way: He was toying with two pieces of coin in his mouth, one of copper, the other of a spurious metal. He placed one above and the other below the tongue. When the edges of the two metals came in contact he noticed a peculiar taste and its absence when they were separated. This led to the construction of the

First Electric Battery,

Known as Volta's Pile. It consisted of a large number of laminations of sheets of copper, zinc and moistened cloth. Here the stored-up energy in the metal zinc was released. This metal's dissolution gave birth to heat, light and force. This is a beautiful exemplification of Nature's law, that nothing is lost. I am told your society has members who are fresh and ambitious in the study of electricity, and this paper should be within their understanding. It will be greatly to their advantage to remember this law. They may release the stored-up energy in coal and produce heat. With the heat releases the gases, from which the water is composed. In turn drive steam engines.

By their force generate electricity, which appears again in the form of magnetism, light and heat, and yet nothing is lost. It is simply a conversion of energy from one form to another. It is not in man's power to make or destroy one atom. One Christmas morning, in 1821, Michael Faraday, whose name will be remembered when kings are forgotten, first discovered electro-magnetism. In 1826 Prof. Joseph Henry, late of the Smithsonian Institution, starting with the principles discovered by Faraday, succeeded in producing a magnet capable of sustaining several thousand pounds. Following up his brilliant discoveries, in 1831 he constructed a telegraph system. Later on he invented the relay which made long-distance telegraphy possible. During the same year he wrote Prof. Silliman as follows: "I have lately succeeded i producing motion in a little machine by

Magnetic Attraction and Repulsion."

This is supposed to be the first electric motor ever constructed. Although fully realizing the value of his inventions, Henry saw the production of power by the consumption of zinc was a very expensive process. In 1832 Sturgeon of London produced a rotary electro-magnetic engine. In 1835 Thomas Davenport, a Vermont blacksmith, exhibited in Springfield, Mass., a model of the first electric railway. In 1850, Dr. Page, aided by Congress, operated a large electric motor on a road near Washington. These experiments demonstrated Henry's predictions that the cost of the zinc precluded the possibility of commercial advantage. The failure here arose from the fact that

Zinc Cost a Great Deal

More than coal and contained much less energy. For a time this seemed to be an insurmountable obstacle to electric railway engineers. In 1831 Prof. Faraday, while searching for reciprocal action from a magnet, discovered that by passing a closed wire near the poles the movement was resisted by the magnet and the lost energy appeared in the coil of wire in the form of electricity. This is a pure case of induction. The law governing it was formulated by and is known as Lenz Law. It is the foundation of all dynamo-electric generators and motors. One loop of wire was succeeded by a multiplicity of loops, which to-day are revolved at a high rate of speed before the face of powerful magnets in all modern dynamos. Remembering Lenz's law, the current induced is of such a nature and in such a direction that it tends to resist the motion which produces it. The revolving of the loops of wire (technically called the armature) resists the power of the initial force, let it be a steam engine, water-wheel, or any other. The consequence is this spent energy, which must appear again in some form, is led from the machine and is made to do useful work, such as heating the wires, burning lamps or transmitting power. So perfect are some of the modern dynamos constructed that 93 per cent

of the energy put into them is made to appear again in the form of electricity. The balance is wasted in heating the copper wires of the machine and the mechanical causes. Following

This Sketch of Development,

It leads us to a very large and weak machine as permanent magnets alone had been used. During the year 1870 it occurred to a number of experimenters about the same time to use a portion of the circuit to energize the field magnets of its own machine with powerful temporary electric magnets.

This grand step forward appears to have been conceived of simultaneously by scientists in several different countries. This invention secured the commercial use of dynamos, and then the different electric-light companies began their work. To retrace our steps a little, we find, by considering Lenz's law, it is easy to formulate a converse one. The dynamo resists the power of the steam engine and a current of electricity is generated. A second dynamo placed in the circuit tries to stop the current from flowing, and its armature is forced backward.

Pacinotti's Invention.

I must not pass the history of the development of the art without referring to Pacinotti's invention, which was fully described in an Italian journal in 1864. It consisted of a dynamo machine, and its reversibility was plainly pointed out. In other words, by applying power to its armature, a current was generated. By giving its current from an external source, it developed power. Strange to say, a working model of this lay buried and forgotten in the University at Pisa for over 20 years, until after it had been reinvented. In 1879, Siemens Bros. exhibited at the Berlin Exhibition a small electric locomotive supplied by current from a dynamo machine. Previous to this, in all experiments, the energy came from batteries carried on the cars. On this road the iron rails carried the current to the moving motor from a stationary source. About the same time the writer, whose long experience with currents on telegraph lines impressed him with the importance of good insulation, conceived the idea of

Placing the Conductors Over the Track.

Work was immediately commenced on the designs of an electric railway system, and preparations made for protecting the invention by patents. The details consisted of stationary dynamos, electric conductors leading therefrom supported over the route of the cars by guy wires to posts at the sides of the street, and a traveling contact held firmly to the wires by spring pressure, which was connected to the car by flexible conductors. So perfectly were the details worked out at this time, that their principles are in use on 98 per cent of the roads in operation to-day. Owing to your author's forced residence on the plains, a thoroughly practicable demonstration was not made until 1884, when a street-car was fitted out and operated on one of the Kansas City horse-car lines. In the mean time demonstrations were being made with surface and conduit conductors by different inventors. In the spring of 1885, the Kansas City Experimental road was inspected by Chas. J. Van Depoele, one of Chicago's most prominent electricians. He regarded it as a complete solution of the electric-railway problem, and immediately commenced the construction of roads. His work has since extended to nearly every State in the Union. To-day there are some 50 roads in operation and hundreds more projected and undergoing construction. Having completed a cursory view of the historical part, we will turn to the practical side of the question.

What Advantages have Electric Roads

Over others? This can be best understood by an analysis of those systems in general use.

The early history of railroading brings us back to the tram roads in the English mines, where animals were used to haul wagons loaded with coal on iron tracks. Next, the animals were displaced and the cars moved by cables driven by stationary engines, and finally the cables were generally succeeded by locomotives. This change commenced some 75 years ago. To-day the modern locomotive has developed into a strong and reliable machine built upon the principles thoroughly demonstrated by George Stephenson in 1814. It contains nothing new in principle. Owing to peculiar construction, it is far from being economical. The best results ever obtained with locomotives is the consumption of eight pounds of coal to the horse-power developed per hour. The Risdon and Union Iron Works in your city to-day are building stationary and marine engines that will develop a mechanical horse-power for every two pounds of coal consumed. Electric roads derive their power

From Economical Stationary Engines

Or the forces of nature, such as waterfalls, etc. Here we have an indicated saving of about 75 per cent. For many centuries the ingenuity of man has been directed to the flying problem. The prime causes of failure arise from the fact that birds weigh much less in proportion to their strength than man does. This analogy is very suggestive when comparing the electric with the steam motors, particularly so when elevations are to be ascended, as a very large percentage of the power of the locomotive is lost in lifting its own weight. As a matter of fact some of the modern locomotives which are capable of developing 300 horse-power weigh 60 tons. An electric motor could be made to develop this same power and not weigh ten tons. Steam railway engineers will tell you it requires this weight to get sufficient adhesion. This is a fallacious idea when connected with electric motors. On our San Diego road we have frequently taken two cars, containing about 150 passengers, up a grade of 450 feet to the mile with a motor weighing but 2000 pounds, and depend upon the adhesion of but one pair of wheels. With this load we frequently stopped and started on this grade. I am strongly of the opinion, and it is the

Result of Close Observation

And study of the action of locomotives, that there is not one of any weight in this State to-day that can stop and start again on the same grade with this load. The reasoning for this will be better understood later on. You have all probably seen motors that you suspected gave a small return for the amount of current they took. Improper proportions and overwork produce wasteful effects. How this came about is partially explained by returning to the steam engine. Suppose we have a locomotive working 300 revolutions per minute, developing 200-horse power when taking steam full stroke. Let us overload her as in the case of starting so that her drivers can only make 20 revolutions per minute under full head of steam. The result is, she is actually developing less than 15-horse power. Does it not seem strange to you at this late day that nothing has been devised to overcome this? The same conditions and some worse ones govern electric motors; and it will be well to explain them here. There is a medium in all things. There is a limit to the saturation of magnetism. For instance, an iron bar surrounded by a coil of wire in an electrical circuit produces a certain magnetic effect. Doubling the amount of wire and current does not give you double the magnetism. The second coil is necessarily longer and offers more resistance to the current. Its effects are weaker on the iron core. So you will readily see, for high efficiency for a given amount of power, the question of proportions plays an important part. To analyze the necessity for another precaution, just return to the

Theory of the Dynamo.

You will remember the movement of the loops of wire in the armature were resisted by the field magnets, and Lenz's law shows us that the current induced was in such a direction as to oppose the initial force. We have seen that loops of wire revolving before magnets induced a current in the wires, and that an electric motor is constructed the same as the dynamo. It is obvious that the motor's armature revolving under the magnetic field must produce a current, and one in such a direction as to oppose the initial force. In other words, the current generated by the motor presses back against that which comes from the generator. This is what we call back electric motive force. The electro motive force of all machines is directly in proportion to the armature speed. Now you will observe that when a motor is allowed to run very fast it takes but little current, because the back pressure is nearly equal to the initial. But, if its speed is choked down so that it gives but little back pressure, it is taking an abnormal current and working very inefficiently, and also endangering the insulation of the machine. This is the

Principal Cause of Burning Out Armatures.

To avoid these objections, both in locomotives and motors, has been a hobby with me for many years, and it affords me much pleasure to assure your society that I have done it in a thoroughly scientific and practicable manner. The secret of it is to always let the machine work at an efficient rate of speed, irrespective of the speed of the cars. While a description of the apparatus might be of interest, it is outside of the scope of this paper to refer again to locomotives. Scientists, who have carefully studied the correlation of forces, tell us that in the best steam-engine practice they do not transfer 10 per cent of the energy of the coal into useful work. It is a well-known fact that electric motors are made to-day that transfer 90 per cent of the energy put into them. An increase or gain of 10 per cent more would be perpetual motion, and put its inventor on a level with his Creator. Although perfection has never been reached with any form of machinery, there is but little room for improvement in the

Modern Dynamo and Motor.

While this is not suggestive of encouragement to aspiring scientists, it points out another problem worthy of their study—that is, to turn the energy of coal directly into electricity, without wasting the most of it, as is the case in the transformation through the medium of steam engines. A single thought and a drop of ink have sometimes made millions think. Who knows but that it remains for some member of the "California Electrical Society" to solve this problem? So far, comparisons have been made with steam motors only. I will now turn to cable railways. Californians are proud of their magnificent cable systems, proud of the achievements of their engineers. The names of Hallidie, Root and others will pass into history, and their work will live long after them. It is not probable that the present generation will see anything better adapted for climbing hard grades than the cable system, principally for these reasons:

First—Cable cars descending grades assist others up. I am aware that this same claim is made for electric motors, and although I have worked on the problem and patented devices to accomplish it, much remains to be done before it can have practical application.

Second—An electric motor of reasonable weight and efficiency would necessarily do this heavy work at an expense of time. To average the same speed, they would be compelled to go up the hard grades slow, and down fast. Those considerations are strongly in favor of cable roads.

We will now turn to the other side. A few years ago, if a man wanted to ring a bell or

Make a Signal at a Distance,

He pulled a cable or wire. The entire mass moved and the signal responded. To-day we press a button, the mass remains stationary, but the bell responds. In one case, a large percentage of the energy was spent in moving the mass. Those same principles govern the two railroad systems of to-day. I am told by excellent authority that the loss in conversion with the cable on the Market-street line here is about 33 per cent. On the other hand, we have the authority of President Holmes of the Chicago cable roads and some prominent street-railway engineers that their loss on level track is about 83 per cent; that is, 83 per cent of the power of the stationary engines is used to move the cable and machinery, and but 17 per cent to move the cars and passengers. The discrepancy may partially be accounted for in this way: The Market-street cars run about one block apart. The Chicago State-street line about three blocks apart. Let us assume that the Market-street engines develop 800-horse power when moving 30 trains; also that it takes 400-horse power to move the cable and machinery without the cars. This would show a loss of but 50 per cent. Now let us assume they run the cars two blocks apart. Then this engine would be doing the work at a loss of 66 per cent. This reasoning brings us to the following conclusions: To get a high return for the amount of fuel consumed on cable railways, you must tax the cable and run the cars less than one minute apart. The roads in the world that require this close service are few and scattering.

In an Electric Road the Power the Engine Develops

Is directly in proportion to the work being done, whether 1 or 50 cars are in the circuit—always provided the wires have proper current-carrying capacity. While I fully recognize the importance of regularity in the speed of machinery, the conditions on street railways prevent this. If a car is passing through a crowded thoroughfare, it must run slow. On the other hand, the lost time should be made up by faster speed when the track is clear. This is readily done with an electric motor, and not possible with the cable cars. Electric motors can take their current from conductors in conduits, or from light wires overhead. Conduits mean two open expensive sewers the entire length of the line. Their construction should be avoided for sanitary considerations if for no other. The comparative convenience, cost of construction, cost of maintenance and operation being so largely in favor of electric roads is proof conclusive that they will be generally adopted. It means also that they will be more profitable to their owners and the public will ultimately be benefited by improved service or cheaper transportation. In reviewing this paper, I find

Many Items of Interest

Untouched. With your kind indulgence I will briefly refer to a few of them. I am told that Mathias Baldwin, founder of the celebrated locomotive works, was haunted all his life with the idea that locomotives should have rotary instead of reciprocating engines. The reasons for this are, first, the locomotive is necessarily top-heavy. When it leaves the rail it is almost certain to tip over. Again, it is impossible to put them on running balance. To better understand this, suppose we were to support a locomotive on its frame, leaving the drivers to revolve freely, and give her steam. She would immediately commence a rocking motion, and the tendency to leave her foundation would increase as the square of her speed. While this tendency might not be very great at a speed of ten miles an hour, it would be four times as great at double the speed. This obstacle has been thoroughly investigated and demonstrated by Mr. McLeoud, engineer of tests of the Pennsylvania railway. He estimates that with some of the latest designs the locomotives, when running at high speed, are delivering trip-hammer blows on the rail equal to a force of 60 tons at each revolution of the drivers.

Electric Motors are Rotary Engines

And entirely avoid this dangerous and injurious effect. For some time past the engineers of the New York elevated roads have been battling with the problem of how to increase the carrying capacity of their roads to meet the anticipated increase of business. The structure will not stand heavier locomotives, and the centrifugal force from the unbalanced parts of their locomotives precludes a higher rate of speed. When the exigencies of the times require improvements, the right man generally comes to the front. Mr. Leo Daft, one of the early workers in the field, steps forward and demonstrates the ability of a light electric motor to handle eight coaches, or double the weight of the ordinary train. What is the limit to

The Transmission of Power

Through the aid of electricity and the speed at which trains may be run? I am dazed at the thought. The wildest dreams of Jules Verne and Stockton are not wholly without reason, and are backed up with some correct theories. A few years ago the late Charles Siemens, to whom the development of electric science owes so much, expressed it as his opinion that a large percentage of the enormous power of Niagara Falls might be transferred through this agency and utilized for manufacturing purposes in New York City. Sir William Thompson, England's greatest electrical scientist, calculated that it is theoretically possible to transmit 26,000-horse power a distance of 300 miles through a copper cable one-half an inch in diameter, at a loss of but 20 per cent. Those suggestions, when made, were ridiculed by the public, but charitably considered by prominent electricians and apologized for as coming from sensational enthusiasts. The electrical pressure proposed was considered uncontrollable.

Within the last few months the principal electric-light company in London, desiring to distribute their light over a large area through small wires, decided to use this same pressure. About 40 years ago some members of Congress missed re-election because they were hoodwinked into voting to squander the people's money to aid Morse in demonstrating the telegraph system. Later came the telephone, first a scientific toy, then gradually coming into general use. Then the electric light, and to-day the motor is coming forward with its velvety motion, and will probably be here before some of our readers think of the subject again.

A MISSISSIPPI MYSTERY.—It is seriously told that "the length of the Mississippi river has always been placed at 4100 miles, but civil engineers familiar with the stream say that it has shortened itself over 400 miles in 20 years, and will do as well in the 20 to come." But we are not told whether that great river is straightening itself out from its snake-like curves, or whether the late severe winters along its northern course are the cause of its mysterious contraction. Cold is a great contractor.

Herschel's Weather Table.

For Foretelling the Weather, Throughout All the Lunations of Each Year, Forever.

This table and the accompanying remarks are the result of many years' actual observation, the whole being constructed on a due consideration of the attraction of the Sun and Moon, in their several positions respecting the Earth, and will, by simple inspection, show the observer what kind of weather will most probably follow the entrance of the Moon into any of its quarters, and that so near the truth as to be seldom or never found to fail.

If the New Moon, First Quarter, Full Moon, or Last Quarter happens	*IN SUMMER.*	*IN WINTER.*
Between midnight and 2 o'clock.	Fair	Frost unless wind Southwest.
" 2 and 4 morning	Cold and showers	Snow and stormy.
" 4 and 6 "	Rain	Rain.
" 6 and 8 "	Wind and rain	Stormy.
" 8 and 10 "	Changeable	Cold rain if wind West, snow if East.
" 10 and 12 "	Frequent showers	Cold and high wind.
" 12 and 2 afternoon	Very rainy	Snow or rain.
" 2 and 4 "	Changeable	Fair and mild.
" 4 and 6 "	Fair	Fair.
" 6 and 8 "	Fair if wind Northwest	Fair and frosty if wind North or N. E.
" 8 and 10 "	Rainy if South or Southwest	Rain or snow if South or Southwest.
" 10 and midnight	Fair	Fair and frosty.

OBSERVATIONS.—1. The nearer the time of the Moon's change, first quarter, full and last quarter are to *midnight*, the fairer will be the weather during the next seven days.

2. The space for this calculation occupies from ten at night till two next morning.

3. The nearer to *midday* or *noon* the phases of the moon happen, the more foul or wet weather may be expected during the next seven days.

4. The space for this calculation occupies from ten in the forenoon to two in the afternoon. These observations refer principally to the Summer, though they affect Spring and Autumn nearly in the same ratio.

5. The Moon's change, first quarter, full and last quarter, happening during six of the afternoon hours, *i. e.*, from four to ten, may be followed by fair weather; but this is mostly dependent on the *wind*, as is noted in the table.

6. Though the weather, from a variety of irregular causes, is more uncertain in the latter part of Autumn, the whole of Winter and the beginning of Spring, yet in the main the above observations will apply to those periods also.

7. To prognosticate correctly, especially in those cases where the *wind* is concerned, the observer should be within sight of a good *vane*, where the four cardinal points of the heavens are correctly placed.

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SAN FRANCISCO
Saturday Morning March 2, 1889.

TABLE OF CONTENTS.

EDITORIALS.—A Miner's Candlestick; Freeman's Dry-Gold Separator, 145. Passing Events; Operations of the Copper Syndicate; Dynamite Guns; Mexican Mine Labor, 148. New Chlorination Works; The Dobriansky Furnace, 149.
ILLUSTRATIONS.—Werntz's Miner's Candlestick; Freeman's Dry Process Gold Separators; 145. The Dobriansky Furnace, 149.
CORRESPONDENCE.—The Sprague Electric Railroad; How Powder is Made, 146
MISCELLANEOUS. — Electric Street Railroads 149. Herschel's Weather Table, 147.
MECHANICAL PROGRESS.—Cast Steel vs. Built-Up Guns; Electric Motors for Cutting Trees; English vs. American Locomotives; Manganese Steel for Drive Chains; American Machinery in Denmark; Nails from Scrap Tin; Three-Cornered Nails; Labor-Saving Machinery, 150.
SCIENTIFIC PROGRESS.—The Laws of Storms; A New Adulteration of Coffee; Contrast of Colors in Nature; A Substitute for the Mariners' Compass; A Convenient Alloy; Another New Powder; Electric Experiments on Animals; Important Mineral Discovery; Engraving on Glass by the Aid of Electricity; Another Twenty Million Devoted to Science, 150.
GOOD HEALTH.—Health of the State; Starving a Cold; Draughts in Trains; Brick Residences Should be Painted, 151.
USEFUL INFORMATION.—Must the Piano Go; The American Whaling Business; Fasting Horses; To Lay Off a Right Angle; Natural Gas; Weight of Different Coals; Long-Distance Transportation; A Stove-Pipe Riveting Machine, 151.
ENGINEERING NOTES.—New Feats of Engineering Skill in Russia; New Device for Utilizing Water-Power; Tonnage of Steamers; The Cape Cod Canal; A Russian Canal Concession, 151.
MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 152-53.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 156.

Business Announcements.

[NEW THIS ISSUE.]

Books—H. C. Baird & Co., Philadelphia.
Engines—Stearns Mfg. Co.
See Advertising Columns.

Passing Events.

There is great excitement in San Diego and thereabout concerning quartz and placer mines 58 miles inland from Ensenada, Lower California. Many people from Ensenada have gone to the new fields. Lower California gold-mining excitements are somewhat frequent, and it is to be hoped that this will turn out better than its predecessors.

The Newberry-Vanton process, which has been quite successful in Australia, is to be introduced in Grass Valley for working gold ores. Large works have previously been established at Denver, Col.

The Senate Committee on Mines and Mining has reported in favor of amending the Alien Land law so as to allow aliens to invest in mineral lands on their own individual responsibility. This will be good news to miners in the Territories, as it is highly probable, after this report, that the law will be amended in accordance with it.

The last of the large castings for the hull of the new cruiser San Francisco has been made at the Pacific Rolling-Mills. The casting is of steel and in the shape of an enormous L, and is the port strut or hanger for the port shaft of the vessel, which is to be a twin-screw steamer. The charge of metal in the furnace was 26,000 pounds, and the strut will weigh about 16,000 pounds. About 12 hours of heating in the furnace at a temperature of 4000 degrees were required to bring the metal to the necessary condition for casting.

Mexican Mine Labor.

As a mining enterprise is so quickly affected by the price of labor, it would seem as though Mexico, with its low-priced labor, was *the* country in which a mining enterprise should flourish; yet those who have had some years of experience with labor at $4 per day in "the States" find that the cheap labor of Mexico is to-day really more expensive than the high-priced labor in this country.

The root of the evil in Mexico is custom; and the objectionable customs can generally be traced back to the "peon system," when the rule was task work.

In the time of the Spaniards powder could only be bought and sold by privileged persons, the lower classes not being permitted to have any in their possession; hence in the mine the drilling was done by one party and the blasting by another. This led to the "task" in drilling.

Custom has laid down the law that the miner shall not move his waste; this must be done by a "peon" at 37½ cents per day. In the olden time every one had to be watched, so to-day will be found on a well-regulated Mexican property every outside door with its velador (guard) and a guards, this or that, for every thing movable. When the wages paid are aggregated, it will be found that good skilled miners at $4 per day would really be cheaper.

It will always be found preferable to let the work on contract, except there be special reasons for day's pay, at so much per meter, the miners furnishing supplies, etc.

Even on contract work one meets with disappointment; eight men will take a contract—working four on a shift. One would expect the men, under average circumstances, to square at least two feet per day. After an experience of six months in good average ground (limestone and vein quartz) a friend of ours found that the best record was 1.9 meters for six days, or a trifle over one foot in 24 hours for eight men. This work was in ground that in the limestone districts in the United States would have been considered easy.

The cause for this trifling amount of work is a lack of knowledge of the proper use of tools and explosives. The men will arrange to blow out a pot-hole in the center of the breast, and then they will put in straight holes around this to square the work. In fact, it may be said that the work is "plugged" out. It is very rare that a hole is put in more than 18 inches deep or an effective rake given.

The cause for this character of work is: First, the powder. The product of the country, which is generally used, compares to the black powder of American work about as our black powder compares to a No. 1 nitro-glycerine powder. This, of course, does not permit of putting in deep holes. Second, the lack of a proper pitch or rake to the holes so as to get the best results. This can probably be traced back to the time when the drill-holes were "churned" in; the long drills necessary for churning in the cramped space precluding the possibility of giving much of a rake to the holes.

The miners of the present day have simply copied the practice of their ancestors; although they have had the great advantage of using hammers instead of churning in the holes, they do not seem to have profited by it to any great extent.

The average Mexican is very conservative, and cherishes the precepts laid down by his ancestors. Any foreigner who goes to the country with the idea that he "knows it all," and with the intention of running the country to suit himself, generally "gets left."

As a rule, the miners are good workers and fairly intelligent, and it has been observed that the minimum amount of work is due rather to a lack of knowledge than to a lack of effort.

The policy to pursue to remedy the faults is one of moral suasion until the men get thorough confidence in the manager—then command. Until he has the confidence of the men, he should never make any changes or institute new practices unless he is thoroughly sure of succeeding. The lower class of Mexicans have a great regard for power, and once convince them that you thoroughly understand your business, all you have to do is to lead and they will follow.

Operations of the Copper Syndicate.

During the past year the copper trade has been practically controlled by the French syndicate, which was formed in October, 1887, to force up the price of copper, in order to enhance the value of the large quantity of shares of the Spanish copper-mining companies held in Paris. Encouraged by the success of their first operations, and the facility with which they were enabled by the purchase of some 30,000 tons of Chili bars for immediate and forward delivery—the whole stock on Dec. 31st being only about 31,000 tons—to raise their value from £40 to £85 per ton, and that of the shares of the Spanish companies nearly 150 per cent, the syndicate determined to try and maintain values at the level to which they had raised them.

With this object in view they entered into negotiations with the leading copper-producing companies for the purchase of their total output for a period of three years, at a fixed price in some cases, and at a fixed price with a division of any excess realized in others. Ultimately contracts were concluded with the principal American companies, the three Spanish companies, the two Cape companies, and several of the smaller producers elsewhere. The price to be paid by the syndicate appears from the annual reports of the companies interested, and other sources of information, to be as follows:

Thirteen cents per pound (£61 10s. per ton, less 2½ per cent discount) with one-half of an excess realized, to the Lake Superior companies, the Parrott Co. of Montana, and the Arizona companies.

Twelve cents per pound of copper in the matte, equal to 13 cents per pound of refined copper, to the Boston-Montana, for 45,000 tons of copper, deliverable over three years.

Twelve cents per pound of copper in the matte to the Anaconda Co. for their first six months' production and 15 cents per pound for the second six months, an average of 13½ cents per pound, or 14½ cents per pound, equal to £68 10s per ton, with 2½ per cent discount per ton of refined copper.

Thirteen shillings per unit for precip'tate and 12s 9d for ore, or the equivalent of £70 per ton for the best-selected copper, to the Rio Tinto, Tharses, Mason & Berry, Quebrada, Cape, Namaqua and other companies.

The production of some mines is limited, that of others is allowed an annual increase, and on others no limit is placed. The quantity of copper contracted for and received by the syndicate during the past year is estimated by James Lewis & Sons of Liverpool, from whose report we obtain these figures, at about 160,000 tons, out of a total world's production of 260,000 tons. In addition to this, they have taken over from the Societe de Metaux and purchased in open market, at an average cost of about £72 per ton, 60,000 tons of Chili, in addition to about 12,000 tons of other copper, the result being that they now find themselves with a stock on hand of fully 145,000 tons.

The total purchases and sales of the syndicate for the year 1888 were estimated by the same authority approximately as follows:

PURCHASES.

56,000	Tons	Lake, Montana, and Arizona copper, at £61 10s. per ton, and half the excess realized.....	£3,444,000
9 000	"	Boston Montana matte, at £61 10s per ton	553,500
28,000	"	Anaconda Co.'s matte, at £68 10s per ton of refined copper.....	1,918,000
67,000	"	Spanish, Cape, Australian, Quebrada, Newfoundland, Panuncillo (Chili), Norwegian, Italian, Mexican, Japan, and other copper, at £70 per ton of refined copper.....	4,690,000
60,000	"	Chili bars, at £72 per ton (exclusive of interest, etc).....	4,320,000
12,000	"	Good merchantable copper, at £77 per ton.....	924,000
232,000	Tons	Costing.....	£15,349,500
		Add interest, commission, brokerage, etc.....	500,000
Total			£16,349,500

SALES.

38,000	Tons	Lake, Arizona and Parrott copper, at £70 per ton (say 16½ cents less half the excess over 13 cents).....	£2,660,000
7,000	"	Anaconda Co.'s matte sold in England at average of 15s. per unit, or £80 for B. S. (11,000 tons remaining in stock 31st December)	560,000
10,000	"	Anaconda Co.'s matte sold in United States at 15½ cents, or £73 5s. per ton.....	732,500
32,000	"	Other copper, at £80 per ton, average of best selected.....	2,560,000
87,000	Tons	Sold for.....	£6,512,500

A greatly increased production has resulted from the operations of the syndicate, but this cannot be deemed excessive considering the high price; but what has surprised the trade is the great falling off in the deliveries of copper, pointing to a diminished consumption of 37,478 tons in England and France. Smelters and consumers hold little, however. One of the disadvantages the syndicate labor under is that they have to carry the stock of copper usually held by the trade.

The success of the syndicate operations will mainly depend upon the extent of supply and demand during the present year. Unless some steps are taken to further restrict the output of those companies that have already contracted with the syndicate, there seems every probability of a further increase in the production of the world of 40,000 tons, bringing up the total for 1889 to 300,000 tons. On the other hand, there is little doubt that the consumption of imported copper will be considerably greater than during the past year, and will probably exceed that of 1888 to an equal extent, the supplies of old copper on hand being now exhausted, the tonnage of steamships in course of construction being 85 per cent more than 12 months ago, trade generally having improved and the use of electricity promising to be greatly extended; while India and other consuming countries will ere long require to replenish their stocks. Even with this, however, and in view of the extensive substitution of other metals for copper, in consequence of its greatly enhanced cost, there promises to be an increase in the stocks held by the syndicate in England, France and the United States during 1889 equal to that of 1888, or of nearly 100,000 tons, making the total about 245,000 tons. Whether the syndicate will succeed in obtaining a diminution of production, which it would appear to be the interest of the large producing companies to agree to, or will be able to bear the severe financial strain entailed by the carrying of so large a quantity and value of copper, remains to be seen.

Dynamite Guns.

The success which has attended the experiments with pneumatic dynamite guns is such that they are expected to greatly change the systems of coast defense and modern warfare. The U. S. Senate has passed the Army Appropriation bill substantially as reported by the committee, after adopting an amendment offered by Stewart, providing for the purchase by the Secretary of War of three pneumatic dynamite guns, with accompanying machinery, to be mounted on the Pacific Coast, at a cost of $187,500.

There are several forms of these guns for throwing dynamite, the principal ones being those of Graydon and Zalinsky. Lieutenant Graydon, late of the U. S. Navy, has an invention which consists in firing dynamite shells from modern guns or cannon, with the full service charge of powder and with no danger from heat or shock, at the same time securing the entire range desired and the complete penetration of the target by the shell before the dynamite is exploded, the penetration being necessary in order to obtain the full destructive power of the explosive. Several demonstrations of the invention have been made by U. S. Army officers. The explosive is prepared in a peculiar way.

The idea of projecting shells by compressed air was first worked out by Mr. Mefford of Ohio, who constructed a gun and had it tried at Fort Lafayette in 1884. The task of experimenting was left to Lieut. Zalinsky of the Fifth Artillery, who improved and perfected it and the projectiles in all their details. The 15-inch guns lately made throw 600 pounds of blasting gelatine. An eight-inch gun throws a shell containing 100 pounds of explosive a distance of 3000 yards, with an elevation of 33 degrees and a pressure of 1000 pounds. The air reservoirs consist of wrought-iron tubes on the traversing platform, which are connected with the air-valve on the gun. The U. S. Government has made elaborate experiments with this pneumatic gun and built a cruiser especially to carry them. This is the form of gun referred to in the U. S. Senate and which it is intended to purchase for use on the Pacific Coast. The gun is very long, those used on the cruiser being 40 feet. The gun fires fore and aft and is directed by steering the vessel. The electric fuse used in the shell is a marvel of ingenuity and acts with great precision.

IONE is developing a quarry of red sandstone of fine quality for building purposes.

New Chlorination Works.

Cheap Handling of Low-Grade Material.

There are in portions of this State large bodies of gold tailings which still contain much precious metal in such a condition that the amalgamation process would not save it. More of the same kind of tailings are being made every day. Works have recently been built in the northern part of the State, especially designed to beneficiate this class of material, and have been for the past few months working over gold-ore tailings of low grade.

"The Butters Ore Milling Works" are located at Kennett, 17½ miles north of Redding, Shasta Co., Cal., on the line of the California & Oregon railroad, and on the banks of the Sacramento one mile below the mouth of the Pitt river. The roasting and chlorination departments of the works are now in operation.

The design of the builder is to establish reduction works for the gold, silver and copper sulphide ores of this portion of the State. The location possesses natural metallurgical advantages in that it has behind it the water-power of Big Backbone creek, with a water-power of 1000 inches, running the year round under a head of 150 feet, thus giving ample power. Wood for all time can be floated down the Pitt to the boom at the works. The railroad at the door brings in ore and supplies, and the surrounding country is well known for its abundance of low-grade sulphide ore.

The first ditch, for 200 inches of water, is now under construction and about two-thirds finished, and the works now completed are ready for handling crushed materials, such as concentrates from vanners or blankets, crushed ores, tailings, etc.

The works consist of a roasting-house containing a reverberatory furnace 43 feet long outside and 12 feet 3 inches wide, containing 3 hearths each 10 feet square, a dust-chamber and two alternating cooling pits for chlorination on cooling floor. The lixiviation-house contains two ore-tanks each 14 feet diameter and 5 feet high, with a capacity of 20 tons to each tank. The tanks have counterbalanced lids fitting in water channels on the outer edge of tank for use when chlorine gas is used The two precipitation-tanks are 10 feet in diameter and 6 feet high, and the lower or copper precipitation-tanks are 12 feet in diameter and 4 feet high. The tanks and foundations are all built on inclined water-tight floors leading to waste-tanks. The generator for the production of chlorine is a very satisfactory machine made after designs of the builder to run by power and heated directly by a wood fire, being practically a lead-lined kettle of 120 gallons capacity, arranged with valves and safety overflows, the connections with the vats being made with water-stopped lead valves, no hose being used in the works. The laboratories, melting-rooms, shops, offices, living apartments and stables are very complete and compact. The bricks, tanks, lead and iron work were all worked up and manufactured on the spot, the iron castings alone being brought from San Francisco, making these works as they stand not only the most recent, but undoubtedly the model gold chlorination works on the coast.

They are now handling 1000 tons of gold tailings assaying from $4 to $6 per ton, at a cost of about $1.75 to $2 per ton by the chlorination process; these tailings are located at the Central mine, on the line of the railroad 12 miles below.

The fact that such low-grade material, in which not a trace of free gold is visible, and from which but 30 cents per ton, even after roasting, can be obtained by amalgamation, can be treated by the chlorination process at a profit, is one that, to say the least, deserves notice. The capacity of these works is from 300 to 400 tons per month of their kind of material, of which only about one-tenth is roasted.

The builder and owner, Mr. Chas. Butters, who built the large chlorination works of the San Sebastian Gold Mining Company of San Salvador, the largest works of the kind on this continent, conducts a regular assaying and ore-testing business, charging $1 per assay, and is prepared to purchase tailings or crushed stuff, or to work such material for certain fixed charges, from $3 to $18 per ton, depending on the material, and from 80 to 90 per cent will be returned. The railroad company is making very liberal rates on such low-grade material, which can be shipped in bulk without the use of sacks.

PUEBLO, Colorado, has just had a Mardi Gras celebration, which was largely attended. In the evening there was a grand procession. The Mardi Gras floats, 12 in number, were very beautiful and carried Rex and his queen and suite. They all carried out the sentiment of Pueblo's future greatness, each typifying one of the minerals produced at Pueblo's Smelting Works. They were followed by a long line of floats and trucks prepared by business men and manufacturing firms representing Pueblo's industries and exhibiting innumerable ingenious and interesting devices. The pageant was a credit to Pueblo and to Colorado, being the first affair of the kind ever attempted west of St. Louis. The idea of the mineral floats was especially unique and appropriate.

CHEMICAL LECTURE NOTES.—John Wiley & Sons have just published a volume with this title, by Prof. P. T. Austen, professor of general and applied chemistry, Rutgers college and New Jersey State Scientific school. This little book is not intended to be a text-book of chemistry, but is simply a collection of notes and observations on certain topics which experience as a teacher has shown the author often give the student more or less trouble. No particular order has been observed in the arrangement of the topics, nor has any attempt been made to include all the rocks and shea's on which the chemical student may get wrecked. The subjects considered will prove of interest and value to all thoughtful students.

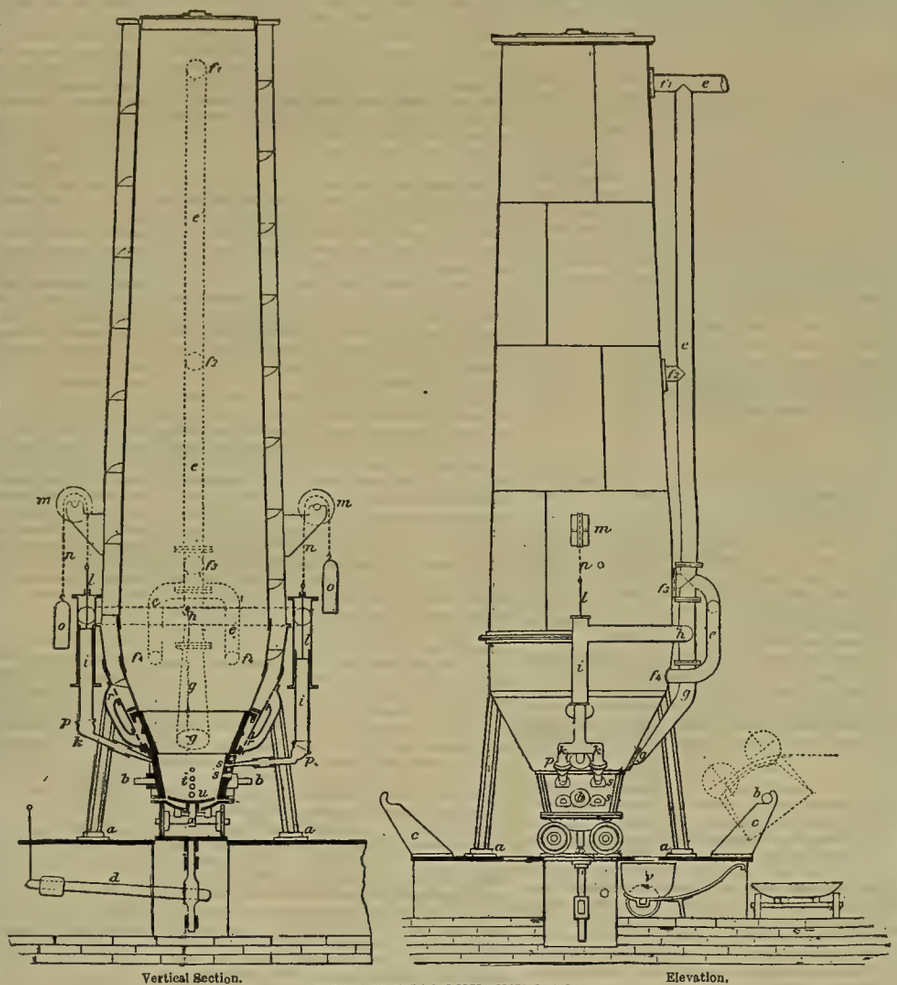
Freeman's Dry-Gold Separator.

(*Continued from page 145.*)

duced by the expansion of air. The close mesh of the apron retains the air within the air chest until it becomes compressed, and the expansion of the air forces it through the apron; when, becoming liberated, it resumes its original space and all force is destroyed. The action of the air in this machine is wholly by expansion and not by velocity, and there is no blast to drive the gold from the riffles. The force of the current at the surface of the apron is strong enough to buoy up stones of considerable size and carry them off from the apron; but immediately it reaches the open air, it becomes dispersed and its force is lost. The great specific gravity of the gold allows it to lay on the apron undisturbed by a current that will float the rock and debris off.

A small prospecting machine, weighing only 27 pounds, is also made, which is similar to the larger in construction and has a capacity of two tons a day. It is provided with straps for carrying on the back. The same inventor has a pulverizer for clay and cement which cleans from the stone all the particles attached, thereby liberating the gold and preparing the gravel for thorough separation. The separator has also a "blacksmith" attachment, as shown in the cut The price of the 50-ton machine is $125; the 100-ton machine, $200; the prospecting machine, $25; and the blacksmith forge $8. Mr. Freeman has a number of testimonials from people who have used his separator. The address is J. B. Freeman, Los Angeles, Cal.

SETH COOK, the well-known mining operator, died at the Palace hotel on Tuesday last. He has been identified with the mining interests of California and Nevada for many years and leaves a fortune valued at from two to three millions of dollars. Though latterly not very robust, Mr. Cook's death was altogether unexpected even by his most intimate associates.



Vertical Section. Elevation.

THE DOBRIANSKY FURNACE.

The Dobriansky Furnace.

In last week's PRESS we gave the observations of F. L. Garrison on the metallurgical appliances of the iron works at Dobriansky, Prussia, and the Wartsilla Iron Works, Finland. On this page are cuts of the Dobriansky furnace. The first furnace designed for the use of hard refractory ores, and to make loupe capable of being directly hammered and rolled without further refining, was started June, 1886, in Count Stroganoff's Iron Works at Dobriansky, in the Ural, and has given great satisfaction ever since. It was originally intended to build two furnaces, 35 feet in hight, 9 feet of which was for gas "take-off." In order to facilitate the building, however, it was determined to build only one stack. This resulted in a furnace 26 feet high from the top of the movable hearth to the throat, having a diameter of five feet at the belly and four feet at the throat. The inner and outer shells are separated by a space of seven inches.

The tendency of the unreduced iron to stick to the lower portion of the furnace was ingeniously overcome by inserting into the lowest part of the stack a hollow cast-iron ring, with its upper edge concentric with, but somewhat less in diameter than, the inner shell, and extending downward, gradually acquiring a quadratic shape, with rounded edges. The outer shell of the furnace is supported upon flanges, with which this ring is provided. The blast passing through the hollow walls of the furnace is conducted to and passed through this hollow ring by means of two broad flat tubes, situated on opposite sides of the furnace. By this arrangement it is easy to repair the parts of the furnace exposed to a high temperature; and by thus keeping the walls cool at this place, the unreduced iron seldom, if ever, sticks to them. At the same time the temperature of the blast is increased.

The inner wall of the furnace is lined with bricks made of "chamotte," 1½ to 2 inches thick, for a hight of 5 feet above the upper edge of the cast-iron ring. The upper part of the stack, as well as the cast-iron ring and the hearth, are without any lining. The stack is supported by four pillars made of steel rails fastened together and inserted into cast-iron sockets, the upper ones being fastened to the outer shell of the furnace, and the lower to an iron bed-plate. This bed-plate rests on a foundation of ordinary brick 2½ feet high, in which two channels are made, crossing each other at right angles, thus giving access for the slag-car to be run under the hearth, and also room for the apparatus to raise and lower the hearth. The cuts in Mr. Garrison's paper, though lettered, are not described in detail, but are sufficiently clear to be properly understood.

The carbonization of the reduced iron can also be regulated by the ore charges and the quantity and temperature of the blast. The furnace may be so operated that soft iron or steel can be produced as desired, the only difference in the operation being that in the former case the ore charges are larger. If hard iron or steel is desired, the temperature in the lower part of the furnace must be increased, and the inclination of the blast into the hearth decreased. The charcoal used at Dobriansky is very inferior, being made mostly from Siberian fir, which produces a porous, friable charcoal, hardly capable of sustaining the weight of the charges. It is usually made in meilers, but badly done, and contains a large amount of moisture.

ON Saturday U. S. Treasurer Hyatt received at Washington from the Philadelphia mint two million standard silver dollars, weighing 60 tons. This is the largest single shipment of silver ever known, and required six express cars to carry it. This shipment fills the new vault in the treasury to its utmost capacity, $86,000,000 being there. Besides this amount, the treasury also holds 1900 tons more, making 4500 tons of silver on hand, or about $150,000,000.

ON Tuesday the roving exhibit of the State Board of Trade was in Toledo, Ohio, and a dispatch to the secretary stated that the number of visitors was almost beyond computation. So far, during the two months that the exhibit has been on the road, about 200,000 persons have passed through the cars, and the result has been perceptible in the increased demand for California products wherever it has tarried.

MECHANICAL PROGRESS.

Cast Steel vs. Built-Up Guns.

Much interest is being taken in the experiments which are now being made in regard to the relative effective of cast steel and "built-up" guns. We have already in past issues given the result of the trial of the Hainsworth cast-steel gun, which, although a decided failure, is thought not to have failed through any imperfection in the principle upon which the gun was manufactured, but through a fault in its after-manipulation.

As a proof that the principle of cast-steel guns is not a failure, we have the trial, just completed, of a six inch steel gun cast at the Standard Steel Casting Co.'s works, at Thurlow, Pa., which has been successfully made at the Government proving grounds at Annapolis with 12 rounds, with the full charge of 48½ pounds of prismatic powder and a 100-pound projectile. In this gun the steel was made by the open-hearth process, while the one that burst a few weeks since at the first round was of Bessemer steel.

The *Iron Age* in speaking of this test says: "While the test must be a most gratifying one to the makers of the gun and to those who have insisted that a solid steel gun can be made that will stand all of the tests and more than are required from built-up guns, it by no means settles the question between cast guns and built-up guns. The superiority of the cast gun, if it is superior, as we believe, to the built-up gun, can only be decided as the result of a number of tests. The results with built-up guns are not such as to justify the claim that is made for them on the score of strength. We have already given in our columns proof of the great liability of these guns to burst, but there is an impression in their favor, and to remove this impression and give the cast gun a standing will require more and more severe tests than that to which the Thurlow gun has been subjected. We are firm in the belief that we have expressed for years in these columns that the cast gun can be made a better gun than the built-up gun. We do not yet claim that the guns made prove this; in fact, there are but two guns upon which we can rely for evidence, but those who know the character and possibilities of steel and the requirements for guns as well, possibly, as any one the world over, still insist, notwithstanding the failure of the Hainsworth gun, that the cast gun is a better gun than the built-up gun, and when the necessary experience in their manufacture has been attained, guns giving far better service than the built-up guns can be made of cast steel." The chief advantages of this mode of manufacturing guns of large caliber is the rapidity and cheapness with which they can be turned out.

IRREGULAR DISTRIBUTION OF SILICON IN PIG IRON.—Very few persons, even among quite well-informed workers in iron, we imagine, are aware of the great difference which exists in pig iron, from the same charge. The following from the *Iron Age*, in reference to this matter, will be noticed with interest: In analyzing samples taken from every other bed of a cast of pig iron, Mr. J. W. Thomas finds the silicon to vary considerably, the iron coming first from the furnace having the highest percentage of silicon. The following are the silicon results, beginning with the first bed that is filled:

First cast.		Second Cast.	
First bed	3.328	First bed	2.021
Third bed	2.058	Third bed	1.732
Fifth bed	1.800	Fifth bed	1.741
Seventh bed	1.800	Seventh bed	1.765
Ninth bed	1.834	Ninth bed	1.722
Eleventh bed	1.834	Eleventh bed	1.783
		Thirteenth bed	1.853

The percentage of silicon varies in each pig, being higher at the point of the pig than at the butt. This is shown by the following results:

	Point of pig.	Butt of same pig.
1	3.328	2.167
2	2.058	1.960
3	1.890	1.806
4	1.800	1.751
5	1.834	1.787

The data given above are from the last volume of the "Transactions" of the Iron and Steel Institute.

ELECTRIC MOTORS FOR CUTTING TREES.—It is sometimes inconvenient to drive saws for cutting trees by steam, especially in thick woods, and electric-power has recently been adopted in the Galician forests. The trunk is usually sawn by such machines, but in this case it is drilled. When the wood is of a soft nature, the drill has a sweeping motion and cuts into the trunk by means of cutting edges on its sides. The drill is actuated by an electric motor mounted on a carriage, which is brought up close to the tree and shackled to it. The motor is capable of turning round its vertical axis, and the drill is geared to it in such a manner that it can turn through an arc of a circle and make a sweeping cut into the trunk. The first cut made, the drill is advanced a few inches, and another section of the wood is removed in the same way until the trunk is half severed. It is then clamped to keep the cut from closing, and the operation is continued until it would be unsafe to go on. The remainder is finished by a hand-saw or an ax. The current is conveyed to the motor by insulated conduits brought through the forest from a generator placed in some convenient spot. A more direct method of cutting trees by electricity is that adopted some years ago, in America, we believe, where trunks were cut through very rapidly by a wire made red-hot by an electric current passed through it.—*London Iron.*

ENGLISH VS. AMERICAN LOCOMOTIVES—A TEST TRIAL.—The Pennsylvania Railroad Company has recently purchased for experimental purposes a superior English-built locomotive. This locomotive will be seen in contest with one of the best-constructed American-built locomotives. In order to make the trial perfectly fair, an English mechanic from the shops of the London & Northwestern Company, by which the engine was built, accompanied it to see that it was properly set up, and an engineer from the same was also imported to run it. The engine, which is thoroughly English in every particular, down to the absence of headlight and "cowcatcher," will afford a practical means of settling the much-mooted question as to the comparative superiority of English and American locomotives, as an opportunity will now for the first time be given for testing the two types under precisely the same conditions of climate, fuel, water, roadway, traffic and management. American locomotive builders and officers will await with much interest the results of the competition. The locomotive has already commenced its work upon the road.

MANGANESE STEEL FOR DRIVE CHAINS.—A new use has been found for Hadfield manganese steel, in the manufacture of drive chains for elevators. Mr. C. E. Hall of Sheffield makes a sewerage elevator in which he uses a novel application of his dredger. The machinery is to be employed for the clearing out of the residuum in the tanks at sewerage works. The dredger is driven by Mr. Hall's patent drive-chain. An interesting point in this connection is that Mr. Hall has designed his driving chain so that it can be made of Hadfield's patent manganese steel. We need scarcely point out the importance of this new departure in the manufacture of driving chains. Mr. Hall's is the only driving chain that can be made of manganese steel at the present time. One of the driving chains made of manganese steel has been at work at the Manvers main colliery for 12 months with excellent results. Large numbers of them are being made for gold, diamond and coal-mining operations in various parts of the world.—*Iron Age.*

AMERICAN MACHINERY IN DENMARK.—Mr. Ryder, the American Consul, writing from Copenhagen, says: "All articles of American machinery (agricultural) that have hitherto been introduced in this kingdom, continue to maintain their high reputation among the purchasing classes. They are found less heavy than English machines employed for similar purposes, and are of superior finish, being also of better material than those of German make." Mr. Ryder's qualification above of the "purchasing classes" indicates that the merchants and importers are not equally favorable to American machines, which is no doubt the fact. It is much more convenient to procure machines in either England or Germany, and the methods of business are better understood. The "purchasing classes" are, however, important factors in the case.

NAILS FROM SCRAP TIN.—Among the useful purposes to which scrap tin has recently been applied, is that of the manufacture of nails. For this purpose scraps of tin are cut by dies into rectangular bits, with a length of about three times their width. These scraps are then fed from an automatic hopper between dies, where they are squeezed first to square form, like a nail, then headed. Nails of this kind are well fitted for many purposes, being free from tendency to rust; also light, very rigid, and capable of being driven into the hardest wood without buckling.

IMPROVED WIRE FOR ELECTRICAL PURPOSES. A new process has been brought out in Vienna for the manufacture of copper-coated steel wire for electrical purposes. The old method was galvanic, while, according to the new one now proposed, the steel wire will be coated by spirally winding around it very thin copper bands. The object in all such wires is to combine the great conducting power of the copper with the tenacity of the steel.

THREE-CORNERED NAILS.—It is stated that a large plant for the manufacture of three-cornered wire nails will be established at Newcastle, Pa., at an early date. The company which proposes to engage in the manufacture of these nails is known as the Three-Cornered Wire Nail Company, and has its headquarters at Pittsburg. It is composed of J. C. Williams, William Taylor and other capitalists of the city.

STEEL as a substitute for granite blocks for paving streets is attracting considerable attention. Its durability and cheapness are claimed to be two strong points in its favor in most sections of the country, and tests of its efficiency are to be made during the present year.

LABOR-SAVING MACHINERY.—An English paper states that the modern labor-saving machinery introduced into foundries and machine-shops has resulted in 50 men producing as many castings as were formerly turned out by 200 men.

SCIENTIFIC PROGRESS.

The Laws of Storms.

Meteorologists are not yet agreed regarding the laws that govern the origin of storms. Storms of all kinds, whether they are called tornadoes, hurricanes, cyclones, or typhoons, present in a general way the same phenomena, that there is an area of light atmosphere, or low barometer, as it is called, toward which the air rushes from all sides to fill the vacuum, thus producing a whirling movement near the center. There is at the same time a motion forward in a given direction. The greater part of those who are within the range of a storm only feel the wind as blowing from a fixed quarter, especially when its diameter is great, and this may sometimes be 2000 miles. In the very center of a typhoon or cyclone there is a dead calm, which lasts but a few minutes, after which the object, be it a ship or village, finds itself in the midst of a conflict of the elements more terrible than ever. In this revolution of a storm around an upright axis the revolution is in the northern hemisphere from right to left, and in the southern hemisphere from left to right.

To understand a storm, it is always necessary to go back to first principles. Its origin is invariably near the equator, where, on account of the eastward movement of the earth, the winds have an apparent direction toward the west; but as the revolution of the surface of the earth north and south of the equator is less rapid, owing to its diminished diameter, as these air currents diverge therefrom they immediately take an apparent direction toward the east.

Given this law of air currents, it only remains to consider the great cause of storms, which is the unequal heating of the air over the earth's surface. Storms have their favorite routes of travel. No storm was ever known to travel from Boston to Philadelphia, from Chicago to St. Louis, or from Nashville to New Orleans; and when the word storm is used it means the storm center. Storms cross the Atlantic invariably from America to Europe and exhaust their force on the coasts of Great Britain and France, or not far in the interior. They never return by the same route.

When a large area of air near the surface of the earth has been heated to a high temperature, it rises, giving origin not only to the currents that rush in from all sides, but causing a mass of the colder air to fall from the upper strata of the atmosphere. It is principally this cold air falling from above that produces relief after a heated term, after a thunder-storm or during a hot summer night. People say after a summer shower, "The rain has cooled the air." This is a fallacy, for it is not the rain that cooled the air, but the cool air falling from the upper strata of the atmosphere, or in some cases coming from a cooler, northern latitude.

According to the theory of M. Faye, into an air vacuum at the surface of the earth falls one of the eddies already formed in the upper stratum of the atmosphere. The rotary motion increases in velocity as it descends, not only from causes inherent in itself, but because the conditions of the lower air are favorable to the propagation of the circular movement. Hence result the storms that are most terrible in their effects, such as the cyclones of the West, the cyclones of the Indian ocean, and the typhoons of the China seas. It would, perhaps, be too much to assert that were it not for these upper currents and eddies there would be no cyclones, for the lower stratum of atmosphere appears to contain all the conditions necessary to their formation; but it is certain now, as it always has been, that the descending currents produce violent complications.

Sailors assert that the wind blows in certain cases straight downward. They have not only felt it, but they say that it is the cause of that condition of the sea when the waves seem beaten flat upon its surface. It is useless to understand the nature of air currents and the cause of storms unless the knowledge assists in navigating the ocean, and in the protection of life and property by sea as well as on land. In this study of the weather it is pleasant to know that this country has always taken and still maintains the lead, simply because as a practical people we approach the subject from its practical side.—*S. F. Chronicle.*

A NEW ADULTERATION OF COFFEE.—Science seems to be aiding largely in the adulteration of food products when manipulated by unscrupulous hands. Of late, artificial coffee beans have been found in the European (German) markets. They are made from roasted grain flour with an addition of dextrine or some such body. There are two establishments at Koln which furnish the necessary outfit, with formula, etc., for the manufacture of the beans. According to an original letter from one of these establishments in the possession of Dr. A. Stutzer in Bonn, from 1000 to 1200 pounds of beans may be made in one day with the outfit, which the firm offers at a high price. The letter further predicts a golden future for the article, but advises that it be used for the adulteration of genuine coffee only in such countries where the laws are not very stringent, etc. These prospects must be very enticing to sophisticators, especially as the imitation is so perfect that only a very critical examination will serve to detect the adulteration. The artificial bean distinguishes itself from the genuine in being perfectly symmetrical and of the same size, and that the epidermal membrane is entirely wanting.

Contrast of Colors in Nature.

Nature is very sparing of showy contrasts of warm and cold colors. Red and blue are very rare, and of yellow and blue the cases are but few, and black and blue are found in lepidoptera more often than white and blue are seen in our flora or fauna. It is not uncommon for one of two strong colors to be overcast with a tinge of its fellow, or for both of them to be reconciled by a common touch of black or of some third color, or for one of them to be lightened by a dash of white, while the other is lowered by as much black, and so red, off-hued with black—russet and green upbrightened with white—often meet in the autumn in dead and dying patches of fading leaves. It may be shown, I believe, by the refractions of light in crystallized gypsum that brown is the complementary color to lavender-gray; and how true to herself is Nature we may go forth and see, in the fall of year, in the dead and curled leaves of the mugwort, or meadow sweet, which are beautiful even in their death, with one side brown and the other the brown-matching gray; and, if brambles be cut in the leaf-greeny season, their two surfaces soon wither into the harmony of gray and brown.

And what use are we to make of these hues of Nature? They are warrants for a gray mantle under locks of brown hair, or a brown bonnet or trimmings, or a gray room wall with brown furniture; and if, on a hot summer's day, I see the dark leaf shades playing on the gray bark of a young beech, I can boldly lay darkish leaf shades on a wall of the beech bark's hue; or if, after the winter rains, I find a barkless pole in railings, tinted with the palest blue-gray, and on breaking off a splinter of it I find its inner wood of its true color of pale brown-yellow, why should I not take the inner tint for my wall and the outer one for the skirting? Or, if I pick up a piece of lichen of dull green on one side and dull gray on the other, why should I not bind my book in one color and lay on it a lettering piece of the other? Nature is the best school of art, and of schools of art among men those are the best that are Nature's best interpreters.—*London Architect.*

A SUBSTITUTE FOR THE MARINERS' COMPASS. The London *Electrician* prints a singular rumor to the effect that the use of the compass is about to be altogether superseded. A method is said to have been discovered by which the true north may at any moment be ascertained by means of a device which is wholly independent of magnetic action. The reading is, however, obtained by electrical means, and it is said that a well-known Berlin firm of electricians has secured the patents. The informant also surmises that gyroscopic action is also involved.

ANOTHER NEW POWDER.—At the Royal Powder factory of Wettern, in Belgium, a new gunpowder is being made. They call it poudre-papier, or paper-powder, and it is said a charge of 2½ grammes (39 grains) gives, in a rifle of small caliber, an initial velocity of 660 yards to the ball. This is equal to, if it does not beat, the Lebel powder. The additional advantages are attributed to it of not smearing the barrel, of producing no smoke and of causing lit le recoil.

ELECTRIC EXPERIMENTS ON ANIMALS.—A party of scientific gentlemen recently performed a series of electrical experiments on the animals in a menagerie at Bridgeport, Conn. The baboon, the sea lion and seals, monkeys, the elephants and other animals were treated to doses of the electric current. All the animals, with the exception of the elephants, manifested an intense disgust at the experiments and fought and howled with rage. The elephants on the contrary, appeared to enjoy the electricity.

IMPORTANT MINERAL DISCOVERY.—The State Mining Bureau recently received a specimen of sulphide of bismuth carrying 2 per cent of silver. It comes from the eastern portion of Fresno county, and is the second sample of bismuth discovered in this State, the first one having been found in Inyo county. When it is considered that bismuth is quoted at $2.40 a pound, the importance of a correct diagnosis of the discovery is at once apparent.

ENGRAVING ON GLASS BY THE AID OF ELECTRICITY.—A process of engraving on glass and crystal by electricity has been communicated to the French Academy of Sciences by M. Plante. The plate to be engraved is covered with a concentrated solution of nitrate of potash and put in connection with one of the poles in the battery, and the design is traced out with a fine platinum point connected to the other pole.

ANOTHER TWENTY MILLIONS DEVOTED TO SCIENCE.—It is said that John D. Rockefeller, the millionaire head of the Standard Oil Co., is about to found a university, with an endowment of $20,000,000, either in Chicago or New York.

A CONVENIENT ALLOY.—An alloy which m lts at a lower temperature than the magic spoon does is obtained by melting together 48 parts bismuth, 31 of cadmium, 10 of lead, and 20 of zinc. This alloy melts at 135° F.

GOOD HEALTH.

Health of the State.

The report of the State Board of Health for the month of January has been issued, embracing returns from 68 cities and towns containing a population of 700,850.

The total number of deaths for the month was 992, or a percentage of 1.41 per thousand for the month, or a rate of 16.92 per thousand for the year. The percentage is slightly above the average, the increase being almost entirely due to the diseases affecting respiratory organs.

Consumption claimed 165 victims, an increase of 28 over the previous month. Pneumonia was unusually prevalent and fatal, 103 dying from it. Bronchitis numbered 34 cases. Diphtheria and croup were fatal in 43 cases, while scarlet fever claimed but 1 victim throughout the State for the month.

There were only 3 fatal cases of smallpox in this city and 1 in San Leandro.

Diphtheria seems to have a wide prevalence, but few localities being free from its ravages. The report recommends the most radical precautions against its spread. The following remarks which we condense from the report should be read and observed with care: The impression seems to be very general that the frequency of this disease is in the main dependent upon bad sewerage, defective drains, foul air, and insanitary conditions generally. Although these conditions may render the persons exposed to them more liable to take the disease from the deteriorating influence upon the general health, yet they do not *generate* diphtheria, nor is the disease capable of spontaneous generation any more than is smallpox or cholera. In order to produce diphtheria you must have the germ of the disease present, and then to be developed it must come in contact with a suitable soil for its growth. From this fact the inference is plain that although prudence requires that the sanitary condition of the patient's surroundings be kept in the best possible condition, and all predisposing causes which might deteriorate the patient's health be removed, it is infinitely more important to insist upon the complete isolation of those attacked, and the rapid destruction by fire of all substances likely to be the conveyancers of contagious germs. Diphtheria germs, as far as can be ascertained, are carried in the air, exhaled by the breath, deposited on the clothes, on the walls, everywhere in the room; hence the necessity for the most thorough disinfection of the person and the dwelling before intercourse with well persons is allowed. If more care was exercised in this regard we would hear less of the disease, and many very valuable lives saved that are now sacrificed by criminal carelessness, and the utter disregard for the public welfare.

Starving a Cold.

How it Can be Done Without Inconvenience to the Sufferers.

The man who originated the oft-quoted and unscientific maxim, "Feed a cold and starve a fever," either did not understand what he was writing about, or he has been widely misunderstood, to the great injury of multitudes who have acted on the absurd maxim. Presuming that the author of it was a physician, who knew something of the nature of a cold and the action of remedies, he must have spoken subjunctively, and not imperatively. And then it would read thus: If you stuff a cold the consequence will be that you will be thrown into a fever as the result of the stuffing treatment of the cold, and then you will have to starve the fever. This is a true and sensible interpretation of this commonly received maxim, which has done as much harm as any of the thousand and one of the popular errors which prevail on medical subjects.

If it cannot be explained in the manner mentioned, it must be remanded to the dark ages of ignorance and superstition, and classed with lunar and stellar influences over the human body, witchcraft and other absurdities long since exploded in the progress of true science. Without dwelling on the nature and causes of colds, or on what physicians call the pathology of these disorders, I will say that a low or even starvation diet for a few days, with the free drinking of warm, mildly stimulating teas, is better for a cold than any drug or combination of drugs. If with this a warm bath or a hot foot-bath is taken, little more will be needed. Nine cases in ten of colds can be broken up in this early stage by a hot-foot or rather leg-bath, keeping the bath as hot as it can be borne until perspiration arises. After the bath, drink a half-pint of hot lemonade and go to bed.—*Woman's Work.*

DRAUGHTS IN TRAINS.—Draughts encountered in railway traveling are the active causes of many intolerable attacks of neuralgia. Occasionally they have more permanent consequences. To avoid this peril, most persons try to secure places with their backs to the engine. This answers well enough as regards the seat next the window, but owing to the angle at which the air enters the rapidly advancing carriage when a window is open, the occupant of the seat, with his back to the engine, receives a reflected current of air, not so strong, but fully as likely to produce what is popularly called a "chill" as that to which the brave traveler who "likes air," and persists in riding forward, with the window down, exposes himself. The prudent man, who has ensconced himself in the second seat, and rides backward, probably finds a tingling in the ear nearest the window, and possibly suffers a mysterious attack of toothache or tic douloureux some days afterward. Any one interested in the subject may work out the conditions of this phenomenon with the aid of a pencil and the familiar law that angles of reflection are equal to angles of incidence. This simple circumstance seems to have been unaccountably overlooked.—*Lancet.*

Brick Residences Should be Painted.

Statistics show that people live longer in brick houses than in stone, and that wooden houses are the healthiest. This suggests the idea of using paint on masonry. An authority states that a hundred years ago it was fashionable to paint brick buildings white, and many charming old structures remain to attest the value of the coat of paint in preserving the masonry, and its pleasant, homelike effect is a foil to the vines and shrubs with which even city houses are now commonly adorned. If it should prove, as might be easily ascertained, that the painted brick houses preserve their inhabitants more effectually from sickness and premature death than the unpainted ones, it would be worth while to revive the ancient fashion, and, with our greater resources in the way of materials and ideas, exterior coloring might become as important an accessory to the architecture of the twentieth century as it was to that of the twelfth or thirteenth.

Painters who when bidding for jobs are expected to be responsible for the safety of the glasswork, do not like the plan. Years ago the custom of holding painters responsible for glasswork was much more general than it is at present. The presumption is that painters are unnecessarily careless, but this has but little foundation to stand upon. Following are a few lines concerning the painting that ought to be kept in mind: The best time to paint the out side of a house is early in the winter or in spring, when the air is dry and no dust is flying. Knots in boards may be killed before painting by several methods. The surest and best in fine work is to cover the knot with an oil size and lay silver leaf over it. Glue size mixed with red lead, or gutta-percha dissolved with ether, will satisfactorily cover knots not exposed to sunshine. The heat of the sun draws the pitch in the knot to the surface, through the paint. If woods to be painted are soiled by smoke or grease, those parts are to be washed with a solution of saltpeter in water, or with very thin lime whitewash. If soapsuds be used to wash off smoke or grease, the wood should be thoroughly rinsed with clean water, or the paint will not harden. The first, second and third coats of paint on the outside of buildings should be prepared by mixing the white lead with boiled linseed oil, and allowing each coat to dry hard before applying the next.

USEFUL INFORMATION.

Must the Piano Go?

It does seem as if the piano had reached about the end of its tether. Its compass, says a German journal, has been extended to the utmost acoustical limits, and it has been improved until there appears to be no more room for improvement. The virtuosi of the present day have attained, practically, perfection in execution, and the compositions of Chopin, Schumann, Liezt, Tausig and Rubinstein are as difficult as any music can be which is capable of being performed on the piano by a single pair of hands. Then what next? Nature abhors a vacuum and art abhors a halt. There is no use in doing over again what has been done already well enough. We must be original. We must advance. We must invent new lines or new ideas in composition, or else not compose at all. We must play better, or at least try to play better, than Rubi stein or Von Bulow or Joseffy, or else confess ourselves mere scioliats and imitators. This is the spirit of the true artist—of true art. But it is hard to see how there can be any further progress in piano music or piano playing. In this crisis, however, it is allowable to hope to see before long some new instrument no larger, no costlier, no harder to master, than the piano, which shall combine the string principle and the wind principle, and unite the best qualities of the piano and the organ—in other words, a miniature or microcosmic orchestra. Such an instrument would be unhampered by the great deficiency of the piano, which is an inability to sustain tones, or, rather, to sustain some tones while not sustaining others; and when such an instrument is invented there certainly will arise a new group of performers, altogether distinct from the present piano virtuosi, and musical composition will take a fresh start on a line of absolute novelty and originality.

THE AMERICAN WHALING BUSINESS.—The annual review of the American whale fishery shows that there are now 106 whaling vessels owned in this country, of which 20 are laid up at home. Prices for the products, except whalebone, have been low, and the right whaling in the Arctic ocean, where most whalebone is taken, is becoming more and more popular, so that now about half the total tonnage of whaling vessels is employed in that branch of the service. In the Arctic last summer there were 47 whalers, a slight increase from the year before, but their average catch was only about half that of 1887. Of the American whalers now in service, 63 are owned in New Bedford, 23 in San Francisco, 8 in Provincetown, 4 in Edgartown, 3 in Boston, 3 in New London and 2 in Stonington.

FASTING HORSES.—Doubtless it is the experiments of those fasting gentlemen, Dr. Tanner and M. Succi, that have led to experiments of short commons on horses. Trials have been quietly going on in some French fortresses, to ascertain how long artillery horses could hold out, when deprived of solid and liquid food; and of these two life sustaining necessaries, which was the more essential. It has been found that a horse can sustain life five times longer when not deprived of water than if deprived of all solid rations. A horse will not exist longer than five days if kept without water, though it may be abundantly supplied with solid food. Nor will a horse hold out if insufficiently furnished with water. It perishes because the stomach has been exhausted. In Algeria, where cavalry horses have to remain frequently two and three days during a campaign without water, they will, on arriving at the wells, ingurgitate 80 quarts in three minutes. Hence water, in the case of a siege, is more important than solid rations. With respect to the fasting men, the effects of starvation were less visible with those who imbibed water than with those who abstained. But death by inanition would arrive in due course, when corporeal energy succumbed. The explanation is facile; the liquid losses in the system take place in several manners; the diminution of the liquid part of the blood, in the case of inanition, renders the blood thick and viscous, thus blocking circulation, and so arresting the processes of nutrition. Though a horse cannot go beyond 25 days subsisting solely on water, or beyond five when kept exclusively on dry food, yet these periods may fluctuate following the animal's age, condition and movements.

HOLLOW POROUS EARTHENWARE used in the Chicago Auditorium ceiling was thoroughly although accidentally tested recently. A coping stone, weighing nearly two tons, fell from the outer wall of the Auditorium building, cut its way as with a chisel through the tiling of the first intervening floor, and stopped on the next, where it was allowed to remain on exhibition for several days to show the strength of the material. When the hole was patched up, the floor was as good and strong as new, not having been disturbed in any other part.

NATURAL GAS.—One of the disadvantages of natural gas, remarks a contemporary, is the fact that for various reasons it often gives out during the night, and, however short its temporary absence may be, all the fires go out. To prevent the gas from filling the house on its return, "safety valves" were invented, which at once close the pipes. Now a young man of Pittsburg has invented an electric apparatus for waking up one to light the fires at the proper time, and whether or not it will become popular, it is certainly ingenious.

WEIGHT OF DIFFERENT COALS. — Walter Johnson, in his report, printed in 1844, on American coals, after investigations under the direction of the United States Government, found that the average weight of anthracite in lumps was 53 05 pounds per cubic foot. He found for Beaver Meadow coals, 54 9, 56 3, and 55.1 pounds; for Schuylkill coal, Forest Improvement Company, 53.6 and 53 8; for Lehigh Company's coal, 55 3; for Lackawanna coals, 48.9; and for Lykens coal, 48.6 pounds.

LONG-DISTANCE TRANSPORTATION.—A party of Denver men are engaged in a project that contemplates the transportation of natural gas from the wells in Pennsylvania to Denver by rail. The cars are made of steel boiler plate, and much in the form of oil-tank cars, and are expected to contain from 10,000 to 15,000 pounds of gas when compressed. It is to be used as fuel to operate the engines of a cable line of street cars.

A STOVE PIPE RIVETING MACHINE.—A recent invention is a machine for riveting stovepipe. In the old way each of the six or nine rivets in a piece of pipe was drawn and driven separately. By the use of this riveting machine all the rivets are drawn by one drop of the hammer and all of them are set by one drop of the hammer. One man with this machine can turn out from 600 to 1000 joints of pipe per day.

TO LAY OFF A RIGHT ANGLE.—If you wish to lay off a right angle of some size, make a skeleton triangle of three strips of wood, having a length respectively of three, four and five feet, securing the corners firmly. The five-foot strip will form the hypothenuse of the triangle and the other two strips will form the two sides of the right angle. It is handy for excavations, embankments, and masonry.

AN OUT-OF-WORK FUND.—Several New York unions have established "out-of-work" funds, and some unions in other cities are following their example.

ENGINEERING NOTES.

NEW FEATS OF ENGINEERING SKILL IN RUSSIA.—Many of the great works executed in our days in Russia, and many others which only a future generation will carry out, were conceived in the days of Peter the Great. One of the most interesting of these is the grandiose scheme for connecting the Baltic with the White sea by means of a canal. This project would seem now, in parliamentary parlance, to have come within the "sphere of practical politics." The motives of the Government are manifold; not only strategical, but economical—for they are sincerely desirous of doing something for an immense rich territory suffering from the absence of roads and water-ways. Not only have experienced engineers been sent out to survey the country and report on the difficulties and the cost of construction, but they have already finished their work and handed in their report. They assert that the difficulties are practically *nil*, and the project quite feasible, and they estimate the cost of the canal, which will be 210 Russian versts long, at 10,000,000 roubles. The matter was discussed by experts under the presidency of Gen. Ignatief, and only one voice was raised in opposition, and that not on technical grounds. The dissentient was actuated by a strong desire to see the ten millions expended in works which he considered more urgent in his part of the North country. Miliutin and Gen. Ignatief expressed themselves very strongly in favor of the project, which will probably soon be realized.

THE CANTILEVER BRIDGE is an American invention, although it has been developed by Messrs. Fowler and Baker, British engineers, in their huge bridge now building across the Forth, in Scotland, of size which dwarfs everything hitherto done in this country, not excepting the Brooklyn bridge. The system is devised to dispense with staging or false works, when from the great depth or the swift current of the river this would be difficult, or, as in the case of the Niagara river, impossible to make. The first design of record was that of a bridge planned by Thomas Pope, a New York ship-carpenter, who published a book in 1810, giving his designs for an arched bridge of timber, with a span of 2400 feet, across the North river at Castle Point. The first railway cantilever bridge in the world was built (commenced in 1854) over the deep gorge of the Kentucky river, being 300 feet high with a center span of 330 feet.

NEW DEVICE FOR UTILIZING WATER-POWER. A Russian engineer, M. Tayn, has invented a new means of utilizing a current of water. The apparatus consists of an endless cable, carrying a series of canvas cones which open and shut like an umbrella. The endless cable passes over a double drum on board a pontoon, and at the other end over a pulley suspended from a buoy. The current opening the cones on the rope moves the cable at a certain speed, and this drives a shaft or drum. On the upper part of the rope the cones are naturally closed by the current to which they present their points. This plan, it is suggested, would serve to raise a certain quantity of water for the purpose of irrigation.

THE MOST ECONOMICAL MEANS OF TRANSPORT.—M. Demoulin has calculated that a cargo boat driven by a triple-expansion engine is by far the most economical of all means of transport. It carries 2500 tons of coals and goods, consumes 10½ tons of coal in 24 hours and easily makes 8½ knots an hour. Thus, 11 grammes, or not one-half ounce of coal, is sufficient to develop the power necessary to carry a ton at the rate of 4½ meters or 14 feet per second. Another calculator has calculated that a half sheet of note paper will give when burnt enough heat to carry a ton a mile in an Atlantic ship.

TONNAGE OF STEAMERS.—The tonnage of some of the largest steamers traveling the Atlantic is as follows: City of New York, about 9000 tons, of the Inman line; City of Rome, 8415; Furnessia, 5495; Belgravia, 5000, of the Anchor line; Alaska, 5500; Arizona, 5300; and Montana, 4320, of the Guion line; Aurania, 4030; Servia, 3971; Pavonia and Cephalonia, 3490; Umbria, 3401, of the Cunard line; the Amerique of 3034, and the France of 3033.

A CURIOUS CASE of the settlement of the piers of a bridge is reported from Knin, in Austria, where the abutments of the Oraznica bridge have sunk a depth of 20 feet in the river-bed since 1886. As the settlement progressed, the masonry of the bridge was built up correspondingly so as to maintain the same road level. The settlement has now entirely ceased and no further trouble is apprehended.

THE CAPE COD CANAL.—They are still pegging away at the Cape Cod ship canal, which was begun nine years ago. The contract requires the work to be finished by June 20, 1891, but as there are seven miles yet to be dug, and as during 1888 there was only about seven-eighths of a mile opened, the prospects are not good for the fulfillment of the contract.

A RUSSIAN CANAL CONCESSION.—The Government has granted a concession for 81 years to a company to join the Black sea and the Sea of Azov.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Amador *Ledger*, Feb. 23: Drifting at the North Star continues, but there are no new developments to chronicle. If no change occurs soon, it is probable that sinking will be resumed, and the shaft deepened to the extent of 200 or 300 feet, before any further drifting will be done. If nothing is discovered at that depth, the company will most likely throw up the property.

POCKET.—Another rich pocket was struck in the Reed & Askey mine, near Clinton, last week. This property is proving a genuine bonanza to its fortunate owners. The general character of the rock pays well, yielding $6 or $7 a ton, while these pockets, which are so frequently met, bring up the average to probably the highest figures reached by any mine in the county. The mill is kept running steadily. We hear that the owners have been offered $30,000 for the property, which was refused. They say they have more than that in sight. Connection was made last Saturday at the Alpi mine between the shaft, 50 feet deep, and the tunnel which has been driven in from the gulch a distance of between 70 and 80 feet. The character of the rock looks very encouraging. Samples which have been left at this office ought to yield, according to the opinion of expert miners, between $10 and $20 per ton. But very little work will be done at the mine from this time on until a mill is erected. The Volcano Gold Gravel Co. at Volcano have only sufficient water to enable them to run an hour or two each week. They are said to be in excellent pay gravel.

ALICE.—*Dispatch*, Feb. 23: Work at this mine is being pushed right along. A recent cleanup gave a profit of about $2.50 per ton, after deducting working expenses. This valuable property is owned by Messrs. Petre, Tripp and Littlefield, and is located a short distance above Big Bar bridge, on the Mokelumne river. Their new mill works like a charm. Mr. Nooner is still at work sluicing off the surface ground with the expectation of unearthing a rich quartz vein. He has been working this claim, which is about a mile and a half southeast of Butte mountain, for two or three years and during that time has cleaned up $6000. The gold is all found in decomposed quartz, thus giving the impression that it must be detached from a body of rich quartz. The Mello brothers are working their gravel claim back of Butte mountain.

Fresno.

FINE GOLD DISTRICT.—Cor. Fresno *Expositor*, Feb. 23: The Zebra, located in Fine Gold district, was recently purchased by Messrs. Farrington & Rogers of San Jose. There is an immense body of ore in this mine. Three tunnels have been run on the ledge 300 or 400 feet in length each, and about 80 feet apart. There has been little or no stoping done as yet. The tunnels have been connected by chutes, and everything is in readiness for the extraction of unlimited quantities of rich ore. An incline shaft is being sunk in the face of the lower tunnel to supply water to run the mill, which will be built at the mine if a sufficient quantity of water can be found. The Wilson mine is still working and looking well. Negotiations for the purchase of this property were going on some time ago, but for some reason the sale was not consummated.

HILDRETH.—Fresno *Expositor*, Feb. 23: T. W. Robinson of Hildreth reports the Abbey mine looking up. Eight or ten extra men were put on it Friday. There are a great many prospectors in the hills. On this side of the San Joaquin river, at Temperance Flat, sufficient men to work the mines cannot be procured. At the Jackson mine this drawback greatly interferes with the developing of the mine. Many rich claims have been struck at Temperance Flat. Near Auberry, W. L. L. Witt & Co. have been developing a promising claim, and at the depth of 30 feet have been rewarded by striking a three-foot vein of rich gold-bearing quartz. This late find has greatly encouraged the miners and prospectors of that section, and the hills are eagerly traversed by prospectors.

A BIG STRIKE.—During the past few months many rich developments have been made in the Hildreth and Toll House mining districts, Fresno county. This afternoon a courier from the Hildreth district brought news that a rich strike had been made in the Crown Point and Belcher mines, near Hildreth. This mine is owned by Baldenabro & Ball. The strike exceeds all expectations of the owners of the mine. The ore works $80 per ton over and above the cost of getting out and working it. The ledge in sight is six feet wide and 300 feet long. A five-stamp mill is running night and day crushing the rock.

Mariposa.

SHERLOCKS. — Mariposa *Gazette*, Feb. 23: Reports from Sherlocks show that two feet of snow was the depth of the fall on the hills out there. With that much snow, the miners of that locality ought to be able to save a little water for washing up. Mr Lorenzo Alvord finished his contract at the Alabama mine on Whitsocks on the 10th inst., after sinking the shaft to the depth of 62½ feet. He has done his work in first-class order, and the mine is now in good condition to show experts.

Monterey.

LOS BURROS.—Monterey *Democrat*, Feb. 23: Jas. Goodrich is in town from the Los Burros gold mines. Mr. Goodrich is an old miner and has faith in the Burros. He has a claim himself and it pays him all the time. He has a tunnel in 120 feet and an incline 30 or 40 feet and his claim grows richer as he develops it. Close to him John Bushnell has a claim from which he is taking out good-looking quartz and free gold all the way along. Close to Mr. Goodrich are also at work on good claims three Danes, Messrs. Malm, Soberg & Olsen, and that old veteran of the mountains, "Rocky," and Joe Logwood are also at work upon a claim near by that looks well and is no doubt rich in the precious metal. Mr. Goodrich says that preceding the storm of last Thursday, it was very cold in the Burros, and that when he left, the ground was covered on the north side of the mountain two feet deep with snow.

Napa.

IN CALISTOGA DISTRICT.—*Calistogian*, Feb. 23: Work continues as usual in the Palisade mine, and the reduction-works are running regularly. There is plenty of ore, and will be for several years to come. Very little prospecting is being done in the district, however, despite the fact that the Palisade property is satisfactory every way and very valuable. Many believed that when the reduction-works were running and producing bullion the fact would stimulate men to action and the result would be a greater amount of prospecting and finding of more veins. But such has not been true, and the fact is somewhat disappointing. If the opening of a good mine and production of a satisfactory amount of bullion will not create interest in mining business here, we do not know what will. Perhaps if one or two more mines and mills were in operation, men of means would pay more attention to the district. That other mines will be opened here we do not doubt, but a great deal of time seems necessary for the work.

Nevada.

IMPROVEMENTS AT THE MINES.—*Tidings*, Feb. 21: Work on the new hoisting plant for the North Star mine was instituted to-day by the Risdon Iron Works, through Mr. Cutter, a sub-contractor. We have heretofore made mention of the improvement as projected. When it is completed the North Star will be thoroughly equipped for sinking the shaft to a depth of 3500 feet, double the depth attained to date. And yet this mine was abandoned years ago as worked out. The new mill at the Pittsburg mine was started up for the first time yesterday and run for a few hours. Everything worked satisfactorily, but of course there are a few minor matters to be attended to, and in consequence the mill will not start up regularly until to-morrow, or perhaps Saturday. This mill is of 10 stamps and the accessory machinery comprises the latest approved gold-saving apparatus. The building has been so constructed and the machinery so arranged as to enable automatism to a large extent, thus conserving economical reduction of the ore. Supt. Elliott believes it to be the finest and most complete structure of its kind on the Pacific Coast, or in the world. Several hundred tons of ore are on the dump in readiness for reduction, and such is its quality that the superintendent confidently believes that the first month's run of the mill will yield sufficient to pay for that improvement. In a week or two the 1100-foot levels will be started, over 100 feet in depth having been attained in the shaft since the mine passed into the hands of the present manipulators. The ledge in the shaft varies in size from a foot to seven feet, and the character of the ore is such as to convince the management that the Pittsburg is a first-class piece of property. This mine, too, has had many reverses, has been shut down several times, etc., and its ore has been libeled as not worth a dollar a ton on an average. Verily, it is true that after 35 years of quartz mining in this county, our miners are just beginning to realize that the industry is yet in its infancy—that not half of the secrets of the earth in this relation has been ascertained.

THE DELHI.—*Herald*, Feb. 21: Good news continues to come from the Delhi mine. A new shoot of very rich ore has been discovered south of the one heretofore worked. An intermediate tunnel between No. 1 and No. 5 was run south and tapped this new formation. After leaving the old shoot the ledge narrowed down to a mere seam for a distance of 80 feet, where it came to a width of 4 feet. On this ledge the tunnel has been extended 200 feet, and how much longer the shoot is of course is not known. It is a fine body of ore all the distance opened. Some of it is very rich in free gold, beautifully imbedded in the quartz and surrounded by sulphurets and galena. The rock is of an entirely different character from that hitherto worked. At this point there are 400 feet of backs. Tunnel No. 3 has been extended 1100 feet, 500 feet of which was through country rock. There is a fine body of ore in the face of this tunnel. In the upraise there is a 3-foot ledge, which assays $87.50 in free gold, besides rich sulphurets. A river tunnel will give 400 feet backs under tunnel No. 3. The trend of the Delhi is north and south and it pitches nearly vertical. The country rock of the hanging-wall runs parallel with the ledge, but the footwall runs up against the ledge obliquely and carries feeders of quartz in the seams. The walls are from 8 to 9 feet apart, the hanging being very hard. The quartz also is hard to break. The mill is run by water-power. The rock is raised in cars from the mouths of the different tunnels to the rock-breaker, from which it falls into an ore bin and from thence to the batteries. There are eight concentrators in use, four Frues and four Triumphs. The bullion output of the Delhi has been large, but bids fair to keep up its record for many years. It is under the able supervision of Chris Mallon.

Placer.

QUARTZ AND GRAVEL NOTES.—Placer *Herald*, Feb. 23: The White boys have taken out several thousand dollars from their ledge on Duncan Hill. Henry Purdy is running a tunnel for copper at Whisky Diggings with good prospects of striking it rich. Ned Gilbert reports scarcity of water at Oregon Bar. The miners can work a few hours only each week. The Hidden Treasure mine still rolls out its wealth of gold. The dividend to each shareholder was $115 for January. George Geissendorfer informs the *Herald* that he is running a tunnel on the Live Oak quartz mine, near New England mills. Thomas Sheridan has run a powder drift in the Pride of the Divide mine, and is hoping water will come soon to help him make a cleanup. "Thirty days" should have been "13 days" in the notice given the cleanup at the Mayflower mine in our last week's issue. The mine has yielded over $70,000 since the mill started on the 11th of December last.

Shasta.

DISCOVERIES.—Shasta *Courier*, Feb. 23: Two rich gold-bearing quartz ledges have recently been discovered near town, and are being worked with favorable prospects. One by Joseph Bucher near the residence of D. Lynch on Nob Hill, and less than a mile from this office; the other by the Schroter brothers just north of town.

FROM LOWER SPRINGS.—Our miners here are a little slack in proving up their mining property. Some who pretend to have the best ore are very careful to let it remain as nature placed it. As for myself, I am very much delighted over good prospects, no matter who has them. We find that the miners are not the only ones that take part in our mining industry. It is Illinois capital that is with us in our struggle, and have placed an expensive plant at the Four Mile House, with the intent of working all ores, no matter how rebellious they may be. It is well known that Capt. Atkins has spent the best part of the last two years in assaying and examining the ores in this district. With his careful assaying and ability, have come to the conclusion that the works will, when started, be a complete success, and we should congratulate the captain on his untiring effort in accomplishing his desire, and now is the time for miners to bring forth their hidden wealth. The cry "no mills" has been for a long time. Now pitch in, miners, and show up, for there is a boom coming.

Sierra.

PORT WINE.—*Mountain Messenger*, Feb. 23: Riffle Co. is taking out good gravel and has a crowd at work. They will get their claim opened up in good shape by spring. The Union Con. M. Co. are also taking out big pay gravel, from $4 25 to $4.62 to the carload, and putting on all the help they can work. James Jones and T. Edwards are still drifting under town in their old diggings.

WIDE AWAKE.—J. O. Jones of Forest City has been appointed superintendent of the Wide Awake drift mine, Alabama Hill, and took charge of the property last week.

OXFORD.—The Oxford quartz company is now working three shifts, two running north and one south.

TUNNEL.—Tom Bessler is again at work running his tunnel for quartz in the ravine above the Catholic church.

QUARTZ.—Jack Hughes is working the regular force of men on the Montpelier quartz claim.

THE NORTHERN BELLE. — *Tribune*, Feb. 22: This mine is situated about one-half of a mile back of the Marguerite mine at Loganville, and is owned by Swan & Co. The owners are confident that it will prove to be a most profitable mine. Two tunnels have been run at the mine. Tunnel No. 2 is in a distance of about 60 feet. A ledge of five feet, showing much free gold, can be found there. No. 1 tunnel is in but a short distance and shows up a well-defined ledge of about three feet. At present the company is engaged in erecting four stamps of the old Keystone mill on the Northern Belle, and it will not be very long before they will know just what kind of a mine they have. The mill will be run by water-power.

THE CAL. CON. M. CO.—Pushing work ahead at a rapid rate. The owners have great expectations as to the outcome of the mine. The ledge that they have is a good one and prospects well.

Trinity.

NEW RIVER.—*Western Watchman*, Feb. 23: Mr. G. C. Sarvis got in from Battle creek in the New River section last Saturday. He says everybody is at work; it is a very busy camp and has bright prospects before it. During his stay he has been at work opening up two claims which he owns, the Occident and Goodenough. On the former he exposed a good body of about $20 ore, while on the latter he struck free gold and sulphurets. Gus Gutzen, who owns an extension claim on the same ledge, called the Golden Gate, has developed a 16-inch vein bearing $30 rock. The Ridgeway, 600 feet distant on line with same ledge, is in the hands of an English company, and they are working 15 men getting out necessary timber and tunneling. They are running a tunnel which is to be 700 feet long and will tap the ledge at a depth of 400 feet. It is the plan of the company to spend $25,000 in the development of the mine. J. S. Thomson is operating the Excelsior mine with a quartz-mill and doing well. The Mountain Boomer, owned by Clements & Ladd, is being worked right along with good pay. The mine has been bonded for $60,000. The extension of the Ridgeway, called the Hard Tack, run through 15 tons of rock and cleaned up $185 per ton. The weather has been unusually open. About January 10th there was a heavy fall of snow which went off gradually and is now nearly all gone. Water is scarce; there is not as much power for the quartz-mills as is required, and the placer mines are having a hard time.

A GOOD PROSPECT.—Trinity *Journal*, Feb. 23: Ed Jose tells us that there is a chance for a bonanza in Trinity Center. Last summer a prospector found good quartz on Snow creek, just above the town. He returned several days ago accompanied by Mr. Roberts, a well-known San Francisco mining man. They have contracted for a tunnel to be run in on the find 100 feet. Ed says a specimen shown him was the finest he ever saw. The piece of quartz was about 3 by 2½ inches and was studded thick with gold, and presented a beautiful appearance, as the quartz was white.

Yuba.

BLUE POINT MINE.—Grass Valley *Tidings*, Feb. 21: Patrick Campbell has renewed a lease with Marysville men to work the Blue Point gravel mine, at Smartsville, for two years from the first of the present month. At the present time, with an arastra and a force of 20 men, the mine is yielding at the rate of $4000 per month. Next week it is the intention to put in another arastra, and hoisting works and a rock-crusher are to be added. The working force is to be increased to 40 men, and with these improved facilities it is expected that the monthly yield of the mine will be increased to $10,000.

Tuolumne.

TIOGA.— Union *Democrat*, Feb. 23: Contracts have been let to parties in Groveland to haul a large amount of freight into Tioga the coming summer. This looks favorable for the opening of some of the mines in that district. These mines, which are situated in Tuolumne county near the Mono line, have long been known to be very rich, having plenty of water and other facilities for working them, the only drawback being the severity of the climate, which only allows surface mining to be done for about six or seven months in the year. The leads in this district are numerous, the Sheepherder vein being the principal one. This is 30 feet wide in places and is very rich both in silver and gold. Many other leads in the neighborhood are also rich; assays showing the rock in some of them to average $900 a ton. These mines are destined at no distant date to be extensively worked. The Great Sierra Mining Co. has large interests there, and the contracts lately let by them may be the commencement of operations upon their property. Those who are fortunate enough to have locations in the Tioga or Mt. Gibbs district, which is near Tioga, should by all means hold on to them, as they will no doubt soon be valuable property.

BONANZA.—Tuolumne *Independent*, Feb. 23: Another rich strike was made in the Bonanza mine on Saturday last, and on Wednesday of this week this second pocket was cleaned up, yielding about $20,000. This makes about $85,000. It is hoped another pocket may be uncovered very soon, as they will commence sinking on the vein. Most of the gold in this last find was taken out in two big chunks, and before they were broken up, on Tuesday afternoon, crowds of men, women and children flocked to the mine to see them.

NEVADA.

Washoe District.

HALE AND NORCROSS. — Virginia *Enterprise*, Feb. 23: On the 400 level No. 1 west crosscut is now advanced 90 feet. From the joint west drift on the north boundary have started a drift south, following a stratum of good ore. On the 500 level have resumed work in the south drift, which is now advanced 119 feet. The upraise and stopes above this level continue to yield ore of good quality. The 500 and 700 levels are supplying the usual quantity and quality of ore. The north upraise on the 700 level is now advanced 60 feet in low-grade quartz, showing spots of good ore. On the 1300 level the north drift is now advanced 85 feet. This drift shows spots and bunches of good ore. Have hoisted during the week 1054 tons of ore; have shipped to the Mexican mill 1081 tons, and milled 1035 tons. Average battery samples assay $21.78 per ton. Have bullion on hand and previously shipped for the month amounting to $37,041.70.

SAVAGE. — On the 400 level have commenced stoping ore in the north drift from the west crosscut on the south boundary. The ore is of good grade. No. 2 southwest crosscut has been advanced 42 feet. This drift passed through two feet of fair-grade ore. Have turned a drift south, following this ore. From the north and south drifts on this level are extracting ore from the old stopes. On the 500 level have started west crosscut No. 3, our south boundary. This drift is advanced 29 feet. Are extracting ore from the old stopes on this level, also from No. 3 east crosscut on the 600 level. Have hoisted during the week 587 tons of ore, have shipped to the Rock Point mill 428 tons, and milled 478 tons. Average battery assays, $21 per ton. Have bullion on hand and previously shipped for this month amounting to $16,837.

BELCHER.—The 200 north drift is out 490 feet, having advanced 31 feet during the week. Will soon connect with the Crown Point 160 drift, assoundings between the two show them to be close. Have started the winze below the 1100 joint drift and are down 22 feet, leaving about 23 feet to sink and connect with the 1300 raise. Are timbering the 1100 north drift at the point of connection.

CROWN POINT.—Have stopped No. 2 east crosscut at a distance of 97 feet in, and started a west crosscut (No. 1) opposite it, which is now out 16 feet in a mixture of quartz and porphyry. Also started a north drift on the 600 level, at the top of the 700 raise, to find the upward continuation of the ore found in the raise.

JUSTICE.—Have advanced the 400 level north drift 39 feet during the week, making its total length 946 feet. Advanced the 370 level drift 23 feet; total length, 173 feet. Shipped to the mill 200 tons of ore, the battery samples of which averaged $23 a ton. Shipped during the week $2925 worth of bullion.

CON. IMPERIAL.—East crosscut No. 2 on the 1100 (Yellow Jacket) level is now in 83 feet, 12 feet having been made during the week. The face shows quartz and porphyry. Repairs to the main north lateral drift are still going on.

CHALLENGE CON.—The usual work has been done in the mine without any important developments. Ore shipments to the Brunswick mill amounted to 130 tons, averaging, by assay, $26.41 per ton.

OVERMAN.—The upraise from the east drift has been extended about 20 feet; total distance, 51 feet above 226 level. The formation is porphyry and quartz.

SEG. BELCHER.—Have started the winze below the 1100 level drift and are down 22 feet, leaving about 23 feet to sink to connect with the 1300 raise.

CHOLLAR.—The usual work of exploration is progressing, and the usual quantity of ore is extracted and reduced at the Nevada mill.

BALTIMORE.—Hoisting ore from the 338 level, from the ledge in its most western workings, and saving the same for reduction.

ALTA.—The ore reserves from the 800 to the 1100 level are yielding their usual quantity of ore, which is being reduced at the mill.

CONFIDENCE.—The usual quantity of ore is now being sent to the Brunswick mill. The average assay is $26.41 per ton.

YELLOW JACKET.—Have stripped no ore this month, but are prospecting the upper levels of the mine, as usual.

SCORPION.—Progress is only represented in the crosscut on the 300 level.

ANDES.—The work of reopening the 175 level is progressing favorably.

NEW YORK.—Still drifting north on the 800 level in vein material.

BULLION.—The usual work of exploration only is reported.

Bernice District.

THE MINES.—*Silver State*, Feb. 23: News has reached here that W. W. Williams is preparing to resume operations on his mines at Bernice, and will set a number of men at work about March 1st. Something of a boom in the mines of that district and Cottonwood is looked for the coming summer.

Columbus District.

CANDELARIA.—Inyo *Register*, Feb. 23: Candelaria is at present extremely quiet. About 20 men are working at the Mt. Diablo, the ore from which is taken to Soda Springs for working. A small force is at work in the Georgene, and some digging is being done on smaller claims. The Columbus, Metallic, Princess, Holmes, and other mines which have heretofore poured their bullion into the world's coffers, are at present closed. Supt. Wescott, Secretary Judson, and day and night watchmen remain to take

care of the interests of the Candelaria Water & Milling Co. The company's fine mill is lying idle, as is all other machinery in the vicinity except at the Diablo hoisting-works. The impression created by a visit to the camp and a cursory inspection of mines and mills, is that there is an abundance of life yet in the old camp, and it is only lying dormant awaiting something—probably the rise in silver—to be again a good town. The settlement of impending lawsuits will remove the bar to work upon some of the largest mines, while a jump in the silver market to 100, 105 or 110 would put an end to the present stagnation, in that vicinity as well as many others. The boom at Candelaria, for which all wait in patience, would mean better things for Belleville. That once lively center is now a mere shadow of its former self. The two 20-stamp mills are lonely, rusting monuments of the busier past, while dozens of vacant houses make the contrast between present and past only the stronger. Not over 15 or 20 people remain there.

ARIZONA.

MOHAVE MINES.—*Miner*, Feb. 23 There came in from the Lone Star, Mineral Park, about seven tons of ore, on Wednesday. This ore is high grade, and the owners expect a handsome sum from it. The sampling works have not been running steadily this week, owing to a scarcity of ore occasioned by last week's storms. Dan Maloney came down Sunday from the Broncho mine, Wallapai mountain. Dan has a shipment of very rich ore awaiting transportation, which is delayed by the late snow. Supt. Mackenzie is working 18 men on the Prince George. At the combination shaft they have ore both north and south, and have about 400 sacks on the dump, which will be brought in as soon as possible, as the roads are not in the best condition since the storm. The main ore body seems to be in the Prince George North, while heretofore the rich ore has come from the Prince George South. The Tintic gold mine at Chloride has proven even more promising and permanent than the owners anticipated when they resumed work some three weeks ago. From reliable information received from the mine we learn that they are now down 94 feet, and while they thought they had all the ledge at 74 feet, they discovered an additional two feet in sinking, which now gives them six feet of free-milling ore. By way of testing the vein they worked two tons in an arastra last week from which they got a little more than one pound of gold bullion. There is considerable water in the mine.

HEAD CENTER MINE.—Tombstone *Epitaph*, Feb. 23: Quite a stir has existed in mining circles for a day or two past on account of the relocation of the Head Center and Yellow Jacket mines on the hill and lying between the Contention mine on the south and the Tranquillity mine on the north. As there were conflicting rumors in the air as to the condition of the title to this property, we have taken some pains to get at the facts and find them to be about as follows: Application was made by the Head Center Co. for a patent to those mines as far back as 1882 or 1883. A survey was made, notices posted on the claim and publication had, but for some unaccountable reason all proceedings were stopped at this point, and no entry was ever made. The company, apparently, acting on the belief that an entry had been made and the purchase price paid, which, under the decisions of the courts would have been equivalent to a patent, have neglected from year to year to perform any assessment work. The fact that no entry had been made becoming known to Mr. Perasich, he relocated the claim, with a fair prospect of holding it, and is now posing as a prospective bonanza king.

BRITISH COLUMBIA.

GOOD ORE.—Donald *Truth*, Feb. 23: The Warm Springs district on Kootenay lake is a coming mining camp. Of its quartz mines, G. B. Wright's Number One is the richest yet developed. Its ore will average over $300 to the ton. The Great Falls Smelting Co. has made an offer to buy 50,000 tons of the ore at a price up in the hundreds. At present there are 17 men at work in the tunnel, which will have to run in about 300 feet. They are working 8-hour shifts, and are now in 140 feet. Two shifts are taking out ore in the incline when not engaged in surface preliminary work; but when the tunnel strikes the ledge Mr. Wright expects to make things hum. The mine is located 3½ miles from the warm springs on the lake's shore, and the snow is about four feet deep at it. A. D. Wheeler has six men at work on the Lei-Her-Go-Gallagher claim, and two on the Krao. Both claims are rich and opening up well. The Little Donald is another first-class claim, on which seven men are at work taking out ore. Across the lake Dr. Hendryx has several claims, one of which, the Blue Belle, is developed into a mine. After running a tunnel, six men are now at work crosscutting the ledge to find its width. They are in 63 feet, "and God only knows how much wider it is." The ore is low grade, but as the mine is right at the water's edge, it is bound to be a great property.

MONTANA.

WEST OF ANACONDA.—*Review*, Feb. 21: In regard to the prospects west of Anaconda, and especially in Oleson gulch, a correspondent sends the following: The Blue-Eyed Nellie, situated on the divide between Oleson gulch and Foster creek, and adjoining the Antelope, the shaft is down now about 75 feet and they have a pay streak of carbonates 15 inches in width which runs high in silver and lead. The owners of the Antelope are now shipping ore of a very high grade. They have a nice lot of ore in sight at the 100-foot level. Adjoining the Antelope is the Monitor lode, owned by Layelle, Strong & Co. This mine is worked by a tunnel which is in 145 feet. They have cut two stringers of ore in the last 15 feet which is a good grade of carbonates, and the owners feel confident that when the main lead is reached they will have a good paying property. They expect to strike the main lead within the next 25 feet. The Fairfield is the next adjoining claim, owned by Fairfield and others of Butte. They are down something over 100 feet, which has been mostly iron and talc. It is their intention, we understand, to sink another hundred feet before running any levels. The Morgan Evans is the next claim. It is owned by Thomas & Co. of Butte. They have a nice lot of ore on the dump, and I understand they commence shipping next week. The Little Pittsburg, owned by Jos. Corbin & Co. of Anaconda, is the next adjoining claim. They have a shaft down 75 feet, in iron carbonates, but have stopped work until spring, when they will put up a whim and resume work. We have just learned that Mrs. Rae & Miller have stocked the Antelope mine for $150,000 and will largely increase the output of that mine. The Cable mill has resumed operations, and will, we learn, make a long run.

NOTES.—Montana *Mining Review*, Feb. 23: Several of the mines in the neighborhood of Radersburg are shipping ore to Townsend, preparatory for treatment at the smelters. The output of the Granite mountain for the week ending February 13th was 39 bars of bullion, containing 64 274.24 ounces silver and 54.76 ounces gold. The coal company at Sand Coulee are erecting 15 new tenement-houses for the use of the increased force of miners they intend soon employing. Work will be resumed in a short time by the Indian Creek Mining Co. on their property, located at the head of St. Louis gulch. Eighty tons of ore were shipped to the Great Falls smelter last Monday from the Lexington and Bunker Hill mines, Rimini, and 80 tons more were shipped to-day. The third stack of the Great Falls smelter is being heated and will be in full operation by the first of next week. About 150 tons of ore per day is being received at the smelter. The Iron Mountain Mining Co. has uncovered a very wide body of ore, samples of which, as assayed by C. E. Kemp of this city, run from 75 ounces silver to 784 ounces per ton. A correspondent writing from Wickes, says: "Mining is looking well around this camp. It seems to be the uppermost question with a great many around here, because of the number of mining experts who visit us daily." Mining operations in the St. Louis district are lively for this season of the year, and the most satisfactory reports come from there. A new find is reported in the Buckeye, and ore is being shipped from the Gold Dust mine to the Great Falls smelter with very gratifying results.

IDAHO.

ORO FINO. — Idaho *Avalanche*, Feb. 23: The Leonard mill has been running steadily on ore from the Oro Fino mine for some time, and, as we write, is pounding away on good milling ore extracted from the levels of the Oro Fino mine, where, as we are credibly informed, there is an abundance of the same kind in sight. We hear that a cleanup will be made in a short time, when there is no doubt but that the fondest hopes of the owners will be realized.

SOUTH MOUNTAIN.—Mr. H. French thinks that before a great while South Mountain will again be booming, by reason of the numerous large lodes of galena in that district that will pay when the ore can be hauled to a near railroad.

JANUARY ORE SHIPMENTS.—Wood River *Times*, Feb. 23: The shipments of ore from Hailey during the month of January last amounted to 202,900 pounds, against only 43,500 pounds during the corresponding month of 1888—an increase of 159 400 pounds. This is a very gratifying showing.

NEW MEXICO.

DEVELOPMENT WORK.—Silver City *Enterprise*, Feb. 23: Two shifts are employed in the Four Hawks, Cooney district. The ore will be worked in the Sheridan mill. The Flagler smelting works have closed down, owing to the impassable condition of the roads. Martin Cox, manager of the Deep Down at Pinos Altos, reports that the mill runs about 10 hours per day. A tin assay was made this week by Hand & Beall on ore from Valencia county which averaged 10 per cent. Tin is a new metal in this section. A tramway will soon connect the upper ore body of the Sheridan mine with the Sheridan mill. As soon as a sufficient amount of ore can be taken out a run will be made, and if satisfactory, the mill will be supplied with ore from that part of the mine. A ten-inch streak of $1600 ore was recently encountered in the Maud S. at Cooney, owned by Capt. Cooney. The strike is in addition to the regular high-grade ore which has been coming from the mine. Work on the Snow Drift, Cow Springs district, recently purchased by Mr. Hussey, was commenced on Tuesday. The work is in charge of Paul Mitchell, a well-known miner of this section. Mr. Hussey is in receipt of plans and specifications for a new mill which he will soon erect. The erection of this mill will be a great benefit to that camp, as there is any quantity of low-grade ore there, as well as no small quantity of very high-grade.

UTAH.

SILVER REEF.—Salt Lake *Tribune*, Feb. 23: R. F. Gillespie, for the past five years superintendent of the Christy Mining Co., Silver Reef, has resigned and is now in the city on his way to Tacoma. Mr. D. M. Tyrrell, formerly superintendent of the Meadow Valley Co., Pioche, has assumed the superintendency of the Christy Co. The mill is running steadily and is crushing about 40 tons of ore per day, making the monthly product from $20,000 to $25,000 in silver. The company employs about the mill and mines some 90 men. The Stormont property is under lease to Robert Lund and T. P. Gillespie. The mill was started on the 10th for a few weeks' run on ore taken out by chloriders. It crushes about 20 tons per day, and will run as long as the supply holds out. In all, about 140 men are employed in mining in this silver sandstone district.

REVIEW.—Salt Lake *Tribune*, Feb. 21: The week has been a quiet one in mining circles, the storms hindering operations somewhat, though their effect will be good in the movement of ores as soon as the roads are fairly broken in the snow. The receipts in this city for the week were to the value of $134,793 in the aggregate, of which $81,467 was in ore, and $53,326 in bullion. For the previous week the receipts were $45,878.61 in bullion and $40,287.65 in ore, a total of $86,166.26. The Ontario product for the week was of bullion, 21,401.34 fine ounces; no ore sales on account of the bad roads making hauling impracticable. The Daly output for the week showed no transactions, the bad state of the roads preventing the hauling of ore. Fine bar receipts in this city for the week were to the value of $20,401; base bullion, $15,000; copper matte, $1200. Ore receipts in this city for the week were to the value of $17,261 by Wells, Fargo & Co. and $64,200 by McCornick & Co.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents in DEWEY & CO.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING FEB. 19, 1889.

397,976 —ROAD ENGINE—R. R. Doan, Sacramento, Cal.

398,247.—PLANE—H. Fry, Eugene City, Oregon.

397,920 —SHIRT WRISTBAND—W. E. Howell, Los Angeles, Cal.

397,986.—DRESS FORM—W. A. Johnson, S. F.

397,922.—HIP REIN SUPPORT—A. Kempkey, S. F.

398,054.—WINDMILL—F. B. Kendall, Olympia, W. T.

398,055.—PAVEMENT—J. E. Knoche, San Jose, Cal.

397,990.—DENTAL ENGINE—Ira G. Leek, S. F.

398,071.—POTATO PLANTER — J. E. Ohlson, Rockford, W. T.

398,081.—POOL REGISTER—Edward R. Robbins, Sacramento, Cal.

398 302.—SAW—W. T. Wilson, Marshfield, Ogn.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DENTAL ENGINE.—Ira G. Leek, S. F. No. 397,990. Dated Feb. 19, 1889. This invention relates to the class of dental engines, and especially to the cranes or brackets by which the flexible power-conveyer and hand-piece are suspended from the wall, and may have imparted to them such variety of movement as will adapt the tire or bit carried on the hand-piece to work in any required position with facility. The object of the improvement is to provide for the proper variety of movement for the hand-piece which will admit of the use of the engine in all possible positions. By the interposition of power-transmitting rods in the tubular arm the inventor does away with all the cumbersome external belting which is used in connection with many dental-engine brackets for transmitting the power to the hand-piece chuck. In this machine the belting is only at the rear end and but a single pulley is used, in which respect the machine enjoys all the advantages of simplicity which are to be found in the common engines.

POOL REGISTER.—Edward R. Robbins, Sacramento, Cal. No. 398,081. Dated Feb. 19, 1889. This invention is a device for indicating or registering the points made in the game known as "fifteen-ball pool," and in connection therewith of an advertising device. It consists, first, of a case having horizontal channels with balls fixed permanently therein to one-half of their length, slides traveling in guides, so as to conceal or expose the balls, and an inclosed or uncovered chamber into which the slides run when the balls are exposed; secondly, of a registering device for ball pool, consisting of a case having channels, within half of which balls are fixed, slides traveling in guides over said channels, and having numbered disks fixed to them; and thirdly, of a case having a vertical central partition, horizontal channels extending across the case, and containing balls upon one side of the partition, in combination with covers sliding in grooves, and through the central partition, and having numbered disks or knobs upon them.

ROAD ENGINE.—R. R. Doan, Sacramento, assignor one-half to John H. Roberts. No. 397,976. Dated Feb. 19, 1889. This invention relates to improvements in that class of machines known as "road engines," and consists of a pair of engines mounted upon a frame and connected with a crank-shaft which is journaled upon said frame, a single bearing wheel so connected with the rigid crank-shaft as to be driven therefrom, while at the same time it may be turned from side to side in a horizontal plane for the purpose of steering the machine; and in connection therewith of a second crank-shaft journaled upon the frame parallel with the first one, and having a pair of driving wheels connected with it, the cranks of said shaft being connected with the first shaft by side rods, so as to be moved simultaneously therewith. This machine, which was recently illustrated in the PRESS, is especially adapted for rough mountain roads, where it has been doing good work for the past two seasons.

Legislative.

The Assembly bill providing for the erection and management of a State hospital for insane in Southern California, and appropriating $300,000 therefor, has been passed.

Senate concurrent resolution asking Congress to appropriate $2,000,000 to improve Sacramento and Feather rivers has been passed.

The members of the Manufacturers' Association have passed resolutions protesting against the passage of the Pinder bill by the Legislature. This bill provides that all wares manufactured in this State shall have printed or stamped on them a mark showing whether they were made by white or Chinese labor. The manufacturers at the meeting discussed the matter, and decided that they could not comply with the requirements of such a law if it were passed.

The anti-compact bill has been passed in the Senate by a vote of 37 to 1. This is aimed against the insurance compact.

The bill closing the sash and blind factory at the State prison has been passed.

A bill has been introduced entitled an Act to designate the quality of goods manufactured and prepared in the State of California, and to require manufacturers to stamp upon their products and manufactures the class of labor employed in their preparation.

National Iron Works.

On Sept. 9, 1888, the National Iron Works in this city were entirely destroyed by fire, sweeping away in a few hours the accumulations of years of patient toil and industry. But the proprietors, Messrs. Marshutz & Cantrell, with the indomitable pluck and energy of all old Californians, immediately set to work to rebuild, and now, after five months of incessant work, they see their efforts crowned with success. On the old site, at the northwest corner of Main and Howard streets, they have erected a massive brick building on a solid foundation of concrete. The lower story is 76 feet wide by 110 feet long, by 20 feet high. On this floor are placed all the iron-working tools necessary to carry on a general iron manufacturing business. On the northeast corner of this lower story is situated the large and commodious offices, 25x40 feet, which are plainly but substantially fitted up suitable for the business. Immediately back, and in the rear of the office, is the forging-shop, 45x60 feet, built of a substantial frame and covered with corrugated steel. This shop is fitted up with steam hammer, forges, cranes, etc., complete for all kinds of forgings. Immediately in the rear of the main building is situated the foundry, which is 75 feet wide by 137 feet deep and 30 feet high. This, like the forging-shop, is a heavy frame covered with corrugated steel and fitted up with the necessary cranes, core-oven, cupola, etc., complete for all kinds of iron castings. The second story of the main building is devoted to the drawing department and pattern works. This story is 18 feet high, 76 feet wide, and 110 feet long. On this floor are placed the necessary planers, band and crosscut saws and turning lathes used in the manufacture of patterns. These buildings have been built as nearly fire-proof as brick and iron can make them, and all the tools are of the latest improved design and from the best makers in the United States. Now with increased floor space and better facilities for handling all descriptions of work in their line, they will be pleased to see all their old customers and as many new ones as will favor them with a call.

Sheet Iron and Steel Pipe Works.

As a pioneer in this special branch of iron work on the Pacific Coast, Mr. Francis Smith takes the lead, having started the business in North San Juan, Nevada county, Cal., a little more than 25 years ago. Five years later Mr. Smith removed to San Francisco, where he established works on the site at present occupied, 130 Beale street, covering a ground space of 14,000 square feet. A commodious two-story brick structure shelters the heavy and improved modern machinery, steam-power, etc., which the requirements of a large and steadily growing business necessitate.

Some years since Messrs. Smith & Co. introduced American brands of sheet iron to the coast, taking the place of the inferior foreign article; and it has been pronounced by those using it as better in all respects. Sheet steel is also being used for pipes where lightness and greater tensile strength is a desideratum, and is giving such satisfaction as to warrant hearty commendations.

The firm manufacture pipe of all sizes up to five feet in diameter, and is adapted to all purposes, such as conveying water for power-wheels, hydraulic mining, town water-works, artesian wells, irrigation, electricity; smoke-stacks, air pipes, and other uses too numerous to mention. A patented rust-preventing composition of coal tar and asphaltum is applied to their pipe, making it more durable as well as keeping water pure where intended for drinking purposes.

They also make a specialty of coating pipes for the trade, for which there is a growing demand. In its regular course of business, this enterprising firm has contracted for and constructed the water works in many of the towns and cities of California and Nevada, and they now own and operate the water plants of Winnemucca, Nev., and Redding and Watsonville in California. Large experience in this branch of business makes their advice peculiarly valuable, and it is much sought by those contemplating works of the kind.

Messrs. Smith & Co. keep constantly employed from 40 to 60 men, mostly skilled hands, and it is justly due them to mention the fact that within the quarter of a century that has elapsed since the establishment of their business, there has never been a strike among their employes, nor a difficulty of any kind. Persistent application and straightforward business methods have advanced this firm from a comparatively small beginning to a business that extends over the entire region west of the Rocky mountains, as well as to Mexico, South America and Australia, being the largest works of the kind on the coast.

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TURBINE WATER WHEELS.
BRADLEY CUSHIONED HAMMERS
MASSEY'S STEAM HAMMERS.
SCHLENKER'S BOLT CUTTERS.
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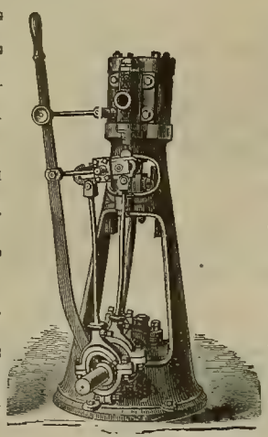

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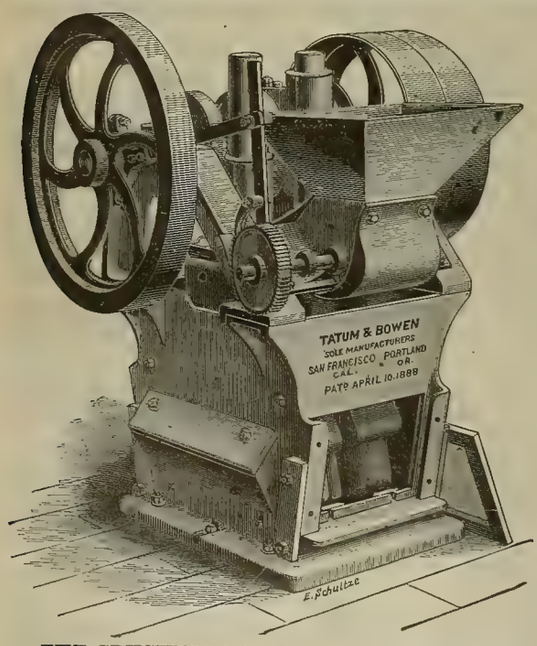

—THE—

PERFECTED DOUBLE Economic Quartz Mill.

Attached to each Mill is an effective

Automatic Ore Feeder.

THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

IMPROVED ROCK BREAKER.

Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address:

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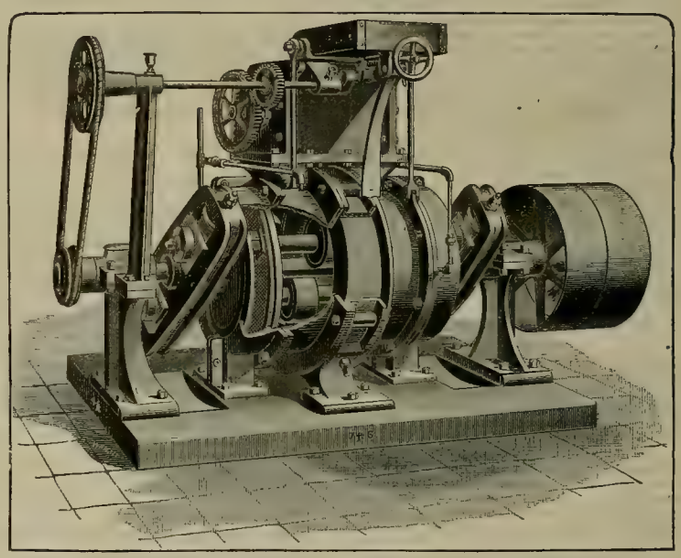

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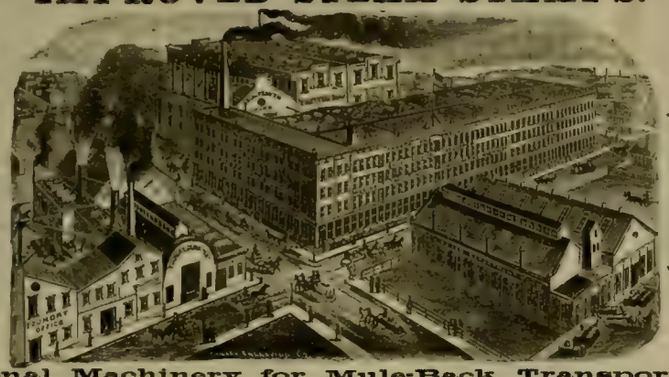

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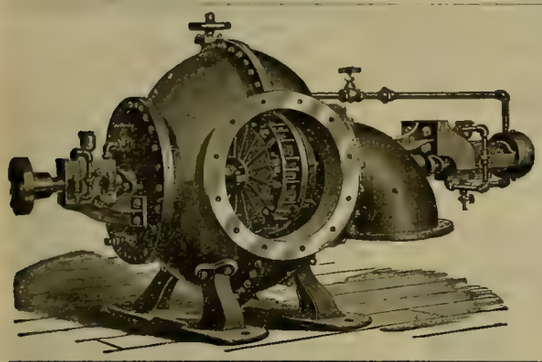

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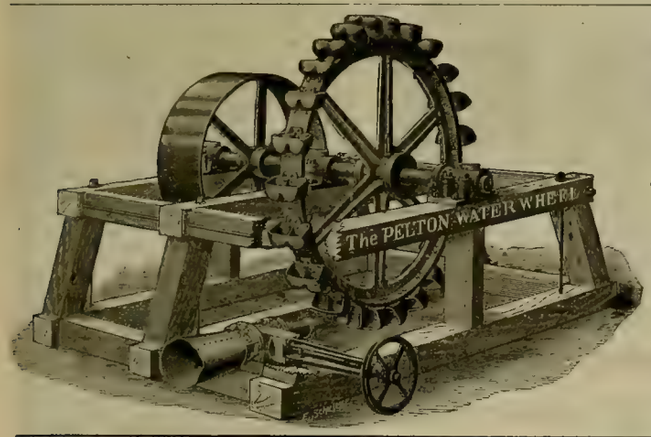

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MARKET REPORTS.

Local Market.

SAN FRANCISCO, Feb. 28, 1889.

In general trade there was more activity the past week than at any time this year. The call does not appear to be confined to any one section, for from nearly all distribution points come fair-sized assortment orders. The two days rains in the past week contributed no little in dispelling the gloomy feelings of some merchants, for now they not only speak more cheerfully, but are disposed to extend trade in localities where fears were entertained regarding the outcome of the crops. The deposit of snow in the mountain ranges is not as deep as is desirable, yet it is of sufficient depth to supply many mining districts with water well into the summer months. Collections are better than they have been, still they are not made as freely as they should at this time of the year. In the local market money is quite close, owing to many capitalists calling in their money so as to avoid paying taxes, while others again having money idle would not put it out for the fear of having to pay taxes on it. Large sums of money were sent out of the State for the same purpose; the latter has caused exchanges on the East to rule very high. After this week, moneys drawn out of general circulation will be put into circulation again, when a lower range of interest will obtain. The call for accommodations is said to be light. The decline in the price of coal is well received by iron workers and manufacturers in general, but the firmness with which iron is held to some extent counteracts the effect of the lower range of coal. In the speculative markets there is more activity in local securities, with Spring Valley water stock the favorite at a decline. It now looks as if the inside is beginning to concentrate the stock they sold at higher figures. In mining stocks there was more active trading with lively fluctuations, with the movements being of a chopping character. The trading was chiefly in the Comstocks, where very important work is going on. While this work promises good results, yet it now looks as if it may be some time before anything very positive can be determined regarding several veins, ledges or ore bodies being run far in some of the mines, and in the meantime it is claimed that a line of assessments will have to be levied. Probably the certainty of the latter causes the more pronounced bear feeling among many of the outside operators. From the other mining districts the news is of an important character, but everything points to the future before the work now going on in the mines will determine their richness in mineral ore.

It is claimed that the Mexican mill will, on tomorrow, commence crushing ore from the Crown Point, Virginia City, mine, but then operators think the ore to be crushed now will not assay high.

At the California Electric Light Co.'s office the writer was informed that the remaining dynamos (four in number) are in readiness to be put in place in the Nevada mill, Virginia City, as soon as word is received to go ahead. Our Virginia City advices report that the two dynamos now in use in the mill could not work, and why the full complement of six dynamos are not put in use, causes considerable surprise, which leads to the impression that the course of the managers of mills is controlled for stock manipulation purposes, for with six dynamos working, 60 stamps instead of 40 will drop on ore, besides allowing the California Panmill to start up.

Advices received to-day from Virginia City are confirmatory of a further improvement in the ore in Ophir, and also of an improvement in Crown Point on the 800-foot level.

SILVER—The market held to fairly firm prices throughout the week. There was apparently more disposition on the part of sellers to meet buyers' views, and in consequence the steamers to sail for China on March 2d will take out fairly large shipments. The disposition to sell was no doubt mainly due to the near approach of tax-assessment day. The very high rates that ruled for exchanges the past week were in favor of silver. After this week it is claimed that they will ease off, for there will be no occasion to send money out of the State so as to dodge paying double taxes. Sales of silver were made the past week at from 93 3-10 to 93 2-5c, and even at 93½c. With more water in the Carson river, it is expected that the output of silver from the Comstock mines will be increased in the near future.

QUICKSILVER—The market continues quiet, but steady at last quoted prices.

LEAD—The movement in pig is chiefly for Alaska canneries. The market is unchanged.

TIN—The market, which was also bare of supplies, was relieved the past week by three vessels bringing tinplate, putting in an appearance. It is said that about all had been contracted to arrive, and that some not under contract was placed at $5.25 to an Alaska cannery. Pig is without change.

COPPER—The market is reported to be settling to steadier prices.

COKE—Arrivals the past week aggregated more than for some time past, but as all received was under contract (some had been resold as often as four different times) the market is not affected, but continues strong at $20 a ton for spot.

COAL—The demoralized market was not bettered any the past week by several vessels laden with Australian putting in an appearance. It is claimed that our coast collieries are handicapped by high freights, they being fully as high, if not higher, from the mines up north to this city than from Australia to this port. This does not appear to be the worst, either, for there is said to be a large tonnage headed toward Australia that must seek this port for wheat charters, owing to light crops in Australia, and they will bring coal for ballast, if not for profit. It is claimed that the output of the coast collieries will be reduced in the near future by reason of the above competition.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Savage, Feb. 23, $16,837; Hale and Norcross, 23, $37,041; Cons. California and Virginia, 23, $56,538; Hanauer, 19, $2500; Hanauer, 20, $20,401; Mt. Diablo, 28, $8029; Peerless, 28, $5143; Hanauer, 21, $2700; Confidence, 28, $15,621.

MINING SHAREHOLDERS' DIRECTORY.

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ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Best & Belcher M Co	Nevada	42	25	Jan 10	Feb 15	Mar 7	L Osborn	309 Montgomery St
Baltimore S M Co	Nevada	4	25	Feb 4	Mar 8	Mar 26	A R Grim	402 Montgomery St
Belcher S M Co	Nevada	37	50	Feb 19	Mar 25	Apr 12	J Crockett	327 Pine St
Con Pacific M Co	California	10	15	Feb 5	Mar 11	Apr 2	F E Luty	330 Pine St
Crocker M Co	Arizonia	6	10	Feb 25	Apr 2	Apr 24	A Waterman	309 Montgomery St
Christy M Co	Utah	1	10	Feb 20	Mar 25	Apr 15	G R Spinney	310 Pine St
Golden Prize Con M Co	Nevada	2	30	Feb 16	Mar 20	Apr 10	C D Bennett	328 Montgomery St
Gould & Curry M Co	Nevada	61	30	Jan 10	Feb 14	Mar 7	A K Durbrow	309 Montgomery St
Gray Eagle M Co	California	11	03	Jan 23	Feb 26	Mar 19	O H Bogart	327 Pine St
Julia Con M Co	Nevada	23	10	Jan 30	Mar 7	Mar 23	J Stadfeldt Jr	309 Montgomery St
Martin White M Co	Nevada	22	25	Jan 19	Mar 6	Mar 26	A B Cooper	325 Montgomery St
Mayflower M Co	California	44	50	Jan 14	Feb 18	Mar 11	J Morizio	328 Montgomery St
North Peer G & S M Co	Arizona	5	05	Feb 25	Apr 1	Apr 24	H Deas	309 Montgomery St
New Coso M Co	California	22	30	Feb 5	Mar 14	Apr 1	J L Hunt	308 Montgomery St
Overman M Co	Nevada	59	25	Jan 15	Feb 19	Mar 12	G D Edwards	414 California St
Oak Con M Co	California	1	03	Feb 25	Apr 8	Apr 23	E J Ryan	230 Montgomery St
Peer M Co	Arizona	7	10	Jan 23	Mar 5	Mar 28	A Waterman	309 Montgomery St
Piedmont M Co	Nevada	1	05	Jan 28	Mar 6	Mar 27	J J Scoville	309 Montgomery St
Savage M Co	Nevada	72	50	Jan 7	Feb 11	Mar 4	E B Holmes	309 Montgomery St
Superior M Co	Nevada	24	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
St Louis M Co	Nevada	2	05	Jan 14	Feb 18	Mar 16	W E Dean	309 Montgomery St
Scorpion M Co	Nevada	24	10	Jan 3	Feb 8	Mar 4	G R Spinney	310 Pine St
Scott Bar M & M Co	California	2	10	Jan 23	Feb 28	Mar 19	H Pink	318 Pine St
Union Con M Co	Nevada	37	25	Jan 4	Feb 8	Mar 1	J M Buffington	303 California St
Western Belle M Co	Nevada	1	20	Jan 24	Mar 1	Mar 21	J H Sayre	328 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
El Dorado W & D G M Co	California	R M Welch	524 Sacramento St	Special	Mar 9
Guascaran & California M & M Co		T H Day	26 Mint Ave	Annual	Mar 5
Hale & Norcross S M Co	Nevada	E B Holmes	309 Montgomery St	Annual	Mar 13
Indian Creek L & M Co	California	S C Mills	419 California St	Annual	Mar 5

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M Co	Nevada	A S Cheminant	328 Montgomery St	06	Feb 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Mar 1
Idaho M Co	California		Grass Valley	7.50	Feb 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Dec 10

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 7.		WEEK ENDING Feb. 14.		WEEK ENDING Feb. 21.		WEEK ENDING Feb. 28.	
Alpha	1.90	2.20	1.75	2.00	1.55	2.10	2.05	2.30
Alta	2.00	2.35	2.15	2.50	1.95	2.20	2.15	2.50
Andes	1.05	1.10	.85	1.05	.80	.95	.90	1.00
Argenta	....	.10	.05	.10	....	....	....	.10
Belcher	3.50	4.65	2.80	3.65	2.65	3.15	3.05	3.50
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	5.50	5⅞	4.75	5.50	4.25	4.90	4.70	5.25
Bullion	1.10	1.25	.95	1.10	.80	1.05	1.00	1.10
Baltimore	.20	.30	.20	.35	....	.20	.20	.30
Belle Isle	....	.40	....	.35	....	.35	....	....
Bodie Con	1.60	1.75	1.60	1.70	1.50	1.60	1.50	1.55
Benton	3.00	3.50	....	3.50	....	....	....	....
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.50	.60	.50	.55	.45	.50	....	.50
Con. Va. & Cal	8.00	8⅝	7.50	8¾	7.50	7⅞	8.00	8.50
Challenge	4.30	5.00	4.10	4.60	3.80	4.10	4.50	5⅝
Champion	....	....	....	....	....	....	....	....
Chollar	3.15	3.50	2.55	3.10	2.35	2.50	2.05	3.10
Confidence	.13	15¾	13¾	14½	13	14	14	16¼
Con. Imperial	.70	.80	.70	.75	.60	.70	.70	.80
Caledonia	.40	.45	.35	.45	.35	.40	....	.40
Con. Pacific	....	....	....	....	....	....	....	....
Crown Point	4.75	5⅝	4.45	5.25	3.80	4.90	5.00	6⅜
Crocker	.90	1.10	.70	.85	.50	.75	.60	.75
Central	....	....	....	....	....	....	....	....
Dudley	....	....	....	.15	....	.15	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	....	....	2.10	....	....	....	....
Exchequer	1.05	1.15	.90	1.05	.80	1.00	1.00	1.15
Grand Prize	1.05	1.15	1.00	1.50	1.30	1.40	1.05	1.10
Gould & Curry	2.70	2.85	2.55	2.85	2.55	2.85	2.80	3.20
Hale & Norcross	4.85	4.95	3.90	4.75	3.75	4.10	3.85	4.25
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	....	....	.25	.30	....	.25	.35	.30
Justice	2.00	2.05	1.85	2.00	1.50	1.75	1.60	1.85
Kentuck	2.05	2.25	2.00	2.20	1.90	2.10	2.25	2.35
Lady Wash	....	.45	.40	.50	.35	.40	.40	.45
Martin White	....	....	....	....	....	....	....	....
Mono	....	1.20	1.00	1.20	....	1.00	....	1.05
Mexican	3.40	3.50	3.05	3.65	2.80	3.60	3.20	4.20
Mt. Diablo	....	....	....	....	....	....	....	....
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.50	1.60	1.40	1.50	....	1.45	1.40	1.50
North Belle Isle	2.25	3.00	2.50	2.80	2.00	2.75	2.55	2.65
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	3.15	3.35	2.90	3.15	2.80	2.95	2.75	2.80
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.65	1.75	....	....	1.50	1.65	1.55	1.70
Ophir	5.25	6⅜	5⅛	5.75	4.90	5.50	5⅝	6.50
Overman	1.25	1.45	1.15	1.30	1.00	1.45	1.35	1.55
Potosi	2.35	2.55	2.10	2.35	2.00	2.40	2.20	2.60
Peerless	1.05	1.15	.85	1.05	.65	.85	.80	.75
Peer	....	.35	.25	.35	.25	.30	....	.25
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.90	3.10	2.75	3.30	2.75	3.15	3.05	3.45
S. B. & M	2.85	3.35	2.85	3.20	2.65	3.20	3.05	3.30
Sierra Nevada	3.05	3.35	3.00	3.35	2.80	3.25	3.10	3.80
Silver Hill	.75	.80	.75	.80	.65	.70	.70	.75
Silver King	1.25	1.30	....	1.05	....	....	....	....
Scorpion	.45	.60	....	.55	.50	.55	.55	.65
Syndicate	....	.10	....	....	....	.10	....	....
Union Con	3.70	4.30	2.85	3.25	2.30	3.15	3.15	4.10
Utah	1.40	1.50	1.20	1.35	1.15	1.30	1.30	1.50
Yellow Jacket	4.40	4.60	3.90	4.40	3.50	3.90	4.00	4.60

Sales at San Francisco Stock Exchange.

THURSDAY, Feb. 28.

557	Alta	2.05	
100	Andes	.90c	
200	Alpha	2.25	
100	Argenta	.10c	
150	Belcher	3.60	
150	B. & Belcher	4.65	
200	Bullion	1.00	
90	Bulwer	.50c	
1300	Baltimore	.30c	
100	Chollar	3.00	
160	Con Va & Cal	8⅛	
500	Con. Imperial	.80c	
200	Crown Point	5⅞	
350	Challenge	5.00	
50	Confidence	15.75	
100	Exchequer	1.05	
300	Grand Prize	1.10	
120	Gould & Curry	3.00	
600	Hale & Nor	4.20	
100	Iowa	.30c	
50	Lady Wash	.35c	
300	Mexican	3 80	
150	New York	.35c	
120	Nev. Queen	2.95	
200	N. Belle Is	2.65	
500	Ophir	5⅞	
280	Overman	1.50	
50	Potosi	2.60	
200	Peerless	.80c	
100	Peer	.35c	
200	Savage	3.35	
250	Sierra Nevada	3.20	
250	S. B. & M	3.20	
100	Silver Hill	.75c	
250	Utah	1.45	
350	Union	3.35	
300	Comstock	.50c	
100	Weldon	.40c	
80	Yellow Jacket	4.60	

Mining Share Market.

The stock market has weakened somewhat during the latter part of the week. The following mining companies have been dropped from the list in the San Francisco Stock Exchange for the non-payment of the annual dues: Silver Star, Rock Island, Pioneer, Brophy, Orleans Con., Atlantic Con., Flowery Haywood, Montezuma, Pondere, Champion, Combination and Christy.

The Virginia City *Chronicle* of the 26th inst. contained the following: The snow in the mountains is reported as disappearing very rapidly under the present warm temperature, and an unusual scarcity of water for operating the Carson river stamp-mills must ensue unless another snowfall occurs of greater depth than has yet accumulated. Ore shipments from Comstock mines last week aggregated 5849 tons, divided as follows: Con. Cal. and Virginia, 2459, assay value, $33.50; Savage, 428, assay value, $21; Hale and Norcross, 1081, assay value, $21.78; Potosi, 940, assay value, $20.40; Confidence and Challenge, 790, assay value, $26.40; Justice, 240, assay value, $30; Alta, 220, assay value, $29.75. The bullion yield of the above aggregated about $140,000. Bullion shipments from the Con. Cal. and Virginia mine on the current month account up to Feb. 22d, aggregated $113,378. The February yield of the mine will not fall far short of $300,000.

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J. C. HOAG—San Francisco.
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FRANK S. CHAPIN—Colusa Co.
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The works are situated at Daggett, Cal., in the Calico Mining District, and on side-track of the Atlantic & Pacific Railroad. They contain a first-class 50-horse power Engine and 45-horse power Boiler with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPY & CHILDS, 123 California street, San Francisco.

THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Lefler, Superintendent. Divided into 30,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No 1, 32 ft.; No. 2, 9½ ft. No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Bu ch, Sup't, or Hugh Murray, Sec'y.

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EXTENSIVE GOLD MINE FOR SALE.

To be sold at public auction by the undersigned, at the Merchants' Exchange, in the City of Halifax, on Thursday the Fourteenth day of March next, at twelve o'clock noon, that extensive, valuable and well-equipped GOLD MINE known as the Dufferin GOLD MINE, situate on the Atlantic coast, about ninety miles east of said city. Daily mail from Halifax. Telegraph office at Salmon river, four miles from the works. Salmon river harbor never freezes, and is safe and easy of access. The mine embraces 342 areas, each 150x250 feet, all in one block. The entire area measures fifteen hundred feet in width across, and eight thousand five hundred and fifty feet along the lodes. The leases have nearly fourteen years to run, and can at any time be renewed for a period of twenty-one years, upon payment of two dollars per area. Within this area is a belt of veins dipping on each side of an anticlinal. They have been found by tests made on the surface to extend upwards of 4,000 feet The ore has been partially removed to a depth of 200 feet over a distance of about 700 feet, and to a depth averaging about 70 feet over an additional 1,000 feet in length or thereabouts. The veins are of various width, the largest averaging about ten feet of solid quartz.

This mine was discovered in the Autumn of 1880, but was not worked to any extent until the Autumn of 1881. It has yielded up to the end of November, 31,012 ounces of gold from 84,568 tons of quartz, according to the sworn returns made to the Mines Office. The gold can be produced at a cost which will leave a very handsome margin of profit.

The mine is operated by machinery worked by water power, the power being transmitted by a line of wire rope running from the water wheel to the mine—a distance of about 4,750 feet—and lying parallel to the outcrop of said veins, at a distance therefrom of about fifty feet. The Salmon river crosses the property twice. It supplies the hoisting and pumping power, and the same water is afterwards used to drive the crusher. The latter has thirty-eight stamps, and there is ample water power to operate three times that number. Sixty stamps can be operated with present machinery. Of the 120 horse-power existing for pumping and hoisting only about twenty-five is used. There are about 700 acres of well timbered and well watered land owned with the mine. This partly covers the areas, and where it does not immediately adjoins them. It is also provided with a steam plant to operate hoisting gear and pumps in case of accident to the transmission power, a sawmill, sufficient for the requirements of the property, a tramway from the mine to the crusher for carrying quartz, and stables, offices, and boarding-houses, sufficient to accommodate a large number of employees.

The mine is owned and has been operated by a partnership, and owing to the death of one of the principal owners it has to be sold to enable his estate to be settled. A good title will be given.

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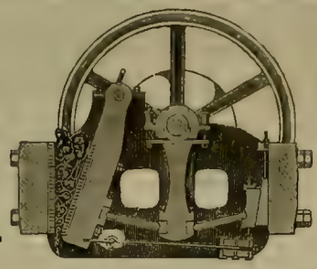

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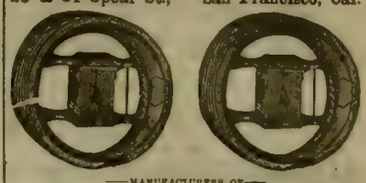

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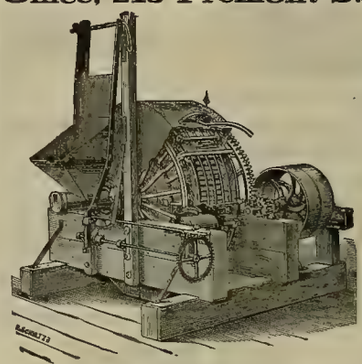

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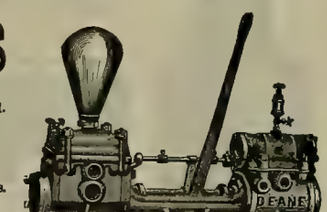

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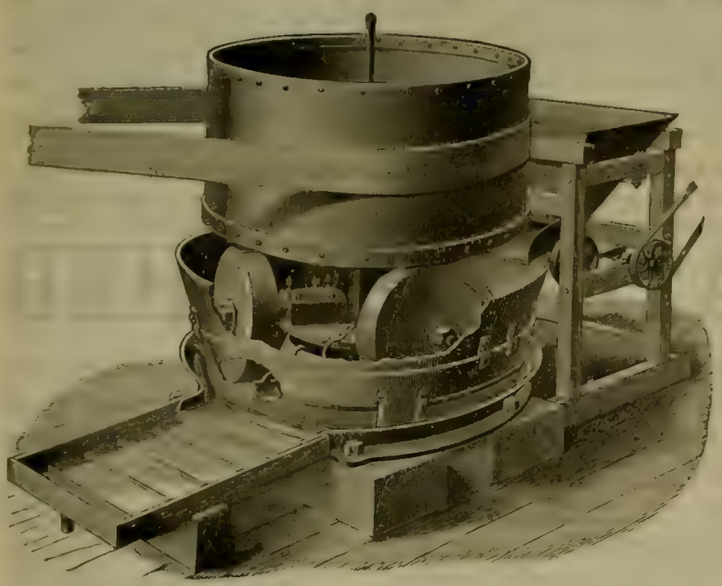

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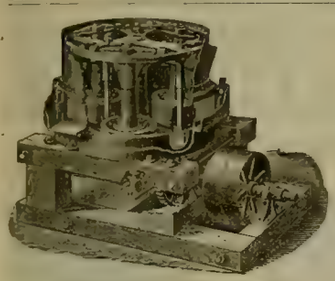

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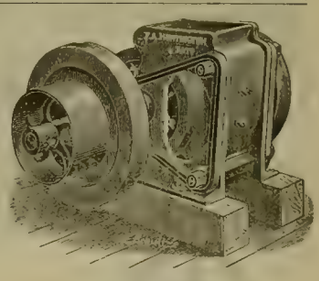

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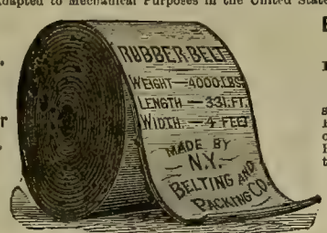

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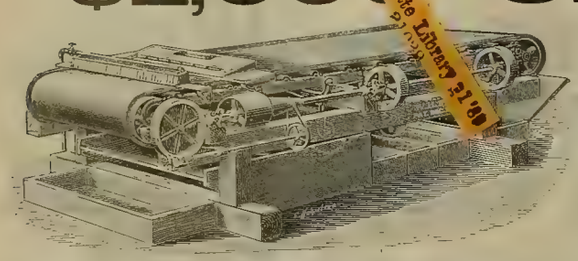

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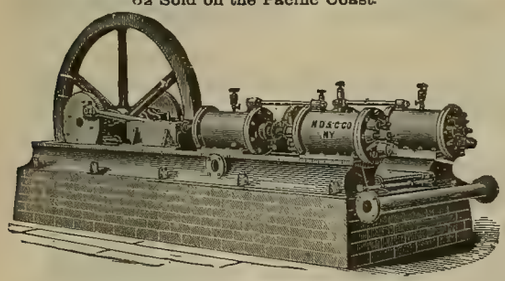
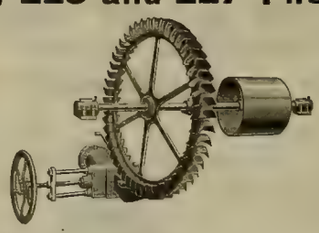
62 Sold on the Pacific Coast.





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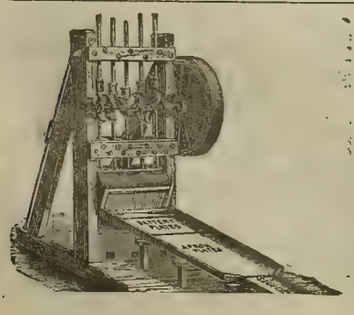

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

TWENTY-PAGE EDITION.

BY DEWEY & CO. Publishers.

SAN FRANCISCO, SATURDAY, MARCH 9, 1889.

VOLUME LVIII. Number 10.

British Columbia Mines.

We had a conversation the other day with Dr. T. J. Jones of Victoria, B. C., who is interested in mining properties in the Nicolai Valley region. There are some very good claims there which make a fine showing. The ore is all "concentrating," and carries silver and gold. They can work the year round in that region, which is much similar in character to the Grass Valley district in California. There is plenty of wood and water, and coal has been found 12 miles from the mines.

Dr. Jones states that the operations of George Henderson, who was connected with the Star and Planet mines, Nicolai Valley, and the Foster M. & M. Co., Lillooet district, have rather given the country a "black eye." He was manager and part owner of these mines, but ran them in debt and made a failure of the work. He was supposed to be an expert miner, but had very extravagant ideas and did not succeed in putting the mines on a paying basis. The men were not paid, and other operations have been retarded in consequence. The man referred to has left and gone East somewhere. The British Columbia mining people are of the opinion that the district referred to will come out all right in the end, though at present matters are somewhat dull.

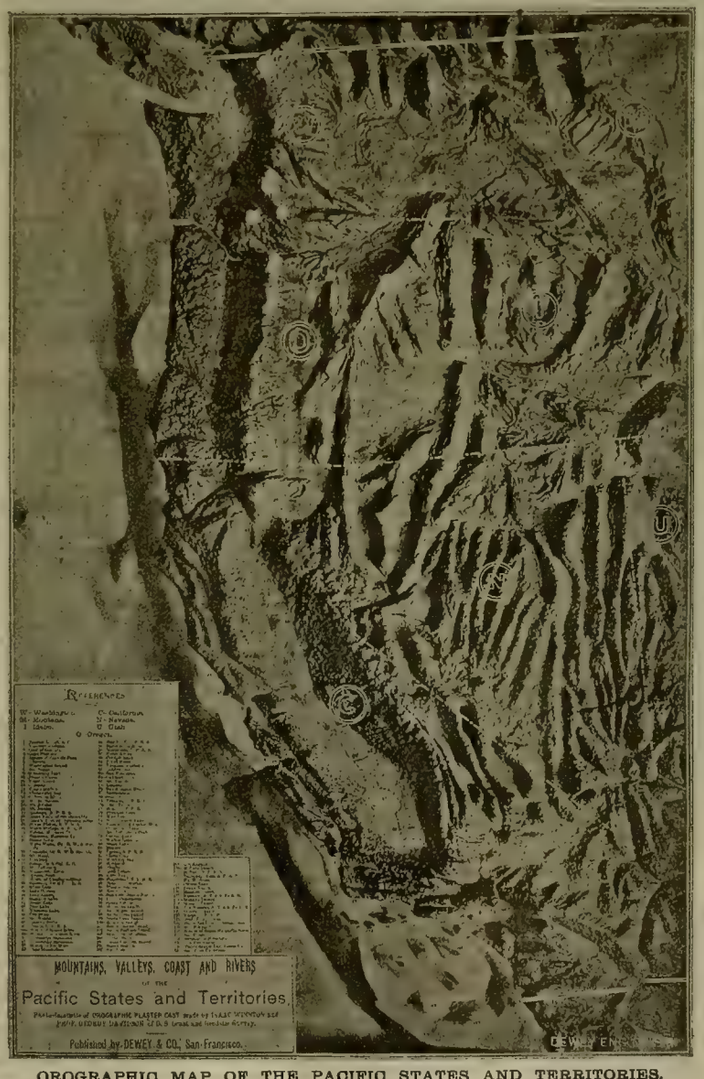
MINES AROUND DOWNIEVILLE.—A correspondent writes us that prospects are brightening for Downieville, Sierra county, several valuable quartz ledges having been found during the past year. Three 20-stamp mills will be put up in the spring close to town, for the Oxford (more familiarly known as the Good Hope), owned by H. T. Briggs, H. H. Purdy and others; Gold Bluff, the property of A. Van Slyke (where a 10 stamp mill has been crushing ore with princely returns for months past); and the Wheeler, being developed by Eastern capitalists under the supervision of John Hughes. The Bald Mountain Extension (drift mine) may soon be yielding good dividends. The upper tunnel, three miles by the wagon road, northwest of Forest City, is in one-half a mile and Supt. Meikle believes within about 426 feet of the channel.

ACADEMY OF SCIENCES.—At the meeting of the Academy of Sciences on Monday the Hon. Lucius A. Foote read an interesting paper on "Corea," to which country he was sent by the United States Government when the first commercial treaty threw open the ports of Corea to the world. A paper was also read on "California Earthquakes from 1769 to 1887," the contribution of Prof. Holden. The following new members were announced: Townshend S. Brandigu, Waldemar Lindgren, Volney Rattan, James E. Mills, L. Belding. The death of two members, Seth Cook and Dr. Jules C. A de Tavel, was reported.

CHROMATIC ABERRATION IN TELESCOPES.—A dispatch from New Haven, Conn., says: Professor Hastings of the Sheffield Scientific School, after long experimenting, has succeeded in so combining two glasses, the composition of which is a secret, that chromatic aberration in a telescope has been corrected. This will make telescopes from 10 to 30 per cent more powerful, and new telescopes will probably include Prof. Hastings' principle.

IRON SMELTING ON PUGET SOUND.—About $700,000, most of which has been supplied by San Francisco capitalists, has lately been expended in an iron-smelting plant erected on the shores of Puget sound. The company engaged in the enterprise has the finest and most powerful engines and machinery to be had for this purpose. It has also a fine reduction works is on the southwestern shore of Port Townsend bay, and is called by the suggestive title of Irondale.

THERE are about 140 workmen employed on the Stanford University and the mausoleum now, and three carloads of material arrive from the quarry every day. The buildings have



OROGRAPHIC MAP OF THE PACIFIC STATES AND TERRITORIES.

town site, including a good water supply and excellent wharfage facilities. The furnace is operated with a hot-air blast, and charcoal is used for fuel. Four grades of iron are made, the finest having brought in the markets a higher price than the best grade of Scotch pig iron sells for. As proof of its superior quality the company is now supplying the Southern Pacific Co. with iron for the manufacture of car wheels, and it is well known that car wheels require the very best iron to be had anywhere. Although the furnace is turning out 40 tons of iron a day, it will require several months to complete contracts now running with the railroad company. The location of the reached a state from which some idea of their massive grandeur can be obtained. None of the structures are entirely finished, however, although foundations have been completed wholly around the quadrangle. In addition to the work done thus far on the university proper, there are three other large structures which have been erected. One is the boiler-room with a huge towering smokestack, to be seen for miles. Another is the engine-room, and the third the work-building.

CHAS. A. ASHBURNER, the "oil expert," is examining the oil-fields of the southern part of this State.

Pacific Coast Relief Chart.

We give herewith a miniature copy of the large photoplate relief map which we made direct from a relief model in plaster, illustrating the mountains, valleys, lakes, rivers, etc., of the Pacific States. The large map is 19x24 inches in size. An orographic model has never before been made of the Pacific Coast, and the chart shows a facsimile of it. It gives a much better idea of the topography and orography of the region than can be gained by Mercator's projection maps. The idea of a bird's-eye view is conveyed, while at the same time the correct proportions are preserved. The continuous chains and isolated ranges of mountains are shown with the adjoining valleys and watercourses.

The great backbone of the coast, the mighty Sierra, stands prominently in view, dividing the coast region from that of the great interior.

The configuration of the ranges and mountains can be traced in such a manner that the routes of the principal railroads can be seen as they take advantage of the natural passes.

The coast line is an interesting study in itself. A portion of the ocean-bed is shown, so that the abrupt rising of the land is plain. In places are deep submarine valleys, and again the shoaler submerged land is apparent. The bays, harbors, inlets, river-mouths and islands are also figured.

Numbers are placed on the chart, and a corresponding index gives the names of the principal mountain peaks, lakes, rivers and cities. The course of any large river may be traced winding through the mountains to the sea. This chart will give any one a very excellent idea of the surface features of California, Nevada, Oregon, Washington, and part of Montana, Idaho and Utah. It is printed on heavy paper suitable for framing, and is sold to subscribers of the PRESS for 10 cents by Dewey & Co., publishers.

The "Mining and Scientific Press."

Any one connected with the mining or other industrial occupations on this coast cannot fail to find matter of interest and value in this and other numbers of the MINING AND SCIENTIFIC PRESS. The various departments of the paper are carefully made up of practical matters useful to all. Our correspondence has increased of late, as has our advertising patronage. The advance in both these features is well illustrated in the present number. Many readers will find matter of interest to themselves in the advertising columns as well as in the reading matter. As the oldest mining paper in the United States the experience of the editors and publishers is of value to the reader. We hope our old subscribers will bring the PRESS to the attention of those who would be benefited by becoming regular patrons.

THE Reading Iron Works, Penn., have failed, with liabilities of over $1,000,000. The company owning the works was one of the largest in America.

J. V. WILLIAMSON, the Philadelphia philanthropist, who gave $12,000,000 for a boys' school for manual training, died this week.

THE sum of $214,862 was disbursed in wages during February to the miners on the Comstock.

CORRESPONDENCE.

We admit unindorsed, opinions of correspondents.—EDS.

Central Idaho.

EDITORS PRESS:—The great Salmon-river region in Central Idaho promises to be the scene of much mining activity the coming season. A great many rich prospects were discovered last year, and on these the owners will do work this summer.

In this region the mines contain a variety of ores, but there seems to be a preference for free-milling gold ores, and it is in this character of ore that this region promises so well.

A great many of the quartz veins found hereabout contain the yellow metal in good-paying quantities.

The writer has examined a number of fine, rich samples, showing gold plentifully, and these ore specimens are from large, well-defined contact and fissure veins. There is a very extensive quartz region here in this Salmon-river country that has long been neglected. Several millions in gold dust were taken out of the placer deposits, and strange to say, very little has been done with the rich gold-quartz lodes in the immediate vicinity of these placer gulches.

It seems many of the old placer miners were prejudiced against gold-quartz mines; they worked out the richest of the creek beds and quit the country. It seems, too, as though the thought never occurred to them that the very source of their placer gold was the quartz veins cropping out all through the mountains. These early miners gathered the dimes and left the dollars. But we cannot blame them; it takes machinery to get gold out of quartz. No difference how rich the quartz is, it still requires machinery. At that time there were only trails over the country—machinery was out of the question. Now the "iron horse" goes rolling along within sight and hearing of this long-slumbering wilderness.

On the very borders of this great mountain mineral region, there are a few small mills at work crushing the gold out of some of the gold veins, while yet the central and richer portion is still in its primitive state. It is a splendid field for the prospector—all that region between the Rocky mountains and the head of Boise river and from Wood river to the Cœur d'Alenes, more especially in the vicinity of the Salmon river itself. This Salmon river is about 500 miles in length, runs in shape like a horse-shoe, and from its source in the Sawtooth range to its mouth in Snake river, along its whole length, gold may be washed from its sands and gravel beds. And again, nearly all the tributaries, especially the larger creeks, wash in gold from the various slate and granite mountains. Down on the river, about 100 miles below this place (Salmon City), several Chinese companies have been mining two or three years, and it is known that they have secured a good lot of gold-dust. The gold on or near the river-bed is usually quite fine, but occasionally some good heavy shot-gold is found. In this great mountain section drained by the Salmon, there are hundreds of creeks that have never been prospected, and as it is all more or less a mineral country, there is a good show for a number of these gulches to be good in gold. Such has been known about Leesburg, Florence and Warren's, and there is no reason why some more of the same character may not be found. The country is not one-tenth prospected. It is known to be a quartz country wherever examined, and hundreds of these quartz lodes are rich in gold.

Some 40 miles below this place, right on the bank of the river, is the great property known as the Grunter, a gold-quartz lode 60 feet wide. Several thousand tons of the Grunter ore have been worked in the small mill on the ground. The ore averages $27 per ton in gold, but only about half that amount is saved with the mill. There are no pans, settlers or roasters connected with the mill, hence the loss. It is a magnificent gold property, badly mismanaged. Near by, and on the same vein, is the Kentuck mine, which has been a fair and steady producer for the past five years. It is also free ore, except the sulphurets, which should be roasted. There are a score or more other claims in the vicinity that are opening up well. Several of these properties will likely change hands this year and be extensively worked. More soon about other districts hereabouts. CHAS. F. BLACKBURN.

Salmon City, Idaho.

Bad Mining Laws.

EDITORS PRESS:—Occasionally I read articles in your valuable paper in regard to the inefficiency of our present mining laws. The present law prevents the development of mines, and offers a premium for fraud. Men hold claims year after year without doing any work on them. Perhaps it would be better for every man who desires a quartz claim of 1500 feet to pay $100 per year for five years and then receive a patent for his claim. It costs $100 to buy 20 acres of mineral and $400 for red tape and technicalities, besides $500 worth of trouble in solving the many conundrums necessary to comply with the complex mining laws.

The honest mossback Granger has his land ommissioner, the people their railway commissions, but the miner is left out in the cold to take care of himself. The miners have only produced a few thousand million out of the ground and made California what it is.

I believe the miners are as much entitled to a commissioner of mines to represent their interests and pass upon the mineral and non-mineral land as a county is to a board of supervisors. A commissioner of mines could decide by investigation as to the quality of the land claimed by parties as agricultural, and prevent men obtaining title to lands for agricultural purposes that would not raise a white bean, simply to defraud the Government out of the mineral land. Some one has said all men are liars; if they are not, some one is mistaken; but I do know that in this district there are many men who have taken the non-mineral oath when they promised and told parties beforehand, if they got the land they would sell them the mining claims on it, or let them work on shares. I know one man here that, before he applied for the quarter-section of land, had been for years trying to bring a ditch of water to work the gravel on the land, and after he obtained a patent for the land, he sold it, but reserved the quartz ledges and mineral. I think you can in your valuable paper show the present weakness of the mining laws and the absurdity of the new one that Senator Stewart is trying to have passed. We want a plain, simple law, easily understood and complied with. The average miner is no Solon. Another grievance is if all the mineral land is taken for agricultural purposes, miners find it difficult to obtain fuel and timber.

I believe it would go far toward having proper representation if the miners of this State would hold a convention in San Francisco, and take such action as would protect what is today and will be one of the greatest interests in this State. MINER.

White River, Tulare Co., Cal.

Grub Gulch and Potter Ridge Mining Distr ct.

EDITORS PRESS:—This camp has been overlooked by mining men, and I think it my duty to inform the public through your paper of the facts as near as I can. Having followed the business for nearly 20 years in various localities, I think I have the experience to give a proper description of the camp and mines.

The mineral belt of different formations is about five to six miles wide, and is running in a northwest and southeast direction, passing through the entire width of the county. The main belt is composed of four different belts of formation of different slates, running parallel with each other, making four contacts between the different formations. That makes it favorable for well defined and permanent ledges. The first belt on the west side is a pure black slate and joins on to the granite one. The contact is what is known up North as blue fissure lead. It is thought by some mining men that it has not been found or discovered south of Grass Valley. This is a mistake, for it is here as plain as day on the contact between the black slate and granite, but it is a little different in its character here from what it is in Grass Valley, on account of the formations bearing so regular. There are no cross formations to cut the fissure off, or cause big "blows," bunches or pockets. The fissure in this locality runs for miles very regular, and it hardly forces its way to the surface; so any one finding it on the surface, no matter how small, it will be advisable for him to sink on it, for the ledge will come to its proper size in depth. It is very regular when it comes to a certain level. Of course the higher the ground the more liable the ledge is to be pinched as far as this kind of a ledge is concerned. This ledge is a sulphuret ledge, there not being much free gold in the ledges after the depth of 30 or 40 feet is reached. Some places where the ore comes to the surface, of course the sulphurets are oxidized, and that leaves the gold free, so it will show in a horn spoon.

There are quite a number of mines on this fissure, and every day's work done on them they improve, encouraging the owners. The next belt to the east is a serpentine formation that contains ledges more bunchy and irregular than the formation first mentioned, and the gold is more of a free nature. The next formation to the east is slate. There are liable to be some very rich deposits of free gold ore in this, and perhaps some good mines

The last belt on the east side of the main belt is a spar slate, or of that nature, with big spar dikes running quartering with the formation. This belt is liable to have some extremely rich deposits of ore in it, and perhaps very extensive. The blue lead will bring this county to the front, for every day's work that is done puts a brighter face on our prospects.

Grub Gulch, Fresno Co. C. M. WARD.

A PROSPEROUS RAILROAD.—The earnings of the Southern Pacific Company for 1888 make an unusually good showing. The gross earnings were $48,850,208; expenditures, including interest on bonds, $44,901,381. The earnings of the Central Pacific division were $15,848,862, and expenditures $14 882,032, leaving a profit of $962,830, lacking $397,170 of reaching the guaranteed rental of $1,360,000. Deducting the loss from the earnings of the other divisions gives the net earnings of $3,550,656, or 3½ per cent on the outstanding stock of $100,000,000.

Yield of Comstock Mines.

The Assessor of Storey county reports the product of certain Comstock mines for the quarter ending December 31, 1888, as follows:

	Tons.	Average.	Bullion.
Alta Con	946	$24 62	$23,330
Challenge	1,375	16 75	21,406
Chollar	2,835	14 00	38,131
Confidence	6,195	17 87	105,071
Con. Cal. & Virginia	32,278	21 50	690,845
Hale & Norcross	4,280	21 00	90,016
Savage	5,202	12 50	66 423
Yellow Jacket	3,388	7 70	25,836
Totals	57,089	$18 77	$1,071,648

The above lacks returns from the Gould and Curry, Occidental and Overman mines to be complete. The Virginia *Chronicle* thinks the additions from these mines and the product of the mills in the Six-Mile canyon would swell the total for the quarter to $1,250,000. The same paper thought the product of the Chollar and Savage, omitted from the previous quarter, would have made the total $1,175,900, instead of $1,064,200. We do not see why the complete list is not given from quarter to quarter. Where official figures are possible, they are more satisfactory than estimates. Five of the mines for the last quarter of 1888 worked their ore at a loss, despite the favorable assay values. The ore from the Alta Consolidated mine averaged $24.62, and yet the net cost of production was $8908 above the yield. The Chollar worked $14 ore at a loss of $13,559 above the yield. The Hale and Norcross lost $18,785 on the $21 per ton ore worked in the last quarter of 1888. Savage had $12.50 per ton ore, and yet its product of $66,423 or the last quarter of 1888 was made at a net loss of $40,673 Yellow Jacket has been milling ore right along for upward of a year at a loss. The report of this mine for the last quarter of 1888 is as follows: Product 3388 tons ore, yielding $25,836; average yield per ton, $7.70; cost of extraction, reduction and transportation, $54,270; cost of production above yield, $28,414. Stockholders would have been better off if no ore had been worked from this mine for the past two years. But, of course, there is a profit in the milling, and such of the stockholders as are interested in the milling get good returns and are anxious to see the extraction of ore kept up We can see how it is possible to so grade the ore sent to the mills to make such a low average that only the mill-owners will be benefited But why $24 ore, or $21, or $14, or even $12 ore cannot be worked, except at a loss, we do not quite understand, though of course there are good reasons for that state of affairs.

The quarterly reports of the Storey county Assessor, so far as made public, in a consolidated form, show the yield of the Comstock mines for the calendar year of 1888 to have been as follows:

	Ore Tons.	Bullion Yield.
Alta Con	946	$23,330
California	142 419	3,322 262
Challenge Con	3.123	55,267
Chollar	9 000	134 434
Confidence	34 409	725,871
Hale & Norcross	36,678	949,745
Kentuck	1,027	13,055
Potosi	3,050	56 461
Savage	5,972	66,423
Yellow Jacket	28,618	211,651
Total 1888	264 582	$5,558 409
Total 1887	283,300	4 402 417
Total 1886	268,786	3 430,526
Total 1885	223,004	2,895,249

In making up the statement for 1887, a year ago, we had occasion to say that the indications pointed to as good a yield in 1888 as in 1887. The result shows a less quantity of ore milled, but an increase of over $1,000,000 in the bullion product. From the present outlook, we think 1889 will hardly be a duplicate of 1888 in the bullion yield of the Comstock mines, though any day may show up discoveries that will put an entirely new phase to the whole business.—*Bulletin.*

Photographic Processes.

According to Prof. Wood, the most valuable characteristic that can at present be claimed for photography in its scientific uses—or at least the one by which the most remarkable powers have been exhibited—is in the capacity possessed by the sensitive surface of storing up feeble impressions of light, so that an image is produced by the long-continued act of vibrations too feeble to have any effect until they have been allowed to impinge upon the plate for a considerable time; the experience of astronomers in this respect need only be referred to, as in point. On the other hand, the light rays, if of sufficient energy, can, as is well known, produce their due effect in a time which, to human appreciation, seems infinitely small; thus, photography observes and records the successive positions of a rapidly moving object, whereas to the eye the successive movements are by the persistence of human vision blended into a sort of general average, as in the case of a galloping horse—or lost in confusion, as in that of a rapidly spinning wheel. The photographic plate may also be said to have a greater range of vision than the eye—it is affected by rays to which the eye is quite insensitive, and thus, by its aid, cognizance can be taken of and rays observed beyond the limits of the visible spectrum, of the highest and the lowest refrangibility. As to the amount of detail which is set before it, the photographic lens is, of course, indifferent—a large extent of surface can be observed and its detail at once recorded. In a short series of exposures the lines of a spectrum, which it would take months or years to map by hand, are recorded with an accuracy which the hand could never hope for—the exposure of a single plate to the heavens giving greater and more trustworthy results than six months' toil would formerly have yielded.

Liability of Mining Directors.

In the suit of Emanuel Eyre against Joseph Marks et al., directors of the Gould & Curry Mining Company, Judge Hunt granted the defendants' motion to strike out all that portion of the complaint which relates to the penalties said to be collectable from the directors of mining companies who fail to post statements from superintendents at specified dates.

In rendering his decision Judge Hunt said: "The complaint alleges that the directors failed to perform their duties in accordance with the Act of 1880, Section 1, which requires that they shall cause to be posted in the secretary's office the receipts and disbursements of the company for the current month, and to file with the secretary the itemized accounts of his receipts and disbursements, the question presented here being whether or not the directors should be held liable for any failure or omission other than their own.

"It will be observed from the reading of the Act in question there is pertinent ambiguity in it.

"In the first place it says that the directors shall cause to be posted in the office of the secretary, at certain given times each month, an itemized account of the superintendent's receipts and disbursements, and in the event of a failure so to do these directors jointly and severally shall be liable to a penalty of $1000.

"It seems to me very clear that it was never intended by the Legislature in the passage of this Act to make the directors of the companies liable or responsible for a penalty in the omission of the duties of officers other than themselves. It would not be right or just to hold that directors of a mining company should be liable to a penalty for failing to have a superintendent file with the secretary itemized accounts of his receipts and disbursements at the exact time called for in the Act referred to.

"Directors cannot be held responsible for delay in the transportation of mails or other matters which might occur at any time, and which, according to plaintiff's idea, ought to work against defendants, and make them liable for a penalty of $1000.

"Therefore, in keeping with these views, I think the allegations of the plaintiff, referring to the delinquency of the directors for failing to see that the secretary omitted to post the facts, should be stricken from the complaint. It is so ordered."

The same ruling was made in the seven other cases brought by Mr. Eyre against other mining company directors for similar alleged neglect of duty.

NEWBERRY-VAUTIN REDUCTION WORKS.—When Mr. J. W. Higginbottom was here several months ago, looking over the field for the purpose of informing himself as to the inducements to erect reduction works at which ores and concentrates would be treated by the Newberry-Vautin process, he secured an option on a tract of land on the railroad about one mile east of town. Mr. Higginbottom advises the *Daily Union* from Omaha, under date of Feb. 16th, that the London syndicate, for which he was operating, has authorized the completion of the purchase, and has deposited the money with Wells, Fargo & Co. to his credit. From this it would appear that the London company has decided to erect works in this district, which will be the only works in California using the Newberry-Vautin process. The intention is to build the works on a scale to handle all the business not only that this district may afford, but from all other quartz-mining districts of the State, and it is expected that the business will grow into large proportions. As stated in these columns heretofore, the Newberry-Vautin process has long since passed the experimental stage, and is now conducted successfully in different parts of the mining world, the results of the process showing that it saves a larger percentage of the precious metals than any other practical working process. The London company has now large reduction works at Denver, Col., and is crowded with business all the time. The establishment of the proposed works at Grass Valley will be of untold benefit to the mining interests of this district.—*Grass Valley Union.*

TIMBER ON ALASKA LANDS.—A case of some importance was decided before Judge Sabin and a jury in the United States Circuit Court yesterday. The suit was brought by the United States against William Thonagal to recover 214,000 feet of Alaska spruce cedar, or the value thereof, estimated at $5000, the said lumber having been illegally cut and removed from Government lands. The lumber was shipped and brought to this city as the property of the North Pacific Trading & Packing Co. on the schooner Gem, of which the defendant Thonagal was master. The jury found a verdict for the plaintiff for the sum of $3145.35, the appraised value of the lumber.—*Chronicle.*

ALL the white miners in the Comox (B. C.) coal mines have struck on account of the introduction of Chinese, and the mines are now being worked by Chinese alone.

Astronomical Affairs.

Likelihood That Southern California's Big Telescope Will Not Be Built Very Soon—The Paris Lens Maker.

Reports from Los Angeles are to the effect that no authoritative directions have yet been given to Alvan Clark relative to the proposed 40-inch telescope on Wilson's peak. Mr. Clark spent some time there lately, climbed the peak, gave a favorable judgment respecting the location, and awaited orders. He gave the trustees of the University of Southern California to understand that he stood ready to undertake the task and even went so far as to name his price for furnishing the desired lens and photographic and spectroscope attachments. Less than $200,000 was his figure for the difficult work, but he came away with merely a "preliminary order—whatever that means," said he, in speaking of the matter. He is very confident of his ability to carry out the work, but those who are well qualified to speak say the chances are few that the great telescope will ever be made. A French glass manufacturer, Mantsur, who has practically succeeded to the business of the Feils, has offered to make Mr. Clark glass of any desired size. He is considered by Clark and others to be much better qualified for his work than was the elder Feil, who achieved world-wide fame in this direction. Mantsur has just cast a plate of glass fully 40 inches in diameter, which he will exhibit at the Paris Exposition. Clark has already an order for a 40-inch lens for a telescope to be built by one of the South American Republics, and it is very likely that this glass cast may be used for this work.

Captain Fraser, who superintended the construction of the Lick Observatory, is said to be a candidate for similar work at Wilson's peak. He was present at the recent survey of the site by Mr. Clark, the University trustees and others, and hoisted the American flag on Willow peak during impressive ceremonies and speech-making. The endowment of Mr Spencer is sufficient to secure little more than the telescope, and how much else a well-equipped observatory needs the Lick trustees can testify. And after buildings are in shape the observatory must have scientists and an income to support them and carry on the work.

It is understood that Ambrose Swasey of Warner & Swasey of Cleveland, who constructed the mounting of the Lick telescope, will come out here soon. His visit is by request, in reference to certain features of the pier of the Lick Observatory, which are not considered entirely satisfactory by the astronomers.

The Geodetic Survey.

The Los Angeles Base-Line.

About four months ago Prof. George Davidson of the Coast and Geodetic Survey left this city for field service in Los Angeles county. He has been in camp all the time, and having completed his labors, returned to the city last week. He went South, with a party of assistants, to establish a base-line in that region, similar to that located some years ago in Yolo county. The base-line in geodesy is one actually measured, from which all other distances in the survey are calculated, and upon which all triangulation depends for accuracy. The Yolo base-line is used for all purposes on the northern coast, and the line just located will serve as a check on possible errors in calculation from the Yolo base. The present final line does not differ more than 10 or 15 yards at any point from Captain Lawson's line, made some time ago. The results obtained are satisfactory, and Prof. Davidson is confident that no divergence greater than one-fourth of an inch in the surveyed lines can be found.

The established base is northeast of Los Angeles, extending northwest and southeast, between Norwalk and Anaheim. Its length is 17,496 meters, or 10⅞ miles, within 10 meters of the length of the Yolo base-line. Over a month was required to prepare for the actual surveying work, and then the rains of November and December interfered somewhat.

The officers of the party in order of rank besides Prof. Davidson were Captain Lawson, Messrs. Morse, Nelson, Edmonds and Westdahl. In addition there were 16 men who had served from time to time in various surveying parties. There was little chance for recreation or anything but close attention to the field-work. The camp day began at 5:30 A. M. and closed at 6 P. M. A standard field bar, with which the measuring bars were often compared for accuracy, formed part of the equipment. This standard bar will go to Washington to be compared with the official measuring standard there kept.

The ends of the established line were marked by vaults and surface monuments. The vaults or piers are of brick and stone, six feet square, and reach fully five feet below ground. On the surface is a large granite cube in which is set a silver bolt. In time these surface marks will be replaced by monuments of granite about ten feet in hight, suitably inscribed. The upper end of the line is about one mile northeast of Norwalk, and the lower limit two miles southwest of Anaheim.

THREE veins of rich copper ore have been found in Napa county, on the ridge between Berryessa and Spanish valleys.

Gold and Silver.

The Director of the Mint, in a report on the production of gold and silver in the United States during the calendar year 1888, says:

"The gold product was 1,644,927 ounces, of the value of $33,175,000. This is about the same as in 1887, being an excess of only $175,000. The silver product was 45,783,632 fine ounces, of the commercial value of about $43,000,000 and a coining value of $59,195,000. This is an increase of 4,515,327 fine ounces over the product of 1887.

"In addition to the product of our own mines, some 10,000,000 ounces of silver were extracted in the United States from foreign ore and bullion, principally Mexican. The total refined product of the United States in gold was 1,777,877 fine ounces, and in silver 53,128,698 fine ounces. The value of gold deposited at the mints during the year, not including redeposits, was $41,496,410, or including redeposits, $48,794,988. The foreign material comprised in this was $7,055,046. The amount of silver deposited and purchased was 35,512,789 standard ounces of a coining value of $41,323,973, exclusive of re-deposits.

"Coinage at the several mints during the year was: Gold, $31,380,808; silver dollars, $31,990 833; subsidiary silver, $1,084,773; minor, $912,201; total, $65,318,615. The import of gold bullion and coin was $11,031,041, and exports $34 619,667. The loss by export was $23 587,726. Import silver amounted to $21,592,062, and export $29,895,222. The loss by export was $8,303,160."

AN ELECTRIC BLOWPIPE.—The ordinary method of electric welding by passing the current through the points to be fused together are not convenient for all purposes, and Prof. Samuel Sheldon of Harvard University suggests what he believes would be better for many cases. The pole of a powerful magnet strongly attracts or repels the electric arc, which may by this means be driven out sideways into a point very similar to the point of flame projected from an ordinary blowpipe. At the end of this point the heat is intense, being sufficient to melt large copper wire instantly and to fuse any of the metals. It would serve admirably for welding, and a slight alteration would fit any arc lamp to perform the double function of lighting and welding.

Boring and Firing Stumps.

Mr. Wm S. Smith, writing from Greenville, Or., to the *Oregonian*, has the following suggestions to make with regard to clearing land of stumps:

I have read in your issue of February 1st an account of how to blow out stumps, together with several parties' experience, and I thought it might not be out of place to give my eight years' experience, or, at least, what I have learned in that time of how to burn out stumps and to clear up fir land generally.

In the first place, I bore and burn down the trees. For this purpose I use a common two-inch auger, 2½ feet long, for the upper hole, and a crank auger, of the same length, 1¼ inches in size, for the lower or draught hole. I bore pretty deep, then fire with vine-maple coals and fir bark and blow with a bellows. It also pays to bore another hole lower down, so when the fire burns down to it it will save chopping out for draught and is much easier done. This is the time of year for this kind of work, for not only does the fire not spread through the timber, but you have it ready to burn when dry weather comes, and nearly everything except the large logs will burn up. The best of these are generally used for fencing, firewood, etc.; the rest, or such as are necessary, I generally use to burn the stumps out with, which I do in the following manner:

I first dig a trench around the stump from three to four feet wide, according to position of the roots, and 1½ feet deep; then put in a day or two boring and firing logs. A good man, if he uses a crank auger, and a boy or two to fire for him, can bore and fire 60 to 80 places in one day, according to size of timber. They should be bored from six to eight feet apart, according to size, so as to be easily rolled on to the stump.

The next move is to bore and fire the stump, which should be bored about at the line of where the dirt ordinarily touched it. I bore into the main roots the two-inch auger on top, and the 1¼-inch crank for the draught. By using a two-inch at the top they are more easily fired, for they are generally pretty hard to get started, but perseverance and plenty of bark will win; and when the place is burned out, or both holes burned into one, then roll in the logs previously burned into their places and in the trench and on top and continue to do so, cleaning off all ashes and dirt every morning. It will take from three to four days to burn out a six-foot stump, and when it is out it is gone.

The dirt from the trench will fill the hole where it stood, level, and the plow won't touch it; whereas, if they are blown out, you still have the stump on hand, also the logs used in burning them with, no dirt to fill the hole, and at least $1 out for explosives, to say nothing of the danger. After a careful estimate I find I can burn them out in the above way for—six-foot stumps, $1; smaller ones, proportionately less. This I claim to be the cheapest way for farming lands; but where grading is required blowing out is no doubt the best, for you neither have to fill the hole nor destroy the stump afterward. Farmers at this season of the year generally have more time than money to expend on stumps, and will, I think, find the above the cheapest way, unless some one has a better way, in which case I for one would like to hear from him, for I am at present improving these fine days at this business.

SCENE IN A CHINESE THEATER.

In Chinatown.

The tourists who visit this city are always anxious to visit Chinatown and see the Mongolians in the surroundings of their daily life. The people who live here, and are familiar with the Chinese and their habits, do not consider this visit so much of an amusement. Few people, in any event, care to make the trip through Chinatown more than once, if they visit the underground dens and other unpleasant places there to be found.

Some of the buildings in Chinatown are quite picturesque, notably the temples, restaurants and theaters. The better class of Chinese decorate and enrich their surroundings in a curious and interesting way. We give on this page an engraving which shows a picturesque resident of the quarter—a Chinese actor arrayed in his peculiar gorgeous costume. White people often visit the restaurants and theaters, and they are kept cleaner than other buildings in Chinatown.

A MEDICAL MYSTERY.—A well-developed case of rabies is believed to have recently been developed from wounds from fish-hooks in New Orleans. The story is told as follows: A middle aged man named Frank Woods called at the Charity hospital for treatment. He said he was a fisherman and was suffering from terrible pains in his head, throat and chest. He acted strangely, and every once in a while would clutch at his throat. Shortly after going to bed he was seized with convulsions and showed every symptom of hydrophobia. He was chained to the bed, and when he recovered sufficiently to talk said that he had never been bitten by a dog, but had often run fish hooks in his hands and had often been finned by a fish. About midnight he grew rapidly worse. He became so violent that notwithstanding his chains it required two men to hold him. His hands were not tied, and while in the convulsions he would grasp his throat and emit sounds that greatly resembled the growl of a dog. The next morning Dr. Miles stated that the patient was suffering from a well-developed case of rabies. The report does not give the result.

PICKING FROZEN GROUND.—Mr. F. H. Shelton says: "I took off from over the gaspipe some four or five inches, just a crust of earth, and then put a couple of bushels of lime in the space, poured water over it and slacked it, and then put canvas over that, and rocks on the canvas, so as to keep the wind from getting underneath. Next morning on returning there I found that the frost had been drawn out from the ground for nearly three feet. You can appreciate what an advantage that was, for picking through frozen ground, with the thermometer below zero, is no joke. Since then we have tried it several times. It is an excellent plan if you have time enough to let the lime work. In the daytime you cannot afford to waste the time, but if you have a spare night in which to work, it is worth while to try it."—*Scientific American.*

THE ALASKA BOUNDARY.—The report of the Interior Department (Ottawa, Ont., Canada) contains the following with reference to the Alaska boundary, at present a subject of dispute between Canada and the United States: The observations of William Ogilvie, in charge of the survey in Yukon district, have not yet been completely reduced, but an approximate circular shows that the boundary is nearly 90 miles below the point where it is marked on the United States maps. This is of great importance, as the line passes through the best gold-bearing districts yet discovered in the country.

ONE HUNDRED AND FIVE collieries are now open in India, which, among them, mined nearly 1,400,000 tons of coal since 1886. It is not very long since the chief Indian Government geologist said he was prepared to eat all the coal that was ever found in India.

"SPERRYLITE," a new discovery, is said to be the first mineral yet found containing platinum as an important constituent other than the natural alloys with various metals of the platinum group.

A QUARRY of red sandstone, of fine quality for building purposes, is being developed at Ione. The rock is a pinkish red, and the quarry promises to be extensive.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

FROM PLYMOUTH.—Cor. Amador *Ledger*, March 2: Twenty stamps at the Pacific mill are making music for the town pounding out the much-needed root of all evil, and giving employment to quite a number of our working people. The water supply is rather short, and rain is needed to supply the power for the mines and also to make the crops grow. The New London mine is going to have a mill put up as fast as the machinery and material for building it can be got on the ground, so we hear. Mr. Ballard and a force of men are expected up from San Francisco this week to start the work. Mr. James has started up work on his mine, the Lady Bedford. He intends to run a tunnel at the 300-foot level, and commence stoping out rock. The Leventon Gravel mine, east of Plymouth, is turning out to be a regular bonanza. They have got their tunnel run through to the main channel of the hill, and have fine prospects in coarse gold, $5 and $10 to the pan being very frequently met with, and sometimes as high as $25 are panned out. The claim looks as if it would be everlasting, and this is the first tunnel that has ever been run into the hill. All other mines in this place are lying idle at present.

DRYTOWN,—The Potosi mill has been idle a few days on account of scarcity of water, but started up again this morning with David Dyer as mill boss. The Gover mill is also idle. They ran out of rock while changing the steam-power to a water hoist, which proved a failure on account of insufficient pressure to run both mill and hoisting machinery from the same pipe.

GOVER.—*Ledger*, March 2: Supt. Call was in Jackson this week, and stated that the trouble with the water-power recently put in at this mine had been greatly overestimated. He says the mistake was made in not taking into account the friction in over a mile of pipe. Mr. Knight is confident that he can get it to work all right. The work of draining the shaft is in progress. All the ore that has supplied the mill under the present management has come from above the 500-foot level. Below that the shaft has not been freed from water. It is 1000 feet deep, and the intention is now to see the bottom and explore the lower levels. It will take six weeks to complete the drainage of the shaft. The mine has been doing remarkably well of late. Some of the ore has been immensely rich. Forty pounds of quartz was sold some time ago for $1000, to a jeweler. In the richness of sulphurets the Gover stands at the top. As much as $9000 has been received from sulphurets in a run of two months, the sulphurets running from $165 to $200 per ton. This is said to be without a parallel for 20 stamps. The ore carries about two per cent of sulphurets. The rock varies considerably in its yield of gold, running from $3 to as high as $10 and $12 per ton.

AMADOR GOLD MINE.—At this property work is going ahead with increased activity. Graders and millwrights are at work on the new hoisting and pumping plant. The ore bin is put up, teams are at work hauling rock for the masonry work, and it is expected to have the works in operation in a month's time. The ditch is nearly finished. Work on the reservoir will be started next week. The company has just finished timbering the 450 station and resumed sinking. The underground engine is expected to arrive in a few days, when it will be put at the 250 level to do the work now done by the hoisting works at the south shaft. Then the surface hoist will be taken away to allow the millwrights a better chance to put up the big hoisting works. Afterward the underground engine, which will be run by compressed air, will be used to sink winzes.

INTEREST SOLD. — Frank Littlefield has sold his interest in the Alice mine, above Big Bar bridge, to Mr. Petrie, one of the partners, for $15,000. H. T. Tripp was offered the same sum for his share, but refused it. The property is paying well, better, in fact, than the owners expected.

ALPI.—Bids were opened last Tuesday for sinking the shaft 50 feet below the tunnel level. The contract was awarded to W. T. Robinson, J. E. Hageman and E. F. Henderson at $4.75 per foot, contractors to furnish powder, caps, candles and fuse.

MISCELLANEOUS. — Ten stamps of the South Spring Hill mill are to be started at once on rock from the Talisman, for a test crushing.

Calaveras.

COPPEROPOLIS.—*Prospect*, March 1: Considerable work is being done on the copper mine at Copperopolis. New hoisting works are being constructed on the main shaft and a six-inch Jack Head pump is being put in. The Copper Co. is constructing a building about 30 by 60 feet to be used as a storeroom and offices. Within the last year several new buildings have been constructed. We learn from Mr. Ferson that from 500 to 600 tons of copper ore have been shipped from the mine during the last year. The coming season the Copper Co. expects to ship about 1000 tons of ore per month. At the present time there are about 110 men working in and about the mine, 50 of whom are employed in the mine; the others are wood-choppers, teamsters, etc. At present good copper ore is being taken out of the seventh level of the mine.

El Dorado.

THE BALTIC DISTRICT.—Placerville *Observer*, Feb. 26: While we are not now authorized to mention names, we have had it from good authority that several men of vast capital are going earnestly to work, within a short time, to make developments in the Baltic district, a few miles north of Grizzly Flat, and during the coming spring and summer not less than a quarter of a million dollars will be expended in that district in machinery and developments. Some of the most promising prospects in the county are found there, prominent among which are the Big Bonanza and the Varozza mines. It is now in contemplation to build a good wagon-road from Pleasant Valley, across Camp creek, to the Baltic, for the more convenient transportation of machinery and supplies to this new district, and from the present outlook, we are looking for some important developments to be made there. The proposed road would shorten the distance about 14 miles. The Stillwagon mine, upon which work is being vigorously pushed, has been bonded to a San Francisco company, and a five-stamp mill is being erected.

ALPINE. — Georgetown *Courier*, Feb. 28: Supt. Morton informs us that he is going to resume work on the Alpine within the next few days. The present machinery on the mine will be retained and used.

TUNNEL.—A tunnel 50 feet long has just been run by Gibbs & Buchler, under contract, on the ledge on east side of Dark canyon, at Bright Hope mine. The ledge is three feet wide and good milling ore. The tunnel will be continued 50 feet farther, when a crosscut will be run to develop the ledges lying to the east. It is known from surface prospects that the two ledges to the east are much larger. To run in on the west ledge, which was lower down the canyon, and then crosscut, was deemed the most practical thing to do. This development is encouraging, as it proves that free milling ore continues to a depth of fully 300 feet below the shaft on the Bright Hope mine.

Fresno.

NEW GOLD STRIKES.— Fresno *Expositor*, Feb. 27: The mining industries in this camp have progressed very rapidly in the last six months. The Surprise mine, owned by an English company, is looking better than it ever has. The company has been sinking for the past three months. The mine is 520 feet deep now, and a drift is run 600 feet to the west on the 400-foot level, and it shows a fine and continuous body of ore from four to six feet wide. There is a drift run also on the east side of the main shaft, 400 feet, on the 300-foot level, showing a fine body of ore also. This mine is under the superintendency of J. B. Little, who is a practical miner. The company has a 25-stamp mill running day and night on the mine, and have about 50 men in their employ. It is a fine property beyond doubt. The next principal mine of the camp is the Gambetta, owned by Mr. Haley. This is supposed to be the richest mine in the county. Mr. Haley has the largest sized Huntington mill on the mine, and has kept it running day and night for the past five years. The mine is 450 feet deep and has several hundred feet of levels run on it. The mine employs from 15 to 20 men the year round. The Nob Hill, owned by Mr. Rhyne, is looking splendidly. Two arastras are running on the ore, which is packed on animals from the mine to the arastras, a distance of one mile. Two rich strikes have been made lately, one by A. W. Pool and the other by Joe Swanstrom. The strike made by Pool is an exceedingly rich one, near the Fresno river. He has opened the ledge in four different places, and it shows about the same in all of them. He has taken out rock that is nearly half gold, and considerable of it, too. Swanstrom's mine does not show much specimen rock, but it is very regular and will go $50 per ton. The ledge is two feet wide and has a 40-foot shaft on it. The two prospects are close together—about a half mile distance between them. There is no doubt but what those two strikes will prove to be good mines in a short time and draw the attention of mining men to this camp.

COPPER MINES. — Madera *Mercury*, Feb. 27: Few people in Fresno county are aware of the existence of one of the richest beds of copper in California, but which is as yet undeveloped. It is situated about 12 miles northeast of Madera on the large ranch formerly owned by H. C. Daulton. Several years ago, when Mr. Daulton disposed of this land, he reserved 60 acres on which are many rich ledges of copper ore, and he rightly anticipated that it would be a valuable possession at some future time. Mr. Daulton allowed others to become interested in the property, and it is now owned by a corporation composed principally of Fresno capitalists. This week a San Francisco syndicate is negotiating for the purchase of these mines with the intention of immediately commencing the work of development.

Nevada.

CHAMPION.—Nevada *Transcript*, Feb. 26: The Champion quartz mine at this city never before looked so well as it does now. Another level is being sunk for, and when it is developed the milling capacity will be increased by five stamps and two Frue concentrators. Supt. Vincent's management of this property has been notably successful from the time he took charge of it.

DERBEC.—At the Derbec drift mine there is now better gravel being opened than for a long time previously. Eighty-five men are steadily employed. Preparations are being made to rewash the tailings which have been impounded to this end. The payment of dividends will be resumed at an early date, and there is already enough pay dirt in sight to yield five or six. Supt. Galavotti displays much ability and care by the manner in which he handles this extensive property.

YOU BET.—The cement mining company operating at You Bet has every prospect of opening one of the best properties of that character which has existed in the county at any time. Said an old resident of that locality: "From all the information to be obtained it is safe to predict that You Bet mining district is about to recover its old-time prosperity."

Placer.

IOWA HILL.—Cor. Placer *Herald*, Feb. 26: Mining circles are rather quiet just now. The reports from the Pioneer are very encouraging. It is said to be paying very well, although handicapped by a scarcity of water to run all the stamps. I believe there have been only 15 running until very recently. The ore is very good and the force of men in the mine is being gradually increased. Red Point continues to pay well. Watts Bros. at Strawberry flat are at present working only four men, but in the near future their force will be enlarged. The new tunnel at the Eclipse quartz mine, near Cottage Home, approaches completion. The Hohrman mine, at Prospect hill, is working splendid. I hear that the gravel is just yellow with gold, and an average of $12 per carload has been obtained by washing. With a mill this ought to produce at least $30, if not more, per load. The Morning Star has kept up a steady output of gold for the past year or more, so that one is hardly justified in saying much else of this mine than to call it a good-paying property. The contract for extending the main tunnel is going on satisfactorily. The water supply of this mine is short, and if no rain falls this winter, more than has already fallen, the water will be scarce next summer. The Washington is working a small force of men, but there is no water in the ditches which communicate with this mine to wash the gravel. I hear, though, that they are getting good pay by rocking the best of the dirt. I am very much afraid that this place will suffer greatly from want of water unless the storms of March are unusually severe. Armstrong Bros. & Miller are running their tunnel night and day, and hope soon to reach the long-looked-for prospect. It is reported here that the Hogsback mine is shut down until more favorable weather for starting a new tunnel. Also whispers of another great tunnel at the Cape Horn next summer. The New Basil has started a tunnel on their mine, and I am told that as soon as possible they will push it to completion in short order. This tunnel is to do away with the hoisting works now employed at this mine.

BELL'S MINE.—J. E. Spencer is putting up a whim on A. O. Bell's mine, near the Rock Creek school-house, and will sink a shaft 200 feet in depth to test the richness of the ledge. The *Herald* expects to hear of rich developments, as this ledge has been prospected for a distance of 3000 feet on the surface, and rich ore has been struck at every point.

FOREST HILL. — Placer *Republican*, Feb. 26: Wm. Dodge, Jr., of Forest Hill was down yesterday. He reports that he still has 14 men pegging away at the Baker divide mine, but since last September all work has been done by hand, on account of the lack of water. The main tunnel of the mine is in 3300 feet, but all recent work has been done in drifts from the upraises, and is in the nature of prospecting. The company hopes to make some provision for water in the near future.

BELCHER.—Georgetown *Gazette*, Feb. 28: The Belcher quartz mine in Placer county, near Ralston's, formerly known as the Whitman claim, is being opened by Jos. Ward of this place. He has completed 70 feet of tunnel within the last six weeks, and expects to reach the ledge before the end of March. The lode is 10 feet wide on the surface, and shows a good prospect.

Plumas.

A GOOD MINE.—Plumas *National*, Feb. 28: The Lucky S. mine, situated above Indian Valley, owned by J. Hardgrave, E. D. Hosselkus, J. W. Thompson and others, is paying exceedingly well. J. W. McCartney, an experienced quartz miner, is superintending the mill and under his management the rock is paying about $20 per ton. The ledge is increasing in width as the work is pushed forward and everything indicates a rich and permanent mine.

RICH STRIKE. — A rich quartz ledge has been found in Gold valley, a short distance south of Mohawk, by a man named Andrew Gibson. We have been informed that some of the rock taken out is marvelously rich.

Shasta.

STARTED UP.—Redding *Democrat*, Feb. 23: The Lost Confidence mill at Iron Mountain started up last Saturday and is now running night and day. The Texas & Georgia mine has received and put in place their new machinery—the Dodge cannon-ball outfit—which works to a charm. They now work up 20 tons of ore a day. The sulphurets are still shipped to Selby in San Francisco, however. The Walker mill in Old Diggins district has again started up. The proprietors will put a pipe into the river soon, when they will add about ten stamps to their present capacity. The old Florida and Josephine mines, under the management of the Walker brothers, are developing into one of the best dividend mines in the State. They are more than satisfied with this purchase, and it is known that their monthly shipments of bullion are large. The contract to build the road from the Uncle Sam mine to Kennet has been let to Lee Fader, and work will begin immediately. The new tunnel which is to tap the main ledge in this mine has also been contracted for. It will be 600 feet long. F. Warner came down from the Clipper mine Monday morning, bringing a nice bar of gold, cleaned up from a trial run of 12 tons of ore through a Kendal mill. He went to 'Frisco yesterday morning and intends to purchase a five-stamp mill, which he will erect alongside of the Kendal. After a run of eight days in the Gladstone mill on Cline gulch, a $1500 bar was cleaned up last Saturday. The ore of this mine is milling an average of about $20 a ton. Mr. Thomas Lowden is reopening the old Highland mine near French gulch, and recently struck some good ore in a new drift run from an old tunnel. This is one of the oldest quartz mines in the county, having paid well years ago when worked by a local company. It is now owned by Sheriff Hopping and Mr. Lowden, and if the present developments continue favorable, the old mill will be moved and rebuilt on Clear creek, a short distance from its present location.

MINING OPERATIONS.—Redding *Free Press*, March 2: Joseph Parker returned from San Francisco last Monday. He informs us that he has succeeded in forming a company in Kearny county, Nebraska, for the purpose of sinking to the bottom of an old channel that crosses Dry creek near Horsetown. Noah S. Batcheller has organized three companies in Kansas and Illinois to operate in the same vicinity. They expect to commence operations about May 1st. Three families are coming on at once with the companies and two more will arrive shortly afterward.

Sierra.

ANOTHER RICH FIND.—*Tribune*, March 1: Another good find has been made at Hog canyon in the way of an immensely rich quartz ledge. The ledge is about three-quarters of a mile northeast of the Buffalo mine, and it resembles that rock in many respects. A gentleman, who ought to know, told us yesterday that he believed the rock which comes from the newly developed ledge to be even superior to the average rock taken from the Buffalo. Knowing the quality of the Buffalo rock, we can imagine the richness of the new prospect. Our informant says that from no part of the ledge opened up can a piece of rock be broken off that does not show some free gold. Messrs. Geo. McGee, Hugh Murray, John Sorocco and Felix Yoell are the locators of the ledge. Geo. McGee and Felix Yoell are at present at work sinking a shaft.

Siskiyou.

HUMBUG GULCH.—Yreka *Journal*, March 2: A man named Kincaid and his partner, two strangers, have been at work in the old Joe Long quartz ledge on Humbug gulch, west of Yreka, and took out a piece of quartz last week, from which they pounded $60 in a mortar. They are continuing work in the ledge, and expect to realize a rich and permanent mine of great value. McCook & Co. are busy getting out quartz from their mine on Humbug creek, and expect to take out considerable money this season. Their mill is also kept running every day, crushing rock for the Hegler Bros.' new ledge, lately discovered on Old Craggy. The Hegler boys and Bruce Aldrich are also getting out quartz at their claim on the north fork of Humbug, and will commence crushing as soon as warm weather melts the snow and ice to supply water for their batteries and steam engine, their mill and mine being located in the shade of the mountain, where the hot sun has but little influence, until we have warmer nights and rains to help out. The Ashland *Record* is informed by a gentleman from Hornbrook that the upper drift in the Black Jack mine to strike bedrock in Cottonwood canyon, this county, is in 175 feet. In the lower tunnel, which is being used to drain the water, good paying gravel was discovered. This mine is owned by Geo. Barr & Co., and M. Sullivan and Conductor Morgan are interested in it. They recently refused $8000 for the claim from San Francisco parties. Miners from Hungry creek, in the Siskiyou foothills, near the Oregon boundary, have been at Hornbrook lately with some very rich specimens of quartz rock containing more gold than quartz.

San Bernardino.

CITY CREEK MINES.—*Index*, March 2: Public interest in the City Creek mines has dropped below zero, as no returns have ever been made public regarding the working of the ten tons of ore sent to National City. The *Times-Index* is able to announce officially that the bottom has not dropped out of the mining boom of City Creek. About the time the carload of ore was sent to National City there arose dissensions in the management of the work where the ore was to be worked. The result was that the ore was not properly handled, and yet a good-sized brick of bullion containing gold and silver was obtained. This brick has been sent to San Francisco to be refined and the owners expect returns from the same soon. The owners of the mine have so much confidence in their property that they are now putting in small, temporary works at Colton, at a cost of about $600, to further test the rock. Mr. Chick, of the National City works, will have charge of the works at Colton, and before many days another carload of rock will be worked, when the full report will be given to the public.

SAMPLING WORKS ASSURED.—Colton *Semi-Tropic*, March 2: Sufficient money has been raised to erect the sampling works in Colton. They will be erected on the vacant lot southeast of the Pioneer lumber-mill, work having been commenced this morning. It is expected that as soon as it is demonstrated that good ore can be found in sufficient quantities, reduction works will follow. The claims on the Jurupa ranch are reported to be making a good showing. Some of this ore will be among the first to be tested by the new sampling works. Mr. G. H. Chick will be manager of the concern.

San Diego.

STONEWALL.—Julian *Sentinel*, Feb. 26: Old experienced miners, men who ought to know, say that the Stonewall promises to be the richest mine on the coast.

SAN DIEGO.—In all probability the San Diego mine, east of town, will be opened up shortly.

Trinity.

NEW RIVER MINES.—Trinity *Journal*, March 2: J. D. St. Clair of New River was in town this week, and reports that camp in a most flourishing condition. Ladd & Clements are taking out rich rock from the Mountain Boomer, which they are crushing in their stamp-mill. They are running tunnels and developing the mine and have their property in fine shape to handle. The mine has been bonded to an Eastern company for $60,000. Some surveying will have to be done on the mine before a transfer can be made. This winter's snow has hitherto prevented a survey. A large force of men is at work on the Ridgeway. A tunnel is being run to tap the ledge at a depth of 400 feet and is now in over 200 feet. The tunnel is being pushed rapidly, eight-hour shifts working night and day. The ledge at the bottom of the shaft is well defined and is high-grade ore. When the mine is well opened it will be one of the best in the northern country. An English company has bought an interest and is supplying the capital to develop and work the mine. Nicholson, who has leased the Hard Tack of Ladd & Clements, is taking out first-class rock; he cleaned up $2750 from 15 tons of ore. That is good enough ore to satisfy any miner. This mine is an extension of the Ridgeway. The owners of the Sherwood mine are running tunnels, developing the mine and taking out ore. They are not crushing now, owing to the scarcity of water. In the Uncle Sam, Boles, Gulick & Heney are running a tunnel to tap the ledge at a depth of 200 feet; this will give them plenty of stoping ground. Smith Brooks, the veteran prospector and one of the fathers of New River, is running a tunnel on the north side of the Mary Blaine to tap the ledge. G. V. Heley has struck a big prospect on Eagle creek which bids fair to equal any of the older locations. There are over 500 feet of tunnels in the Hunter mine, and ore enough in sight to take a year and a half to crush. The ore averages $40 a ton. On the whole the prospects for a prosperous season's work in the camp are most encouraging. There are about 150 men there and the camp looks better than ever. The advent of capital is all that has ever been needed to show the worth of the mines, and from now on the camp will steadily increase in wealth and numbers.

DEADWOOD.—Trinity *Journal*, March 2: The Deadwood mining camp is gradually improving and the mines showing better all the time. The Brown Bear Co. has the best mines in the camp, and under the superintendency of T. J. Houghten they are paying larger dividends than ever before. The McDonald Bros. and Franck are doing well, running their 10-stamp mill constantly on good ore. Barney McDonald, the superintendent, is an experienced miner, and is making the mine pay handsome dividends.

THE QUARTZ OUTLOOK.—Although the gold yield from our placer mines will be considerably curtailed on account of the dry season, yet we can safely predict a large increase in the output of our quartz mines over last year. With the completion of the East Fork wagon-road, work on which has already begun, several mills will be erected and put into operation before the summer is over in the East Fork camp and the output of bullion will be largely

increased. New River, which lay dormant last summer, has made a fresh start and very lively times are anticipated. Capital has found its way in and will soon display its power in increased development and a steady shipment of gold. Ballychoon has also emerged from the obscurity of last year and work has begun in earnest. There are good mines there, and they will make a good showing this season. Deadwood is holding its own as one of the richest camps on the Pacific slope. News also comes in of promising strikes made in different parts of the county, so there is every reason for asserting that this year Trinity will take a huge step forward in her quartz interests.

Tuolumne

RIVER MINING.—Tuolumne *Independent*, March 2: J. R. Moffit has already commenced getting ready for his river-mining season in the Tuolumne river, about a mile below his bridge. He is also working on his new process for treating ores. He expects to get into his river mine rather earlier than usual this summer. It is said that Dave Oliver and Geo. W. Nicol have leased the Smith vein, and will proceed to develop it. It is the upper vein of three, the under one being the Bonanza. Instead of following along right over the Bonanza pockets, Smith has been branching off. The new parties will follow the vein over the Bonanza and endeavor to find pockets near the surface.

NEVADA.

Washoe District.

BALTIMORE.—Virginia *Enterprise*, March 2: Are still hoisting some good ore from the 338 level.

HALE & NORCROSS.—The face of west crosscut No. 1 on the 400 level still shows stringers of rich quartz. The south drift from the west drift on the north boundary is now advanced 41 feet. More and better ore is found in it than was seen last week. On the 500 level the south drift is now advanced 141 feet. The upraise and stopes above this level are looking well and are supplying the usual quantity of good ore. The 600 and 700 stopes are still looking and yielding well. On the 1300 level quartz carrying some metal is being found in the north drift. During the past week 900 tons of ore, averaging $25 19 a ton, was sent to the Mexican mill. Bullion on hand and previously shipped, $52,746 78.

SAVAGE.—The stopes on the 400 level are improving as regards the quality of ore extracted from them. The several prospecting drifts are looking well. On the 500 level ore is being extracted from the old stopes. East crosscut No. 3 on the 600 level is also yielding paying ore. During the past week 480 tons of ore were sent to the Rock Point mill which assayed $21.33 a ton.

CON. CAL. & VA.—Milling ore is being taken out on all the levels from the 1400 down to the 1950. The best ore and the largest deposits continue to be found on the 1650 level. Are shipping the usual amount of ore to the Eureka and Morgan mills. The average of the assays will be about the same as last week.

CHALLENGE.—Good progress is making in the drifts joint with Confidence, both on the 300 and 1300 levels. They have encountered quartz carrying some metal. The little ore at present being extracted is good, the average assays being $24.73 a ton. The ore goes to the Brunswick mill.

CROWN POINT.—No. 1 west crosscut is out 43 feet in a mixture of porphyry and quartz. The north drift on the 600 level is out 61 feet in porphyry showing streaks of quartz. Have started a north drift from the bottom of the 700 raise, which is out 32 feet in quartz giving low assays.

CONFIDENCE.—Are shipping to the Brunswick mill 450 tons of ore a week, the assays of which average $24.73. Good progress is being made in the drifts joint with Challenge on the 300 and 1300 levels.

CON. IMPERIAL.—On the 1100 level east crosscut No. 2 still continues in quartz and vein porphyry. The work of repairing the main north drift on this level is making favorable progress.

CHOLLAR.—The exploring drifts are finding some good ore. The Nevada mill is running well, the power being one-half transmitted from the Pelton wheels on the Sutro tunnel level.

BELCHER.—The north drift on the 200 level is out 530 feet. The drift from the bottom of the winze on the 1100 level has not yet connected with the raise from the 1300 level.

OVERMAN.—Are taking out about 330 tons of ore a week, which is being worked at the Vivian mill. There is nothing new in any of the exploring drifts.

OCCIDENTAL.—On the 300 and 350 levels much ore of milling value is found. A contract has been let for a 20-stamp mill with concentrating machines.

NORTH OCCIDENTAL.—Some good ore is being found on the 400 level, and quartz showing metal has been cut on the 250.

UNION CON. AND MEXICAN.—The north drift from the Ophir on the 1465 level has reached the Union Con. south line.

SIERRA NEVADA.—The exploring drifts and raises are making good progress, but as yet nothing of value is seen.

OPHIR.—The drift from the bottom of the winze is in milling ore, but it is over the line in Con. Cal. & Va. ground.

UTAH.—The exploring drifts on the 600 level are in vein material carrying some metal.

NEW YORK.—Good headway is making in the north drift on the 800 level.

ALTA.—The mill is running steadily on ore from the 800 and 1100 levels.

JUSTICE.—The mill is running steadily and the mine is looking well.

YELLOW JACKET.—Only exploring work is being done at present.

SCORPION.—The usual progress is making in the 300 crosscut.

ANDES.—Are progressing well in the reopening of the 175 level.

BULLION.—Usual exploring work in progress.

Golconda District.

ADELAIDE COPPER MINE.—*Silver State*, Feb. 26: The Adelaide copper mine at Golconda is fast proving the theory of its owners, that it would become richer in the precious metals as greater depth is attained. At the surface the ore assayed from $6 to $8 in silver per ton. At its present depth, 82 feet, ore assaying 17 per cent copper and 40 ounces in silver is found, with every prospect of still increasing. The shaft is fitted up with one of the most economical but efficient hoisting rigs in the State.

Paradise District.

CREDIT MOBILIER MINE.—*Silver State*, Feb. 26: Albert Lay says the Credit Mobilier mine is now being worked somewhat extensively, and is producing rich gold-bearing quartz. It is owned by A. M. Sadorus, who has worked it at intervals for years. Some specimens taken from the mine have literally been covered with gold. The mine is located about 26 miles east of north from Winnemucca, and about 16 miles from Golconda.

Pioche District.

PIOCHE.—*Record*, Feb. 26: The Pioche Con. Co. has had men working for several weeks on the 8th and 10th levels of the Raymond mine, crosscutting for the ledge. The work on both levels is encouraging and stringers of high-grade ore are already encountered. The prospects of opening up valuable ore bodies at these points are very favorable, and if the theory entertained of the ledges at this part of the mine proves correct, there is room for a bonanza.

Tuscarora District.

BELLE ISLE.—*Times-Review*, March 2: West crosscut from north drift, 250-foot level, extended 21 feet. Rock in the face looks more favorable.

COMMONWEALTH.—100-foot level: No. 1 winze from drift running north from south end line has been sunk 13 feet, showing a small seam of high-grade ore. West intermediate drift from No. 4 chute has been extended six feet, and continues to yield rich ore. Drift running east from same chute is also turning out fine ore. South drift from No. 8 chute has been extended 15 feet; about 15 inches of good ore. 150-foot level: No. 3 winze has been started from east lateral, south; has been sunk three feet, exposing fine ore.

GRAND PRIZE.—400-foot level: West drift on the old vein extended seven feet in a strong vein but low-grade. Face of east drift from north crosscut advanced 13 feet, showing a four-foot vein, two feet of which is $500 ore, balance low-grade. West drift extended 18 feet, vein being larger, but low-grade. Face of north crosscut has been advanced 11 feet through a favorable looking formation.

NORTH BELLE ISLE.—North drift from the bottom of No. 1 winze, 400-foot level, extended 17 feet. The upraise south of the Queen line, 300-foot level, has been connected with the line upraise. An upraise has been started at the south end of the intermediate drift, below the 300-foot level.

FOUND TREASURE.—Some cleaning up of the drifts in the 150 and 200-foot levels has been done. No work of importance will be done, except to keep the water out, till supplies for sinking the shaft another hundred feet can be procured.

NAVAJO.—Work has been suspended for the present in No. 4 south drift, and an upraise started 70 feet south of the 350 stopes, which shows some good ore. The stopes are looking well and are turning out the usual quantity of ore.

COMBINATION SHAFT.—The combination shaft has been sunk and timbered 19 feet. Rock in the bottom shows harder. North drift from the Commonwealth line extended 22 feet.

NEVADA QUEEN.—The stopes continue to yield about the same quantity of concentrating ore. Concentrating works are running steadily and concentrating good ore.

ARIZONA.

HILLSIDE.—Prescott *Courier*, Feb. 25: We heard a gentleman remark the other day that Jack Lawler of the Hillside was naturally lucky, and as proof, said that shortly after the discovery of his famous mine, he let a contract to Joe Howell to sink so many feet, Joe to have the ore he took out. He selected his ore, which ran about $200 a ton, and threw aside a great quantity which he considered too low grade to handle, and finally sold it to Lawler for a mere song, which Lawler bought in good faith, not having any idea of its value. Imagine his surprise and joy on bringing some of it to town and finding that it ran $500 per ton. Of course this looked like luck, but Jack never waited for luck, but went forward with a strong arm and stout heart to hew his own way. There is a fine selection of samples from this mine in County Treasurer Waddell's office, all selected within the last week. There can be seen a red-looking ore that runs $1100 to the ton, and some green-looking rock that runs $480 in silver and 30 ounces in gold. Below the water-line the ore is all sulphide, while that above the water-line is chloride. The greater depth attained the larger becomes the ledge. As regards richness, there is no difference between the chloride and sulphide ore.

HARQUA HALA.—Sim Powell, an old mining friend of the *Courier*, called on us a few days ago, and said he had just returned from the Harqua Hala district, where Stein & Co. have two good mines and Chloride Jack one; that there are lots of California and Colorado prospectors in the country who have money and good outfits, and that there is a tremendous field for the prospector to operate in. Mr. Powell is a partner of Wm. Vanderbilt in some promising gold, silver and lead properties below the new Walnut grove dam; says our prospectors can find no better country for their business than right around home; that it is good enough for him and he means to stand by it.

BRITISH COLUMBIA.

KOOTENAY MINES.—*Colonist*, Feb. 26: Mr. Harry Anderson, mining recorder at Nelson, Kootenay Lake, who arrived here on Tuesday, furnishes us with the following news: The Hall Brothers on Mineral Mountain have been running two shifts on the Silver King mine, and are reported to be in a fine body of ore. Three miles west of them the Tough Nut is being worked by Morrow and Dolan. They report striking a fine body of ore, assaying as high as 400 ounces of silver per ton. The Poor Man, on Eagle Creek, is being worked by Nail & McDougal. Dr. LaBau & Co. report very good ore in large quantities in their various claims.

HOT SPRINGS CAMP.—A. D. Wheeler has been running two shifts on the Gallagher all winter sinking a vertical shaft and is now driving for the ledge. The Number One is being worked by Mr. G. Wright, who has been running a tunnel all winter to tap the ledge. The Little Donald, owned by Davenport and Stevens, has been worked all winter, sinking on an incline out of which they have been driven by water. The Krao, owned by A. D. Wheeler & Co., has also been worked by a few men, following a very rich chute of ore, which was followed until the water compelled them to stop work, leaving the incline on a large body of ore, averaging 180 ounces silver per ton. The Now Then, owned by McGovern and Cap Hayward, adjoining the Crow Fledgling on the south and on the same ledge as that and the Krao, also shows a great quantity of fine ore. The above claims are those on which most of the work has been done through the winter. A number of others have, however, had a small amount of work done on them, nearly all making good showings, among which may be mentioned the Maestro, Banker, Spokane, Kismet, and Ayesha, the last two being adjoining claims on the same ledge. On the whole, all join in saying that this camp will prove to be one of the richest in the Northwest.

COLORADO.

THE MOLLIE GIBSON STRIKE.—Denver *Republican*, March 2: The Mollie Gibson at Aspen still leads. The best of the rich chute as so far developed proves to be embraced in about 15 feet along the vein, but an upraise shows that it improves in the roof. This upraise has been run about three feet and has developed wonderfully rich ore. Much native silver is found and the dirt that falls on the floor is like stuff from a retort. The manner of working is to drive up alongside of the ore and then gad it off. In this way the finest specimen of ore ever seen in this camp, or for that matter in any camp, was taken down last evening. It was broken late and brought over to the office in the evening. The wonderful specimen weighs a little over 300 pounds and will run, as a whole, close to 10,000 ounces to the ton. A piece from the point where the gad was driven in assayed 20,325 ounces. On one corner is a mass of pure silver that must aggregate five pounds, and all over the great boulder the pure metal is plastered. There is not a square inch in which the rich sulphide does not show, and right through it the long way runs a streak, 1¼ inches thick, of the solid metallic stuff that runs over 20,000 ounces. The piece was not weighed, but good judges put the figure at 300 pounds, and it will probably exceed it. The value of this single piece of ore is estimated at $1500.

DAKOTA.

FROM RUBY.—Deadwood *Pioneer*, Feb. 26: The Eclipse company has let a contract for another 50 feet of tunnel. R. E. Love goes up to-day to personally superintend the work. The contractors on the Imperial company's tunnel have completed 75 feet. A further distance of 25 feet will be run to tap the ore body, about 60 feet under the shaft on top of the hill, where ore was first struck. The ore in the top of the shaft assayed from $20 to $28 per ton. Croppings of the vein are seen all around on the same level as the drift, and when the ore body is encountered it will demonstrate a depth of 60 feet of ore. This is the stock of which 30,000 shares were sold last week to a well-known mill-owner up gulch.

IDAHO.

NIAGARA.—Ketchum *Keystone*, Feb. 26: A fine development has been recently made by the lessees, Messrs. Cary & Howe, in the Niagara mine in the Boyle mountain district. They have exposed in their mine a continuous ore chute 60 feet in length, carrying a strong vein of an excellent quality of ore. Some two or three other mining properties in the Boyle mountain district are also being worked under leases, all of which, we understand, are meeting with good results.

SMOKY.—In the Smoky mining district active operations have not been started as yet. There has been quite a force of men kept at work in the Silver Star mine during the winter, but as to the present prospects and condition of the mine we have been unable to ascertain anything. There have been of late vague reports circulated concerning the outlook of this important mining property, but it has been difficult to get at the facts.

EAST FORK.—Flattering accounts come from the East Fork locality and every one there is beginning to make preparations for a vigorous mining campaign the coming season. News was received yesterday that a rich strike had been made in Domski's Venus mine. The vein is reported to be from four to five inches wide, of gray copper ore, running from 800 to 1000 ounces of silver per ton.

STRIKE.—It is reported that a fine strike has been made by Messrs. Shaw & Jacobs, lessees, in the Olympia mine, up Bassett gulch. Parties who came down from the mine on Wednesday stated that one man in one of the openings of the mine is breaking down over a ton of high-grade ore per day.

MATTIE.—The lessees of the Mattie mine on Trail creek are feeling greatly encouraged by the present looks of the mine. It is said that they are encountering ore now and then which runs up into the thousands.

EMMA AND LAST CHANCE.—Wardner *News*, Feb. 26: Development work continues on the Emma mine, giving employment to 13 men. The tramway is daily utilized in conveying lumber and other material to the mine, and also in moving ore to the bin which has a capacity of 300 tons. The mill will resume work about the first of April.

SAN FRANCISCO.—Work is progressing most favorably on the San Francisco mine, where a force of 15 men is busily engaged under the superintendence of E. C. Ray. A new tunnel has been started 100 feet below the old workings, and other development work will be commenced immediately.

FAY TEMPLETON.—Preparations are making for the renewal of work on the Fay Templeton mine. Important alterations and improvements will be made in the mill. Four Frue vanner concentrators manufactured by Fraser & Chalmers of Chicago were shipped from that city on the 16th instant, and are expected at the mine by the end of next week.

MONTANA.

THE CHAMPION MINE.—Butte *Miner*, Feb. 27: It was learned yesterday on the authority of E. P. Mills of the Champion Con. that satisfactory progress is being made on this fine property. It is situated in Deer Lodge county, and lies 16 miles east of the town of Deer Lodge, within half a mile of the county boundary. The shaft is now down about 250 feet, and they are sinking another 100 feet, when they intend crosscutting to the vein, which will happen, at the present rate of progress, about the 1st of April. During the present month 120 tons of ore from the west level at the 250 were shipped to Anaconda and Great Falls, without sorting, and assays received from this have shown 70 ounces silver and $3 to $3.50 gold. There are 23 men working in the mine.

NEW CARBONATE CAMP.—From a gentleman just in from the new carbonate camp situated at the head of German and French gulches, we learn that there is considerable development going on with the most satisfactory results to the fortunate owners, and he is of the impression that before the end of 1889 it will be one of, if not the greatest carbonate camp ever struck. He anticipates a great influx of visitors as soon as the snow will permit of prospectors. At present there are four mines that are bonanzas, viz.: The Edwards Carbonate Co., the Anaconda Co., the Fisher Co., and the McIntyre Co. There are also some very promising locations on Carbonate hill that will make their owners rich by the judicious use of a grub stake, aided by sufficient muscle to sink a ten-foot shaft. There is a large scope of country south and west of Carbonate Hill that will well repay prospectors to investigate, and he says emphatically that he knows of no camp in this Territory where capital can be placed to better advantage. Being so highly impressed with this idea, he intends returning as early as practicable to test the correctness of his opinions. He speaks flatteringly of the gold lead owned by Doctor Beale and his son Perry.

THE PARNELL, west of the Anaconda, is now down 380 feet. When the depth of 400 feet is reached crosscutting will be begun to reach the continuation of the same lead they had last summer.

OREGON.

THE DOWNIE CLAIMS.—Bedrock *Democrat*, Feb. 23: Mr. Archie Downie expects to commence his placer operations at Sumpter within the next two weeks. His claims are equipped with all the latest improved appliances for scientific working, and should the season be at all favorable he will have a successful run. He has just purchased upward of 600 feet of hydraulic pipe from Mr. L. W. Nelson, and the same will be hauled to his mine at once. In addition to this he has already 2000 feet of pipe in position at the mine. Last fall he completed a new ditch to bring in a water supply from a lake high up in the mountains, and he will commence this season's work under more favorable auspices than ever.

CRACKER CREEK.—Bedrock *Democrat*, Feb. 28: Messrs. Ed Hardy, Joseph Murphy, J. W. Virtue and A. McKinnie returned last Sunday afternoon from Cracker Creek, where they inspected the mines of that section and completed other business matters in anticipation of the boom that will soon strike that region. They were all highly elated over the prospects and are confident of there being a great future in store for the mines of Baker county.

UTAH.

STRIKE AT BINGHAM.—Salt Lake *Tribune*, Feb. 23: A big strike is reported in the Galena mine at Bingham. On sinking the shaft below the base ores, seven and eight feet of rich ores were struck, and the owners are in clover.

ANOTHER BIG STRIKE IN PARK CITY.—The city was all astir to-day at the announcement that a rich and extensive strike had been made in the Creole claim. On investigation the report was found to be authentic, and if present appearances are not deceiving, the Creole will soon add its name to the heavy ore-producers of the camp. The claim is owned by David F. Condon, but was leased and bonded a short time ago to D. S. Deacy and E. N. Jenkins, under whose working the strike was made. For three or four years there have been shipments of ore from the Creole, but in small quantities. The present strike is in the old workings, and the ore body is over one foot wide and dipping downward.

MINES ABOUT OPHIR.—The Jim Fisk will soon have its ten-stamp mill running, as it is nearing completion. Only the machinery to put in position; and in another month or six weeks we will hear the ever-welcome whistle. Its tramway from mine to mill is being pushed with all haste so as to have it ready as soon as the mill is ready to begin crushing. The 5-20 mine owned by Appleby and Henefer still holds its own, and is now included among the paying properties of the camp. On Lion Hill Brim Bros. are working three chimneys and are taking out some splendid ore. Monarch No. 1 is in about 600 feet and showing 900-ounce ore. The Lizzie tunnel is in about 500 feet with a shaft of 50 feet, thence to face of tunnel 300 feet and showing 250-ounce ore. The Toalman chimney has a shaft down 95 feet which cuts the ore pipe, which is lying flat. This chimney just at present is in a pinch; but the ore matter is about 3 feet thick. Ore from this property goes from 50 to 200 ounces in silver, 20 to 40 per cent lead, and $8 to $10 in gold. These three chimneys have yielded in the last five years $90,000. The Gold Note mine, owned by Brim Bros., is looking fair to be one more of the bonanzas of the camp.

THE COPPER COMPANY.—Cor. Salt Lake *Tribune*, Feb. 24: The copper smelter at or near Frisco is shut down and all hands discharged. The prospects for resumption are good at some future day; there are many rumors, but the outlook is good so far as the ores are concerned. Under a consolidated management, this property can be made to pay a good dividend. A plant for reduction should be erected at Frisco or Milford. The miners have not received their pay yet in full, but Charles Lammersdorf is now cashing their time for five per cent discount. This is much better than many a poor miner has had to take on the Pacific Coast. I think a new management, a new and a practical reformation and consolidation of the Cactus and Comet companies will be the best way out of the dilemma.

MECHANICAL PROGRESS.

A Bicycle Locomotive.

A new bicycle engine has been running on a special track in an Eastern city, according to the Boston *Herald's* report, in a manner that astonishes all beholders and promises, it is said, to "revolutionize" the present systems of travel, and prove itself a great economizer in the cost of operating engines. The reporter's interview with the inventor is quite florid, but possibly not exaggerated in the revelation he received. The inventor was asked to give some details in regard to the invention. He answered substantially as follows:

"With one-quarter steam and a consumption of 50 pounds of coal per hour, the 20-ton engine was moved back and forth a majority of times with the steam shut up, working by expansion. So accurately balanced was it that the wheels, all of them within half an inch of the guiding beam, frequently stood entirely still. There was no swaying whatever from side to side; the smoothness, stillness, ease and grace of motion was all that could be desired. It was simply the bicycle running on smooth steel and pushed by steam to which 500-man power could be applied by increasing the furnace fires. This machine has a wheel eight feet in diameter and two engines, each 12x14 stroke. From 550 to 600 revolutions or turns, equivalent to 150 miles per hour, are its piston speed and valve action. It is expected to take four cars, each seating 88 passengers, 100 miles per hour if necessary. The weight of these cars is 28 tons, or seven tons each. It would require 10 palace cars, weighing 400 tons, or five passenger cars, weighing about half as much, to convey the same number of passengers we carry with 28 tons."

"Then there must be a tremendous saving?"

"Not only do we save five-fold in the weight of the train, but the friction of the bicycle spindle wheels is less than one-half of the ordinary double-track train. A saving of ten to one in the power required permits the attainment of an average speed of 100 miles per hour, or the carrying of freight and passengers at the present rate of speed, with from five to ten fold saving in power required. The cost of equipment and of wear and tear will be proportionately reduced; each single-track railway, by this single-rail system, becomes a double track, without the purchase of any new land, grading, bridging or tunneling. The only added expense is the upper skeleton frame with guiding beams, 16 feet above the track, which will cost, when made of wood, from $1500 to $3000 per mile, or, if made of steel, about $3000, exclusive of the double-length ties to which the arching steel is fastened. The average cost of tracking roads is about $30,000 per mile. By this system one-tenth of that sum with wood, or one-ninth of that sum with steel, gives ample allowance for every contingent expense. No steel rails are used overhead, only wooden guiding beams, and the wheels scarcely ever touch them, going straight."

"How about safety?" "The safety is nearly absolute, if very high rates of speed are not desired. There is no wedging or side strain, or oscillation, with the bicycle train, which is grooved both above and below and cannot leave its track, and when made of steel, 14 feet deep, it can neither break nor burn, and with additional safety wheels wrecking is practically impossible. The overhead structure carries the wires, with which an engineer can converse in a fog with a train 50 miles away, or with the station-master while he is moving 100 miles per hour."

A company has been formed in New York, with a capital of $5,000,000, to operate these engines in the interest of some of the business men and capitalists in that city. The inventor claims that, for passenger trains, an average of 100 miles per hour will be easily obtainable, and the first unfinished bicycle engine in its exhibition proved it.

The possibilities of the new bicycle engine many scientific men believe will never be surpassed in transportation, either in simplicity, ease, economy or speed, and that the bicycle system of steam, or more likely electric, transportation will be used until earth ceases to be inhabited. Everybody congratulates the inventor upon the success now seemingly assured after ten years of thoughtful preparation and experiment, which he believes is to prove a lasting benefit to mankind, and while leaving to his family an ample fortune, will leave him a great name as one of the world's benefactors.—*Chicago Journal of Commerce.*

THE PARADOXES OF SCIENCE.—The water, says a writer in *Blackwood's Magazine*, which drowns us, a fluent stream, can be walked upon as ice. The bullet which, when fired from a musket, carries death, will be harmless if ground to dust before being fired. The crystallized part of the oil of roses—so grateful in its fragrance, a solid at ordinary temperatures, though readily volatile—is a compound substance containing exactly the same elements, and in exactly the same proportions, as the gas with which we light our streets. The tea which we daily drink with benefit and pleasure produces palpitations, nervous tremblings and even paralysis, if taken in excess; yet the peculiar organic agent called theine, to which tea owes its qualities, may be taken by itself (as theine, not as tea) without any appreciable effect. The water which will allay our burning thirst augments it when congealed into snow; so that it is stated by explorers of the Arctic regions that the natives "prefer enduring the utmost extremity of thirst rather than attempt to remove it by eating snow." Yet if the snow be melted it becomes drinkable water. Nevertheless, although if melted before entering the mouth it assuages thirst like other water, when melted in the mouth it has the opposite effect. To render this paradox more striking, we have only to remember that ice, which melts more slowly in the mouth, is very efficient in allaying thirst.

A New Copper Industry.

The English correspondent of the *American Manufacturer* notes a new copper industry in Great Britain:

A revolution in the copper industry is promised in the prospectus of a new company formed with a capital of £200,000 to acquire and work the British patents of the discovery of Messrs. F. E. Elmore and A. S. Elmore for manufacturing copper articles direct from rough copper bars. By this process copper is electrically deposited from the rough bars upon a revolving mandrel or mold, over the face of which a burnisher moves automatically and so condenses the copper particles as they are deposited. Thus the material is not only rendered dense, silky, fibrous, and cohesive, possessing at present unobtainable strength, ductility, and uniformity, but at the same time articles can be produced at low cost hitherto unknown.

The advantages of this new process, as certified to by authorities, including Mr. W. Parker (chief engineer surveyor to Lloyd's register), and other equally eminent persons in their profession, may be summarized thus: 1. In the manufacture of tubes and similar articles all drawing down and brazing is entirely dispensed with. 2. There is practically no limit to the diameter of seamless pipes and other articles that can be produced, while by present processes these are strictly limited as to size. 3. Many copper articles, especially large tubes, vats, cylinders, and the like, can be produced direct from rough copper far cheaper than by any other process. 4. The electrical conductivity of the annealed copper is greater by 4½ per cent than that of the best commercial copper. 5. The products of the process have the advantages of quality already noticed; and 6. The copper can be varied in tensile strength and ductility according to the requirements. These are practically the entire claims of the inventors, which they support with a considerable quantity of expert evidence. The inventors anticipate from their process such results for copper "as Bessemer's process has achieved for iron and steel."

Works in Sheffield have been secured by the company, and it is estimated that the machinery can be completed and the factory commence work in about three months. Meanwhile, negotiations are pending with the well known firm of copper smelters and manufacturers, Thos. Bolton & Sons of Oakamoor, Widnes, and Birmingham, to adapt Messrs. Elmore's invention to their electrical plant, with a view to a permanent arrangement for its use by them on a royalty. From its own works a probable return of 70 per cent is modestly set down by the promoters of the company.

A NOVEL LOCOMOTIVE.—An application for a patent has been filed by a New York civil engineer for a new locomotive and tender designed for making the fastest time which has ever been made in this or any other country. The boiler is rectangular in shape, having a large and permanent area of evaporating surface, the pressure to be carried being 210 pounds per inch, which is but one-third of the bursting pressure at its weakest point. The cylinders are in the rear of instead of between the truck wheels, and the fire-box is supported between the center of gravity of the driving wheels. All the combination of parts are in exact harmony, and it is intended to easily make the time of 60 miles an hour with 10 coaches, and can, it is claimed, without violent strain be brought to 85 miles an hour with the same load. This gain in performance over the present machine is achieved by a mathematical construction with reference to the distance between rail centers upon which it is supported, and is the first application made which has embraced and specified every portion of a locomotive and tender constructed mathematically with reference to the limits within which they must be confined and supported. As a result of exact proportion, with reference to such base, the cost of maintenance will be greatly below the general average of present construction.

SHARPENING KNIVES.—A dealer in cutlery expresses the opinion that not one man in 50 knows how to sharpen a pocket-knife. "A razor," he says, "must be laid flat on the hone, being hollow-ground and requiring a fine edge. But a pocket-knife requires a stiff edge, and the moment you lay it flat on a stone, so as to touch the polished side, you ruin the edge. The blade must be held at an angle of 20 or 25 degrees, and have an edge similar to a chisel. This is technically called the 'cannel,' and is marked on all new knives by a fine white line which does not remove or touch the polished surface. Knives improperly whetted are often condemned as too hard or too soft without reason."

SCIENTIFIC PROGRESS.

Substances Liable to Spontaneous Combustion.

Cottonseed oil will take fire even when mixed with 25 per cent of petroleum oil, but ten per cent of mineral oil mixed with ten per cent of animal or vegetable oil will go far to prevent combustion.

Olive oil is combustible, and mixed with rags, hay, or sawdust, will produce spontaneous combustion.

Coal dust, flour dust, starch, flour (especially rye flour) are all explosive when combined with certain proportions of air.

New starch is highly explosive in its comminuted state; also sawdust in a very fine state, when confined in a close chute and water directed on it. Sawdust should never be used in oil shops or warehouses to collect drippings or leakages from casks.

Dry vegetable or animal oil inevitably takes fire when saturating cotton waste at 180° F. Spontaneous combustion occurs most quickly when the cotton is soaked with its own weight of oil. The addition of forty per cent of mineral oil (density .890) of great viscosity, and emitting no inflammable vapors, even in contact with an ignited body at any point below 338° F., is sufficient to prevent spontaneous combustion, and the addition of 20 per cent of the same mineral oil doubles the time necessary to produce spontaneous combustion.

Patent driers from leakage into sawdust, etc., oily waste of any kind, or waste cloths of silk or cotton, saturated with oil, varnish or turpentine.

Greasy rags from butter, and greasy ham bags.

Bituminous coal in large heaps, refuse heaps of pit coal, hastened by wet, and especially when pyrites are present in the coal; the larger the heaps the more liable.

Lampblack, when slightly oily and damp, with linseed oil especially.

Timber, dried by steam pipes, or hot water, or hot-air heating apparatus, owing to fine iron dust being thrown off, in close wood casings or boxings round the pipes, from the mere expansion and contraction of the pipes.—*American Miller.*

An Electric Drill.

I. E. Story is a genius. He has patented an electric drill which promises to almost revolutionize mining as well as tunneling—anything requiring work in hard rock. We had the pleasure of watching the drill last night. It is run by a motor which gets its power from the electricity furnished by one of the large dynamos. The motor itself is about eight inches long and seven in diameter. The armature is about four inches in diameter. The shaft which the armature runs on is hollow, so that water can pass through it and through the diamond drill. The motor works easily on bearers, and as the drill forces itself into the rock is moved along by a screw. At the rear end of the machine a brass tube is put over the hollow shaft and this is connected with the water pipe so that water is let into the drill as may be desired. When the drill is at work in a mine the water is forced into the drill by means of a small rotary pump. This is attached to the end of the revolving shaft. The faster the drill works the faster is the water pumped in. When the drill is quiet no water flows, as it is to come from a barrel or tank or pool at some distance from the drill.

The drill used last night was 1¼ inches in diameter. By the movement of a lever similar to that used in turning on an incandescent light, the electricity is attached and the drill begins to whirl and the water to flow. Full pressure was not put on the drill when we saw it, yet in one minute and one second, exact timing, it had bored a hole an inch and three-quarters deep into the very hardest granite to be found in our hills, and we believe we have the hardest granite in the State in this county. The drill, if crowded, can run 2 and even 2½ inches a minute. Running two inches a minute it can bore, if it were not for the time lost in putting on sections, ten feet an hour. Mr. Story estimates that one of the 400-light incandescent dynamos will run 20 drills easily, each one with a capacity of boring on an average two inches a minute in the hardest kind of rock and more in softer kind.—*Bowlder (Col.) Herald.*

MOTION AT REST.—An exceedingly interesting illustration of the phenomenon of "motion at rest" has recently been exhibited before the Royal Institution, London, the demonstration being so complete that small type placed on a disk, revolving several thousand times a minute, was seen and read with entire distinctness. The accomplishment of this unique result was brought about by means of an electrical arrangement which caused brilliant sparks to illuminate the print at the exact instant only when the type was vertical. But for the buzzing produced by the great velocity of the disk, the words would have been supposed to be entirely at rest. This application of the electricity spark of course gives a ready means of observing any and all changes which may take place in either matter or machinery in rapid motion.

Underground Waters.

Prof. Daubree shows, in an interesting paper on the above subject in the *Popular Science Monthly*, that underground waters are potent agents in the formation of minerals. The following extract will be found instructive:

The mode of formation, or, as Buffon said, the genesis of minerals, is one of the interesting questions of their history. But the problem could not be approached until geologists had furnished precise data on the conditions of their bearing. Satisfactory solutions have recently been obtained in the case of a certain number of mineral species. Synthetic experiment, placing itself in the circumstances that seem to have presided at their formation, has succeeded in reproducing them, with their crystalline forms and all their essential characteristics, and has thus completed the demonstration of their origin. By means of this method of demonstration we have been able to ascertain that many minerals are due to the action of subterranean waters. From the most ancient epochs these waters have circulated through the crust of the earth, where they have left, at a multitude of points, signs revealing the part they have played and the course they have taken even more clearly than contemporary phenomena have done.

The sedimentary beds, formed like the deposits which the sea spreads every day in the bottom of its basin, are often distinguishable from one another, even at first sight, by certain exterior characters. The differences are, for the most part, produced by the action of subterranean waters, as is demonstrated by the animal and vegetable fossils, which were for a long time designated as petrifications, or, rather, by the chemical changes which these fossilized bodies have evidently undergone.

Here shells and corals, showing forms perfectly preserved down to their slightest details, are no longer composed of carbonate of lime, as they certainly were during the life of the animal to which they belonged, but are essentially different substances, quartz having entirely taken the place of the calcium carbonate. There are also other minerals, such as pyrites and sulphate of baryta, which have penetrated and crystallized within the cavities which the bodies of these invertebrates occupied.

A NEW DICTIONARY.—The first volume of the Oxford dictionary has been published. The aim of the work is declared to be "to furnish an adequate account of the meaning, origin and history of English words now in general use, or known to have been in use at any time during the last 700 years. It endeavors (1) to show, with regard to each individual word, when, how, in what shape and with what signification it became English; what development of form and meaning it has since received; which of its uses have, in the course of time, become obsolete, and still survive; what new uses have since arisen, by what processes and when; (2) to illustrate these facts by a series of quotations ranging from the first known occurrence to the latest, or down to the present day, the word being thus made to exhibit its own history and meaning; and (3) to treat the etymology of each word strictly on the basis of historical fact, and in accordance with the methods and results of philological science." The first volume, which deals with the letters A and B only, contains 31,254 words in 1240 pages. In Johnson's dictionary, A and B occupied 127 pages.—*N. Y. Sun.*

NEW USES FOR OXYGEN.—One of the industries now followed in London is that of separating and storing oxygen from the atmosphere. This curious industry has an application in the maturing of spirits and the improvement of beer. This is far from being the only application of pure oxygen, for which the price is good; but it is notable, and no doubt distillers and bonders will give heed to the discovery. It is said that the oxygen, in contact with spirits, accomplishes in a few days what is done by from three to five years by nature. The oxygen gets rid of the fusel oil quickly, and as this is the most injurious property of spirits, the consumer has an interest in the matter as well as the producer. A maturer effect is also produced on beer by admixture with oxygen, and obviously this gas is of high value for the whole tribe of effervescing mineral waters.

A STRANGE PHENOMENON is noticed in connection with the natural gas supply at Montpelier, Ind. Six hours out of every 24 the gas runs down to a minimum and six hours daily it reaches a maximum. While at low ebb the valves are often wide to get a sufficiency, and when at the highest point the smallest turn of the key will supply the demand. The movement is constant with the ocean tides, but whether or not the same influences are the cause is a matter of conjecture.

A NEW PROCESS FOR METAL-PLATING is being introduced, in which the batteries and dynamos are dispensed with and the operator depends upon a double electric composition. In copper-plating cast iron an electric bath is used in place of an acidulated one.

ORGANIC EVOLUTION.—Prof. Geddes calls attention to two tendencies in organic evolution—the vegetable and the reproductive—and asserts that evolution is the result of the universal subordination of the former to the latter.

GOOD HEALTH.

How to Prolong Life.

How to prolong human life is a question of personal interest to every man, and the duty of making an attempt to do so is one that particularly rests with the medical profession. When an individual has attained to full development and sound health—say at 40—the expectancy of life may be 25 or 30 years; for the individuals there are great risks, but with the aggregate of mankind such questions may be calculated with business-like accuracy. There are two great factors which concern the prolongation of a human life—the inheritance and the conditions which make up a life history of the individual. The inheritance of longevity from one or both parents is a powerful factor, and one that carries great weight with life-insurance offices. This is a more important factor than an infancy free of weakness, provided that the infantile ailments be dependent upon temporary conditions of defective nutrition, or conditions incident to the stages of development only. The late Emperor William and many other public men of great age and useful life, illustrate that a feeble youth may be followed by a robust and prolonged life. Even conditions of infantile marasmus may be followed by subsequent good development, as in the case of Sir Isaac Newton.

We now proceed to speak of average people, for "a perfect man" can hardly be said to exist; we shall consider average people, especially as we see them in town life, and the special conditions we desire to note are the habits, diet and the wear of life. There is no doubt as to the importance of the habits of life affecting longevity; temperance in all things, in activity and restraint, in regularity in morning rising and in work, as well as in resting and in sleeping, uniform industry is as conducive to health as is regularity in diet. The acquisition of regularity in habits is largely due to early training, and in this way a wisely directed school discipline probably does much to form a sound and steadily acting nerve system, such as give the man a power of resisting adverse influences and prolonging physical health. From the period of infancy upward a sound and well-knit brain has much to do with the permanence of a healthy constitution. The relation of diet to longevity has often been discussed; we can only say here that the diet should be adapted, in quality and in kind, to the work of the individual; while such articles as alcohol, tobacco and tea, if used at all, should be employed in moderation by those who wish for a stable constitution and prolonged life.

Passing over such important consideration, as being familiar to most members of the profession, we come to the great question of the causes of wear in life—the outcome of the frictions of life which all must meet with, more or less. The various factors at work, especially in a town life, make impressions on the brain which lead to fatigue and premature wear. The strong-brained individual may not be hurt thereby; the weaker man is exhausted by such constant impressions from without, and a second generation under such influences is likely to suffer, through loss of tone and vitality, in cell structures rather than in actual stature and measurement. City life naturally produces a rapid and unceasing series of impressions and calls for constant exertion. The laws of sanitation and cerebral hygiene should then be carefully studied. It is very desirable to have what quietness is possible during brain work, and the necessity for proper ventilation as a means of maintaining mental energy is well known. It might lessen brain wear in many offices if electric lighting was substituted for gas illumination. Good digestion is essential to continued work with good lasting power. Late rising and a still more hurried luncheon and rush back to work, followed at the conclusion of the day by a heavy meal when the man is wearied, often tend to exhaustion, as much as the unavoidable pressure of business. A most rational refreshment after heavy brain work is to partake of light refreshments and then rest for half an hour before dinner; thus the power of digestion and social enjoyment are restored to the man.

Probably the chief means of preparing a man to withstand the wear of business life is by a careful training, both physical and mental, before he enters upon the struggle and wear of business. One means of increasing the chances of longevity is by training the child wisely. Many a premature breakdown of health is due to that want of preliminary exercise which would not be neglected by the athlete without disaster.—*British Medical Journal.*

A Convenient and Wholesome Privy.

Referring to the prevalence of typhoid fever and diphtheria, and the danger to health and life from vaults which are improperly placed or constructed, a correspondent of the *Country Gentleman* tells how he manages to avoid such a privy as commonly exists at farmhouses. He has provided an arrangement that answers all purposes of convenience, and can be cleaned out twice a year and used as manure, leaving no permanent deposit in a pit that can infect earth or air or cause disease. He says:

The common small building, placed at a short distance from the dwelling, or connected directly with it, stands where the ground is slightly descending from its rear, so that access may be had to the vault once or twice a year by lifting up a closely fitting swing door, which is partly hid by shrubbery. In the common room over this, containing the seats, is a box or barrel containing muck, ashes or road dust, with a long-handled dipper. A conspicuous placard is placed in front of the visitor with the words "Throw down a dipper of ashes every time, and shut down the cover." Properly instructed, every visitor will do it; but it is well for the owner to examine occasionally to see if enough is thrown down to absorb everything of a liquid nature. The vault must, of course, be well drained, and be so placed that no surface water can enter it. Then, with the case just mentioned, no drainage can pass from it. The whole expense, besides the building, is the box or barrel, standing in one corner, and the dipper, both not costing more than $1, unless the owner procures a smooth, handsomely painted barrel or box at greater expense. From this box a dipperful may be used in two or three seconds, and with about as little labor as to pull the button. The machinery is as simple as it can be, and can never get out of order.

The dust and ashes can be mixed to advantage, and if enough is used to absorb everything, and the place is kept dry, there will be nothing offensive to handle in hauling away and cleaning the place. No bad odors exist, and the privy is a much nicer place than ordinary. This is even better than a water closet.

This subject is of great importance and many doctors' bills and many lives would be saved if such means were used to prevent infection and disease.

MEDICINE FOR THE POOR.—A number of prominent physicians of this city have organized themselves into a society under the name of the San Francisco Polyclinic, with headquarters at 124 Ellis St. It is the intention of the society to furnish medical advice and treatment to the poor free of charge. Certain physicians have been detailed for particular classes of treatment. The hours to be given will be announced at an early day. The institution will also partake of the nature of a post-graduate school for actual practitioners, but no students will be admitted.

WARM WATER.—A pint of warm water taken on an empty stomach in the morning is the safest and surest of all remedies for habitual constipation. It dissolves the fecal matter and stimulates peristaltic action, thereby giving a normal action without pain. If the tongue is coated, squeeze a lemon into the water and drink without sweetening.

THE EYESIGHT.—It is well known that practice in looking at distant objects improves the eyesight. In the test for color blindness among the engineers of the New Jersey Central road, it was found that the oldest man in the service had the best sight for long-distance purposes and was better able to distinguish the various shades and colors.

USEFUL INFORMATION.

WHY CANNING PRESERVES FRUIT.—Many people have never given this matter a thought, while others have often wondered why such was the case, and there let the matter rest. Therefore, it is interesting to many, and they will be glad to know why sealing fruit up in air-tight cans or bottles keeps it from spoiling. Germs of ferments and molds are everywhere present in the air. So long as fruits are alive and growing in a healthy state, they are mostly proof against decomposing agents, but as soon as they lose their vitality through changed conditions, with but very few exceptions they soon and easily spoil. When preserved fruit is put into cans or bottles hot and perfectly sealed while in that condition, the germs of decay present in the fruit and can are killed by the heat, and the sealing excludes the germs on the outside from coming into contact with the fruit.

KEEPING PLANTS THROUGH WINTER WITHOUT ARTIFICIAL HEAT.—A new principle for keeping plants through the winter without artificial heat was recently shown at Regent's Park, London, with the plants grown in them last winter. The essence of the invention is that all light and heat shall previously pass through a shallow layer of water. The water is found to exercise great control over temperature, protecting plants entirely from frost in winter, and from excessive direct heat in summer. The application involves no difficulty. In the case of a garden frame, a sliding "water light" about three inches deep is made to fit over the frame containing the plants; the only difference from a glass light being that it holds water and is always placed in a flat position. The depth of water generally kept in the tank is about two inches in winter and summer, and half the depth in spring and autumn.

HOW TO FORETELL A STORM.—Says a weather observer: "When you wish to know what the weather is going to be, go out and select the smallest cloud you see. Keep your eye on it, and if it decreases and disappears, it shows a state of the air that is sure to be followed by fine weather; but if it increases, take your overcoat with you if you are going away from home, for falling weather is not far off." The reason is this: When the air is becoming charged with electricity, you will see every cloud attracting all lesser ones toward it until it gathers into a shower, and, on the contrary, when the fluid is passing off, or diffusing itself, then a large cloud will be seen breaking into pieces and dissolving.

MANUFACTURE OF GIRDERS.—The substitution of steel for iron in girder manufacture appears to be making steady progress. The *Moniteur des Interets Materiels* states that for the large new warehouses in course of erection at Buenos Ayres, steel girders are specified, and that as these cannot be advantageously obtained in Belgium, the contractors, Halot & Co., Louvain, have had to place the order with the Rothe Erde Works, in Germany, a concern which makes a specialty of this kind of work. As the order is for 5000 tons, the Belgian iron-girder rollers are asking themselves to what extent steel girders are likely to replace iron in the future, and how far their present practical monopoly of the export business in large rolled girders is threatened by this preference for steel. The *Moniteur* draws comfort from the reflection that, while for the nine months ending Sept. 30th, the export of steel from Belgium was only 80,000 tons, the shipments of manufactured iron reached 210,000.

AN INGENIOUS DEVICE for controlling excitable horses has been invented, says the *Indiana Farmer*. It is attached to the brow band of the bridle, and a light but firm cord runs through loops along the reins to the hand piece. In case of fright pull the cord, and instantly the horse is blindfolded. This diverts his attention from the object of fright and puts him into another train of thought. Let go the cord and the double spring instantly withdraws the blinds from the eyes and rolls them out of sight.

FIXING INDIAN INK.—Indian ink, as most of our readers know, is composed of the finest ivory-black and a gelatine size, and is excellent for plans and drawings until any color "wash"—or even a little dampness—comes near the lines, when they then either "blur" or "run" all together. This may be prevented by dissolving in the water used for rubbing up the ink about eight grains of bichromate of potassium, or 6½ of the corresponding ammonium salt per fluid ounce.

STONE-BREAKING.—It is well known that a stone, however large, may be broken by striking a sufficient number of blows with a hammer along the line where it is desired to break the stone. In this process the force of the blow is expended in gradually weakening the cohesion of the particles in a line following the direction of the blows. This weakening is increased by each successive blow until finally rupture occurs.

ANILINE COLOR FACTORIES.—It is said that there are four manufactories of aniline colors in the United States. Up to the Tariff revision of 1863, the business was uniformly profitable; but since that revision the protection has been insufficient, and the business has languished. It is barely kept alive, because of their inability to compete with foreign cheap labor. The difference in cost between Europe and America is as 100 to 139.

WATER PRESSURE.—A body of water, such as is in a canal lock, tank or cistern, has a static pressure equal to .43 of a pound per square inch for each foot in depth. Thus, at the bottom of a depth of ten feet, the pressure would be four and thirty hundredths pounds per square inch; but the average pressure against the sides would be half that, or two and fifteen hundreths pounds, as there is no pressure at the top.

SCENT PENCILS, composed of solidified perfume, are a novelty. They are fitted in silver holders, have a tiny ring attached to them for fastening the watch-chain or chatelaine, and when rubbed on the hands or any part of the dress emit a delicate odor.

KEROSENE OIL AND SHARKS.—It is said that a Key West fisherman rubs his body with kerosene oil and swims among the sharks in safety. They don't want to get any nearer to him than you do to a man who has been eating last year's onions.

THE COST OF BREAD.—The distribution of bread after it is baked now costs the average workman in a city as much as it does to grow the wheat, mill it, barrel it, move it 1500 miles and convert it into bread, all put together.—*Forum.*

THE SWEAR.—General Lew Wallace says that he has seen a thousand men receive wounds, and he never knew one to swear when struck. It is like falling off a wharf. The swear comes after the shock of surprise.

AN ELECTRIC HAND-SAW is the latest invention for carpenters. It works like any ordinary saw, the electricity being applied only in the process of setting and sharpening.

COLLIERIES IN INDIA.—One hundred and five collieries are open in India, says London *Truth*, and in 1886, 1,400,000 tons of coal were mined.

IT is said that collodion dissolved in alcohol and applied with a soft brush will prevent silver from becoming tarnished.

The Big Pend d'Oreille Discoveries.

Mr. J. L. Johns, a Butte assayer, has just returned from a trip to the new camp being started not far from the Pend d'Oreille lake. In conversation with a reporter of the *Inter-Mountain* Mr. Johns gave some particulars about the new camp and discoveries, which will be read with interest by the Butte public.

How to Reach Chloride.

In order to reach the new discoveries it is necessary to get off the Northern Pacific train at Hope, a station half-way between Thompson Falls and Spokane Falls. This point is on the Pend d'Oreille lake, and from thence a steamer runs straight across the lake to Gray's Landing, a distance of 26 miles. The camp of Chloride City lies about six miles from this landing, at the mouth of three gulches. Though the camp is only three months old, there are already 600 men there and 300 cabins are in course of construction. Lots are selling all the way from $50 to $500, and not a foot of ground remains to be located within several miles of the camp.

The Principal Discovery

Is of course the Webber and one or two neighboring claims which have been bonded to Helena parties for $250,000, an account of which has already been given in the *Inter-Mountain*. There are ten men already at work on the Webber. It is developed by a discovery shaft about 50 feet deep and three tunnels have been started. The upper one is in 35 feet and has struck the ledge. The character of the rock is free-milling in the upper tunnel, though base rock is found in the lower tunnels. Mr. Johns made no assays from the Webber, but was informed that the rock went $75 in silver. The lower tunnel is only in five feet, and the ore found in it is galena.

Other Claims.

On the other side of the Webber hill are located the Denver, Eagle, Mary Ella, Jumbo, and Hidden Treasure, from all of which Mr. Johns made assays, showing silver to be present in considerable quantities. The chief feature of the camp is the immense width of the ledges, the lead matter in some cases being more than 90 feet in width. There are more than 30 locations on the main lode. The camp of Chloride has been started with a tremendous boom, and all the miners seem confident that a great mining district is to be opened up in that vicinity.

Alien Mine-Owners.

At the last session of Congress the Committee on Mines and Mining was instructed to ascertain and report to the Senate the number of aliens, foreign companies and corporations owning or operating mines in the Territories of the United States, together with the length of time they have been so, the amount of capital invested by them in mining operations, the amount of money expended, dividends paid, and the effect of the ownership of mines by aliens, foreign companies and corporations upon the prosperity of the country. The report was made to the Senate last week.

Since the recess of Congress last October, statistics have been gathered from Idaho, Montana, New Mexico, Utah, Washington, Dakota, and Arizona Territories, by which it is shown that the mining ventures and investments of aliens in these localities amount to more than $30,000,000, from which they have received $4,000,000 in dividends.

The report shows that the railroad companies admit that 75 per cent of their freight comes from the miners, and since March, 1887, when the alien land law went into effect, they have experienced considerable loss in their carrying trade. From information received by the committee it appears that, as a rule, the aliens are quiet and well-behaved members of the community.

The report contains a detailed statement of their operations since opening up the mines, and concludes with a unanimous recommendation that the alien land law be so amended as to allow aliens to invest in mineral lands on their own individual responsibility.

Air Compressors.

The Clayton Air-Compressor Works of No. 43 Dey street, New York, report a splendid trade in the particular line of machinery which they manufacture. They have been taxing their works in Brooklyn to their utmost capacity for the past seven months, and are thinking of making extensions to their facilities, as there seems to be no likelihood of a falling off in their orders for some time to come. They have built numbers of air compressors for export to different parts of the globe, besides doing an extensive trade in the Pennsylvania coal regions and the western mining fields in air compressors to supplant steam in running machines underground, or which from necessity must be situated some distance from the boilers. Any mine-owner or operator knows the advantage to be derived from compressed air under these circumstances. Besides this, they have been doing a large trade in a small vertical high-pressure belt air-pump, largely used in connection with the burning of crude petroleum for fuel and by experimenters generally. A complete catalogue of the different styles of air compressors and other machinery manufactured by this well-known house will be mailed free on application to the Clayton Air-Compressor Works, No. 43 Dey St., New York.

MINING AND SCIENTIFIC PRESS

A. T. DEWEY. W. B. EWER.

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DEWEY & CO., PATENT SOLICITORS.

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SAN FRANCISCO

Saturday Morning March 9, 1889.

TABLE OF CONTENTS.

EDITORIALS.—British Columbia Mines; Pacific Coast Relief Chart; The "Mining and Scientific Press," 161. Passing Events; The Lower California Gold Excitement; United States Patents; Lithology of Wall Rocks, 168. Inauguration of President Harrison, 169.

ILLUSTRATIONS.—Orographic Map of the Pacific States and Territories, 161. Benjamin Harrison, 23d President of the United States, 169.

CORRESPONDENCE.—Central Idaho; Bad Mining Laws; Grub Gulch and Potter Ridge Mining District, 162.

MISCELLANEOUS.—Yield of Comstock Mines; Photographic Processes; Liability of Mining Directors, 162. Astronomical Affairs; The Geodetic Survey; Gold and Silver; Boxing and Firing Stumps; In Chinatown, 163. The Big Pond d'Oreille Discoveries; Alien Mine Owners; Air Compressors, 167.

MECHANICAL PROGRESS.—A Bicycle Locomotive; The Paradoxes of Science; A New Copper Industry; A Novel Locomotive; Sharpening Knives, 166.

SCIENTIFIC PROGRESS.—Substances Liable to Spontaneous Combustion; An Electric Drill; Motion at Rest; Underground Waters; A New Dictionary; New Uses for Oxygen; Organic Evolution, 166.

GOOD HEALTH.—How to Prolong Life; A Convenient and Wholesome Privy; Medicine for the Poor; Warm Water; The Eyesight, 167.

USEFUL INFORMATION.—Why Canning Preserves Fruit; Keeping Plants Through Winter Without Artificial Heat; How to Foretell a Storm; Manufacture of Girders; Fixing Indian Ink; Stone Breaking; Aniline Color Factories; Water Pressure; Kerosene Oil and Sharks; The Cost of Bread; The Swear; An Electric Hand Saw; Collieries in India, 167.

MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 164-65.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 176.

Business Announcements.

[NEW THIS ISSUE.]

Gold Separator—J. B. Freeman, Los Angeles.
Situation Wanted—Mining Engineer.
Machinery—I. A. Heald.
Candlestick—G. Werntz, Placerville, Cal.

See Advertising Columns.

Passing Events.

The inauguration of Benjamin Harrison, the 23d President of the United States, took place on Monday with appropriate ceremonies. The mining community will now be anxious to see what the new administration will do for the silver interests.

The adjournment of Congress left the Alien bill without being acted on. It is unfortunate for the Territories that this important amendment allowing foreigners to purchase mines in the Territories did not pass.

The signing of the Territorial bill admitting as States North and South Dakota, Montana and Washington, will be of great advantage to those regions naturally. From a mining point of view, it will free them from the operations of the existing Alien Land law.

Hundreds of people are crossing the Mexican border to the new mines in Lower California. Fully 2000 people are there already and 500 are on the way from San Diego. The steamers to Ensenada are crowded. Some gold-dust is being sent back, and most sensational reports about the richness of the fields are being circulated.

There is quite an excitement in the copper market, owing to fears of a collapse of the French syndicate. Prices have fallen and there is an immense stock on hand, while production is increasing. The operations of the syndicate, while they have increased the prices to consumers, have largely benefited the copper-mining industry in this country.

The Lower California Gold Excitement.

One of those periodical "excitements" over the finding of gold on the peninsula of Lower California is now raging, this one being possibly more intense than its predecessors. San Diego and other towns in that region are being depopulated of their laborers by the rush to the mines. Stories about $15 to $100 a day to the man are being circulated, and some are told about men getting out $1000 to $1500 in two days. Ensenada is deserted; many men are going from Los Angeles, and numbers have left San Francisco also for the new gold-fields. All the peninsula towns are deserted. At Tia Juana, near the Mexican border, several hundred people are gathered on the way into Mexico. All the laborers on the Cuyamaca railroad have quit work, and the waiters in the San Diego hotels have gone also.

Some one who is styled Prof. Anthony, or Mineralogist Anthony, telegraphs that the Santa Clara gold-fields are the richest in the history of the Pacific Coast, but we should prefer the opinion of some good practical miners on the subject, especially as the "Professor" says the find surpasses in wealth the discoveries in California in 1849.

The placer strip is said to extend 12 miles by 8, and the gold is in coarse nuggets. Quartz is reported also as having been found. Gold-dust is being brought into San Diego for sale, but not in such quantities as to bear out the statement of the mines being richer than those of '49. The $6000 or $7000 has, however, caused great excitement, coupled as it is with the highly colored reports.

Those going overland from San Diego take out "clearance papers." The duty on a horse is $40; on a wagon, 10 cents per pound; on harness, 75 cents a pound; on provisions, 50 to 90 cents per pound; on tents, 10 cents per pound. The clearance papers cost $10. The Mexican Consul must certify to the correctness of the papers. Picks, pans, shovels, drills, fuel, powder, etc., pay no duty. One is also entitled to bedding, one or two firearms, and 100 cartridges, two pounds chewing tobacco, 99 cigars, and personal jewelry and baggage, free, without any papers. If $100 worth or more of provisions appears on one person's papers, he will have to pay the Consul at Tia Juana a $14 fee. If there are others in the party and the supplies are apportioned, this fee may be avoided.

The extreme southern part of the State is in a fever of excitement over this find. This is all very well for men without families and with nothing to do, but those occupied or having families will do best to remain where they are until something more definite is known. The country is a rough one and exceedingly dry. There are several companies down that way having land for sale, and while they may not be spreading these wild stories, such things have been done before. Mines have been worked more or less for generations on the peninsula, and a number of times have placer deposits been discovered. Gold has been found at many points. This spot may be richer than the others, but it is not probable that several thousand people will be accommodated with rich claims. There are many idle men in the southern part of this State who would naturally join a "rush" of this kind, and the departure of such numbers has added to the excitement. Many of these people are from the East of late years, with no experience of "gold excitements," and it would take little to excite them, not being familiar with the methods of interested parties in getting up such things. The character of the news from the mines sent up here reminds old Californians of many similar occurrences during the past 40 years. Eight men out of ten who join these rushes regret the step in the end. Those with time and money at disposal may risk going; very few among those who have gone know anything at all about mining, and we all know how little gold it takes to excite a "tenderfoot" in any mining field.

THE large reduction works at Deadwood, Dakota, were destroyed by fire last week. Loss, $100,000; insured for $35,000.

United States Patents.

The annual report of the Commissioner of Patents shows that the business of the office is constantly increasing. Occasionally there is a slight falling off in the number of applications for patents; but this continues for a time only, when the increase begins again. The examination of an application for a patent involves an examination of the "state of the art" for the entire world. Consequently the mass of matter to be examined by the examiners in each class of art is increased each year by the patents and publications of the year. The field to be investigated grows in extent year by year, increasing the time and labor requisite for a proper examination of an application. It becomes more necessary than ever for inventors to employ only skilled and experienced agents in preparing and presenting their applications, in order to facilitate the examiner's work by presenting the invention in proper form.

The number of applications requiring examination received at the Patent Office last year was 41,351, which, in round numbers, averages 800 per week. The number of patents, certificates of registration of labels and trade-marks during the same period was 21,892, averaging 421 per week, showing a percentage of not quite 50 per centum of rejected applications.

These figures give a pretty good answer to those who maintain that a man can get a patent on anything, and that too many patents are granted. Nearly half the applications were rejected, it seems, so that those who have useful improvements should see that their cases are properly drawn and carefully presented, if a favorable result is to be reached.

The following table shows in a condensed form the history of the patent business of the United States:

NUMBER OF PATENTS AND CERTIFICATES OF REGISTRATION ISSUED DURING EACH CALENDAR YEAR.

YEAR.	Patents.	Designs.	Re-issues.	Total patents.	Trade-marks.	Labels.
1836, July 28...	109	..	..	..	..	..
1837	436	..	..	..	..	..
1838	415	..	6	..	..	..
1839	404	..	13	..	..	..
1840	458	..	10	..	..	..
1841	490	..	6	..	..	..
1842	488	..	13	..	..	..
1843	494	14	11	519	..	..
1844	477	12	7	496	..	..
1845	478	17	11	504	..	..
1846	566	50	13	629	..	..
1847	495	60	14	569	..	..
1848	583	46	23	652	..	..
1849	989	49	30	1,068	..	..
1850	884	83	26	993	..	..
1851	757	90	25	872	..	..
1852	890	109	20	1,019	..	..
1853	846	86	29	961	..	..
1854	1,769	57	28	1,844	..	..
1855	1,891	70	51	2,01	..	..
1856	2,316	107	83	2,506	..	..
1857	2,686	113	97	2,896	..	..
1858	3,467	142	126	3 695	..	..
1859	4,165	108	231	4,504	..	..
1860	4,363	183	232	4,778	..	..
1861	3,040	142	147	3,329	..	..
1862	3,221	195	116	3 532	..	..
1863	3,781	176	227	4,184	..	..
1864	4,638	139	248	5,025	..	..
1865	6,099	221	296	6 616	..	..
1866	8,874	294	290	9 458	..	..
1867	12,301	325	400	13,026	..	..
1868	12,544	446	420	13 410	..	..
1869	12,957	506	534	13,997	..	..
1870	12,157	737	439	13,333	121	..
1871	11,687	905	464	13 056	486	..
1872	12,200	884	529	13 613	491	..
1873	11,616	747	101	12,864	492	..
1874	12 230	886	483	13,599	559	232
1875	13,291	915	631	14,837	1,188	232
1876	14,172	902	622	15,696	959	472
1877	12,920	699	568	14,187	1,216	393
1878	12,345	590	509	13,444	1,455	492
1879	12,133	592	488	13,213	872	355
1880	12,926	515	506	13,947	349	203
1881	15,548	565	471	16,584	836	202
1882	18,136	861	271	19,267	947	304
1883	21,196	1,020	167	22,383	902	906
1884	19,147	1,150	116	20 413	1,021	513
1885	23,331	773	129	24,233	1,067	391
1886	21,797	595	116	22,508	1,029	378
1887	20,429	949	99	21,477	1,133	330
1888	19,585	835	86	20,506	1,059	327

The patent department pays a profit to the Government. The total receipts last year were $1,118,516.10, and expenditures $973,108.78; receipts over expenditures, $145,407.32. This profit has been made for some years, until there is now a balance in the treasury of the U. S. on account of the patent fund of $3,402,898. Notwithstanding this, owing to our system of appropriations, the patent department is cramped for funds. More examiners are wanted and more room is wanted, but Congress pays no attention to the Commissioners' requests. The inventors of the country more than pay for running the office, yet they are put to unnecessary delay and inconvenience in obtaining their patents.

As to the distribution of patents, the following table shows the patents issued to citizens of the United States during the past year, with the ratio of population to each patent granted:

States and Territories.	Patents and designs.	One to every
Alabama	64	19,726
Arizona Territory	10	4 044
Arkansas	69	11,630
California	445	1,943
Colorado	153	1,270
Connecticut	759	820
Dakota Territory	89	1,518
Delaware	33	4,442
District of Columbia	214	330
Florida	39	6,910
Georgia	122	12,640
Idaho Territory	12	2,717
Illinois	1,061	1,853
Indian Territory	5	.....
Indiana	494	4,004
Iowa	368	4,414
Kansas	330	3,018
Kentucky	218	7,662
Louisiana	98	9,591
Maine	152	4,269
Maryland	283	3 303
Massachusetts	1,887	944
Michigan	603	2,362
Minnesota	277	2,818
Mississippi	48	23,574
Missouri	647	3,351
Montana Territory	31	1 263
Nebraska	137	3,302
Nevada	17	3,662
New Hampshire	141	2,460
New Jersey	863	1,310
New Mexico Territory	23	5 194
New York	3,634	1,898
North Carolina	55	25,450
Ohio	1,363	2,363
Oregon	66	2,648
Pennsylvania	1,990	2,152
Rhode Island	209	1,723
South Carolina	42	23,704
Tennessee	131	11,774
Texas	239	6,160
Utah Territory	21	6,855
Vermont	89	3,733
Virginia	97	15,593
Washington Territory	26	2,889
West Virginia	62	9,975
Wisconsin	461	2,853
Wyoming Territory	6	3,404
United States Army	9	.....
United States Navy	12	.....
Total	18,8.4	.....

Lithology of Wall Rocks.

Melville Attwood of this city, who has been for about half a century more or less practically engaged in gold mining and milling, contributes to the annual report of the State Mineralogist a very interesting and useful chapter on "Lithology of Wall Rocks." Colored engravings are given of hanging and foot walls of several prominent mines. The igneous rocks forming the walls of our richest gold mines vary much in composition. The highly crystalline portions, however, appear to have been formed when the liquid mass was cooled down with extreme slowness. There has taken place a great alteration in the constituent minerals of these rocks, owing to the action of chemical forces, which are everywhere at work within the earth's crust, and which have in many cases so changed the appearance of these rocks that specimens taken at different points from the same wall or dike present a different appearance, and their identity may easily escape recognition.

Mr. Attwood in his article gives his ideas of the source or origin of gold found in lodes, veins or deposits; a description of auriferous lodes or deposits of California and their inclosing rocks; a description of the gangues or foreign matter with which the gold is associated; the blanket system of saving gold; and how to make macroscopical examination of the wall-rocks of auriferous fissures.

The article referred to covers many points in a subject to which too little attention has been paid by mining engineers and miners. No doubt had proper comparisons of the rocks been made, many useless expenditures of money would have been saved. An accurate description is given of the rocks in the most prominent producing California gold mines, and sections of the rocks have been prepared and placed in the Museum of the State Mining Bureau. Mr. Attwood's investigations were made in the field, and the mines were examined, so the paper is not merely theoretical, but based on actual observations.

AT the meeting of the California Electrical Society, Monday night, Orion Brooks read a paper on "Fallacies Relating to Galvanic Batteries." A vote of thanks was tendered the essayist for the excellent manner in which he presented the subject, after which a general discussion took place.

ANOTHER heavy blast was made at Telegraph hill last Sunday. Nearly 10,000 pounds of powder were placed in the tunnel. The blast loosened 50,000 tons of rock, which will be used by the contractors in the construction of the seawall.

Inauguration of President Harrison.

We give herewith a portrait of Benjamin Harrison of Indiana, inaugurated on Monday of this week the twenty-third President of the United States. The arrangements for the inauguration were perhaps the most complete and elaborate ever made, and the affair was as impressive and satisfactory as the weather would allow. Those who need a reminder of what March can do at the East in the way of weather may read the following extract from a telegraphed account of the inauguration:

Benjamin Harrison stood with uncovered head in a cold, drizzling rain, with a raw wind blowing in his face, in front of the National Capitol to-day, and took the oath of office as President of the United States. Grover Cleveland stood beside him, with his hat in one hand and an umbrella in the other, which he held over Mr. Harrison. In front of Harrison and Cleveland was the small figure of Chief Justice Fuller in his robes of office and a Testament in his hand. The rain fell on the silver hair of the Chief Justice, which the cold March wind dishevelled. This scene was witnessed by a drenched and shivering crowd, who crowded in front of the portico of the Capitol, and had waited in the blustering wind to see one administration go out and another go in.

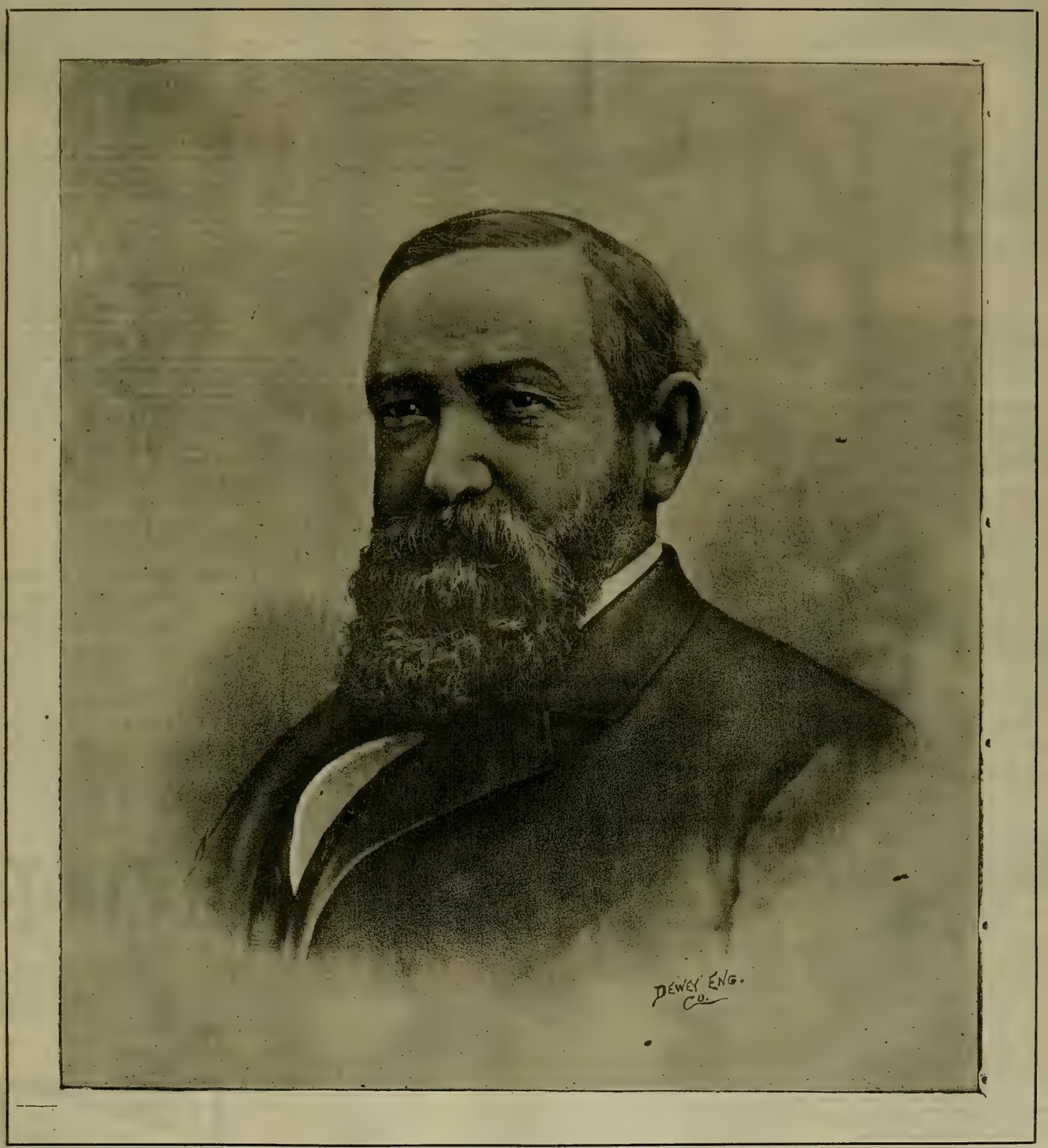
And yet the inauguration was successfully accomplished. The new President read his inaugural address, a paper with many excellent points, and the manifestation of joy, which took form in torchlight parades and a grand inaugural ball, was not dampened, in spirits at least, by the unfortunate weather.

Vice-President Morton took his oath of office and assumed the presidency of the Senate. Thus the new administration begins its labors.

Benjamin Harrison was born at North Bend, Hamilton county, Ohio, August 20, 1833, and is therefore in his 56th year. His father was John Scott Harrison, who served his district two terms in Congress. His grandfather was that famous leader and general, who, after a life of brilliant and distinguished service in the forum and the field, was elected President of the United States, after the most exciting campaign of 1840. His great-grandfather was one of the heroes of the Revolution, Governor of Virginia, and a signer of the Declaration of Independence. One of his ancestors was a general of the Commonwealth of England, before Cromwell's usurpation, and whose unflinching Republicanism cost him his life in the early days of the Restoration. His immediate descendants came to America and founded the family in this country.

Benjamin Harrison received a classical education, and is a graduate of Miami University, Oxford. Immediately after graduation, he commenced the study of law at Cincinnati, Ohio. In 1853 he was married, and in 1854 he established himself at Indianapolis, his present home. On the breaking out of the Rebellion he left home, a successful practice, and all that makes life pleasant, in response to his country's call for her defense. The same diligent application that contributed to his success in peace, enabled him to succeed in war, and the proclamation of peace found him wearing the stars of a general. In 1881 he was elected to the United States Senate, serving out his full term. In 1884 he was prominently canvassed as a Presidential candidate. The memorable convention of 1888, resulting in his securing the nomination, is still fresh in the minds of our readers, and the smoke of the political conflict which ended in his election has only just cleared away.

Those who know him best give assurance that in Benjamin Harrison the country will have a wise, conservative and eminently safe President.



BENJAMIN HARRISON, TWENTY-THIRD PRESIDENT OF THE UNITED STATES.

Coast Industrial Notes.

THE best timber for ships' spars to be found in the world comes from Puget sound.

IN the new California theater there will be used a very large quantity of red sandstone from Arizona mines.

LAST week one-quarter of the employes in the railroad yards at West Oakland were discharged, as a measure of economy.

D. HENSHAW WARD has resigned as General Manager of the Judson Manufacturing Company, and C. B. Morgan, heretofore secretary, has been elected to fill the vacancy.

M. E. HITCHINGS, the principal of a Saginaw (Mich.) syndicate of lumbermen, is in San Francisco preparing for an inspection of the available lumber properties of the coast.

THE Tillamook *Headlight* says: Work on the light-house has commenced, with Mr. Harry Rogers as foreman. At present there will be employed 25 or 30 men, and as soon as the boarding and lodging house is up this number will be increased.

G. W. GORRILL of Oakland has been authorized to make negotiations for a tract of land about ten acres in extent, fronting upon the bay and convenient to a railroad, for a site for a great factory. Mr. Gorrill will seek an available site in Oakland.

THE Watsonville *Pajaronian* says: Something less than 1000 acres of land have been contracted for beets next season, but this acreage includes much of the best land of the valley, and will probably produce more tons of beets than were crushed at the factory last year.

THE elevator system of handling wheat has had only a small trial on this coast. A Minneapolis firm of wheat-buyers thinks that this means of storage can be used to advantage in Washington Territory, and will erect some large elevators near Tacoma in the spring.

MERCURY extracted from cinnabar ore mined in California is most highly prized by the manufacturers of thermometers. Making high-register thermometers has become a business by itself, and considerable art and ingenuity are required to make a success of these valuable instruments.

R. I. PRAY of Towles, Placer Co., says large quantities of lumber are shipped daily. The big reservoir at Lake Valley has now a capacity of 100,000 inches, but contains at present only 40,000. The locomotives and lumber cars have been repaired and ready for use. The pulp-mill has not been started yet.

AT the annual meeting of the Lumber Surveyors' Association, the following officers were elected for the ensuing year: H. Fisher, Pres; J. P. Haines, V. P.; J. F. Clough, Sec.; G. W. Adams, Treas.; Trustees—C. Lyman, R. Pennell and G. W. Adams. Executive Committee—G. A. Morse, A. M. Cook, G. Benson, N. F. Phillips and R. C. Markel.

THE Secretary of the Treasury has awarded contracts for the erection of a life-saving station at Fort Point, California, to James H. Coster of Baltimore for $11,100; for the erection of a station at Point Reyes to John E. Hammond & Co. of San Francisco, for $8195; for alterations and repairs of the Humboldt-bay station to W. H. Mills of Eureka, for $3675.

WORKMEN have commenced the erection of the watch factory at Otay, about ten miles from San Diego. A side-track has already been put down. The main building will be 38x100 feet, three stories, and of brick, with boiler, engine and other rooms attached. The superintendent of the factory, P. H. Wheeler, says 20 watchmakers and their families are en route from the East.

UNDER the new administration the Merced Woolen-Mills will be enlarged by a 50 foot addition. The manufacturing capacity of the mills is to be increased one-fourth by the addition of new machinery. The present annual product of the mills has a selling cash value of $300,000. Hereafter the mill managers expect to manufacture flannel, cassimere and blankets to the extent of $400,000 per annum.

THE Port Townsend *Call* says: Captain J. J. Smith and others of San Francisco have contracted with Hall, the ship builder of Port Blakely, to have built a four-masted schooner of the following dimensions: Length of keel, 178 feet 2 inches; beam, 38 feet; depth of hold, 14 feet. She will have a carrying capacity of 900,000 feet of lumber, and is to be launched on or before the 15th of June next.

THE Tacoma *News* gives the dimensions of two logs recently photographed on the line of the Northern Pacific railroad, which will give some idea of the size of western timber. The picture shows two short sections of logs, one a red fir and the other a spruce, on a platform car. The dimensions of the red-fir log were: Diameter, 95.95 inches, or nearly eight feet. The hight of the tree from which it was cut was 295 20 feet; years of growth, 153. Spruce log: Diameter, 8.40, or nearly eight feet six inches; hight of tree, 196 9 feet; growth, 277 years. Inside of a century most of the forests that take from 200 to 700 years in growing will be destroyed.

THE Pacific Coast Steamship Company has discontinued the outfitting establishment it maintained at the junction of Davis, East and Vallejo streets. Some 80 men were employed there, and all the work necessary on the steamers was done in the shops. Now, however, the work will be let to the lowest bidder among outside firms, and thus business will be made a little more lively for shipwrights around the front. Michael J. Fitzgerald will take charge of the overseeing for the company in place of Theodore H. Downing, who was superintendent of construction.

H. S. LUBBOCK, Supervising Inspector of Steam Vessels for this coast, has returned from Washington, where he went to attend the annual meeting of the supervisors and inspectors from all parts of the country. This convention, Mr. Lubbock said, has changed the form of the test pieces to be taken from boiler plates, and has also introduced a new rule requiring all inspectors to bore through the shell of boilers which have been in use over 12 years. This is done in order to ascertain the weakest part of the boiler, which will only be licensed to carry a pressure of steam proportionate to the weakest spot.

GRIFFITH GRIFFITH, the pioneer worker in the granite industry of this State, died in San Francisco recently. His death removes one of the most promising and enterprising men of Placer county, and will be a heavy blow to the prospering town of Penryn, which owes its creation and growth to him. Mr. Griffith's first quarry of importance was opened in 1853 or 1854, near Mormon island. In 1864, he located a quarry at Wildwood, Placer county, on the line of the Sacramento, Placer & Nevada railroad. He afterward moved to Penryn and opened a quarry there. In 1874, Mr. Griffith erected at the Penryn quarry the first polishing mill in the State.

AS an evidence of the interest shown in salmon packs of the British Columbia waters, it was learned from Mr. Locke, who has just returned from Victoria, that his firm alone in five days of one week placed 158,000 cases of Alaska salmon, and that two other San Francisco brokers placed 30,000 cases, and a prominent Chicago operator purchased for Eastern sales 75,000 cases, making the total movement of Alaska fish 263,000 cases. Of canned fruits and vegetables, last year's pack was far in excess of any previous year, and yet, owing to the excessive tariff, 10,000,000 pounds less were shipped last January than in January, 1888.

THERE have just been turned out at Frank's tannery, San Mateo, two and a half tons of walrus hide. A year's time was consumed in this process of tanning, the hides when finished averaging an inch and a half thick. Walrus leather is used by jewelers for polishing and is valued at $1.50 per pound. Also at the tannery are a lot of hides imported from Spain and supposed to make the finest harness leather in the world. This tannery is the only one on the coast that uses imported raw material, the latest improvements that have been made increasing their facilities so much that hides enough cannot be procured in this market.

THE Risdon Iron Works of this city have in their shops a complete new set of triple-expansion engines for the Australia, designed to give her an increased speed of two knots per hour on a consumption of ten less tons of coal per day. The boiler-shops of the Risdon now present a scene of great activity, two boilers, the largest and strongest ever made on the Pacific Coast, being in course of completion there for the steamship Australia. The two boilers are now lying side by side with their shells completely riveted, each rivet being subjected to a hydraulic pressure of 97 tons. Some 200 men are at present employed in the boiler department.

PERHAPS the most interesting of all the departments of the hat industry is that of cloth hats and caps, boys' wear and military and conductors' goods. This branch is being carried on very successfully in this city by a large establishment, which, until recently, was located on Sansome street, but which has removed to a big building on Market street, where it has increased facilities for manufacture. There are from 30 to 40 girls at work in the factory, and business is very good for the season. The company makes nearly all of the caps worn by the conductors and brakemen of the Southern Pacific Company, and has made 1500 new caps for the employes of Wells, Fargo & Co.

GREAT success has attended the labors of our local piano manufacturers. They started out a dozen years ago with a determined effort to overcome the competition of the outside trade, and although the attempt seemed Quixotic, they have proved themselves equal to the task. It is safe to say that more than one-half of the pianos now being purchased on this coast are of Californian manufacture. It will be interesting to know that one of our large manufacturers has succeeded so well in the Eastern markets that he will build a factory in New York where piano-work begun here will be finished and sold. Agencies are being established by the same manufacturer in London, Paris, Vienna and other foreign cities. Over 20,000 instruments made in the local factories of the firm referred to are now in use.

THE new 10-story *Chronicle* building, in this city, is rapidly advancing. On Kearny street toward Market the blocks of stone facing are in position for a length of ten feet of the frontage and a hight of about 12 feet. The stone is light brown in color with more of a grayish tinge than ordinary Connecticut brownstone. It comes from the Seepe quarries of Ventura county, where it is being specially quarried for the *Chronicle* building. In point of hardness it is scarcely second to granite, and the same rates are charged for cutting and facing it as for the latter stone. A penknife make no impression upon it, which cannot be said of the Flagstaff, A. T., stone. The latter cuts easily with knife or chisel and is a less durable material.

SAN FRANCISCO has made as rapid advances in electrical science, and especially in the adaptation of anything new in electrical improvements, as any other large city in America. The many small uses to which electricity has been put and which have been introduced here are surprising to one who, for the first time, makes inquiry into this branch of the science. In the past few months, for instance, there has been a very large demand for electric bells, for doors and for burglar alarms, servant calls and other purposes. This is owing to a cheapening of the prices of these useful instruments, but more particularly to their neatness and the great improvement over old-fashioned articles, of which they are taking the place.

THE work of digging the tidal canal between San Leandro bay and Oakland harbor has commenced. The contract was let to the San Francisco Bridge Company by Colonel Mendel, and the contractors have been very busy in getting ready for operations. They have built quarters for the men and have two large excavators on the ground. J. S. O. Hamilton is the superintendent, and he has given an outline of the way the work is to be finished. A large dam is to be built around the estuary near the cotton-mills, and behind this the mud and earth will be thrown, making very substantial grounds for factories, which will then be on the line of deep water. When the canal is finished, which will be in about a year, the city of Alameda will be an island. The canal from the San Leandro bay will make a very strong current in the Oakland harbor, which will keep the channel always scoured out and free from mud. About 200 men are given employment.

IN closing contracts for completing the U. S. war vessel Monadnock, $100,000 worth of contracts for the ship will be distributed on the Pacific Coast, the Union Iron Works some weeks ago securing the contract for the boiler plating required in the ship. The following are among the list of successful bidders: Five thousand two hundred and fifty feet of white oak, board measure, 50 white oak knees, 25 hackmatack knees. The contract was awarded to A. Powell of San Francisco for $2720; 68,140 feet of Oregon pine deck planks and 15,000 cubic feet of Oregon pine timber. The contract was awarded to W. Walker of Vallejo for $11,118; 92,000 feet of redwood plank boards. The contract was awarded to W. Walker of Vallejo for $3169; 20 700 feet of white ash, W. Walker of Vallejo, $2262; 1415 feet of white ash boards, A. Crawford, San Francisco, $110 74. The same firm, cotton waste, $39.20; 10,800 feet of black walnut, mahogany, maple and cherry, W. Walker of Vallejo, $2713; 10,000 feet of cypress and cedar, W. Walker of Vallejo, $1000; 475 white oak staves and headings, W. Walker of Vallejo, $194; 25 French plate looking-glasses, W. F. Whittier, San Francisco, $162; 65,770 pounds of wrought iron, round and square, Geo. W. Gibbs & Co., San Francisco, $1302; 400 pounds round steel, Geo. W. Gibbs & Co., $114; 3700 pounds iron cut nails, awarded to Dunham, Carrigan, Hayden & Co., San Francisco, $250; 1000 pounds zinc, Austin & Phelps, San Francisco, $75; 3000 pounds block tin, Dunham, Carrigan, Hayden & Co., San Francisco, $780; 60 dozen locks, hinges, bolts of brass and iron, W. R. S. Foye, San Francisco, $385; hardware of all descriptions to the Dunham, Carrigan & Hayden Company of San Francisco, $2670; 6900 pounds white lead in oil, W. F. Whittier of San Francisco, $407; the same firm, 3500 pounds of white zinc in oil, $227; the same firm, for colored paints, dryers' shellac, cork, etc., $861; also 660 gallons of linseed oil, $412; 500 gallons of varnish and spirits of turpentine to C. M. Yates, San Francisco, $318; the same firm, 20 dozen assorted paint-brushes, $128; 8 leather hides, to W. R. S. Foye, San Francisco, $96; W. F. Whittier, San Francisco, 45 gallons of alcohol $101, 32 gallons of fish oil $13, window glass $12, 19 barrels of North Carolina pitch $54; bulb T bars of steel for the hull, Dunham, Carrigan & Hayden Company of San Francisco, $12,580; the same firm, cone-head steel rivets, $810; the same firm, bulb T bars of steel for turret, $3490; the same firm, T bars, stiffeners for turret, $22; the same firm, angle bars of steel for the turret, $2415; the same firm, rivets for turret, $668; angle steel bars for the hull, Austin & Phelps of San Francisco, $11,900; the same firm, T bars, stiffeners, for the military mast, $55; same firm, steel angle bars for military mast, $39.

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To be sold at public auction by the undersigned, at the Merchants' Exchange, in the City of Halifax, on Thursday the Fourteenth day of March next, at twelve o'clock noon, that extensive, valuable and well equipped Gold Mine known as the Dufferin Gold Mine, situate on the Atlantic coast, about ninety miles east of said city. Daily mail from Halifax. Telegraph office at Salmon river, four miles from the works. Salmon river harbor never freezes, and is safe and easy of access. The mine embraces 342 acres, each 1320 feet, all in one block. The entire area measures fifteen hundred feet in width across, and eight thousand two hundred and fifty feet along the lodge. The leases have nearly fourteen years to run, and can at any time be renewed for a period of twenty one years, upon payment of two dollars per area. Within this area is a belt of veins dipping on each side of an anticlinal. They have been found by tests made on the surface to extend upwards of 4000 feet. The ore has been partially removed to a depth of 200 feet over a distance of about 700 feet, and is valued at averaging about 70 feet over an additional 1400 feet in length, or thereabouts. The veins are of various width, the largest averaging about ten feet of solid quartz.

This mine was discovered in the Autumn of 1860, but was not worked to any extent until the Autumn of 1861. It has yielded up to the end of November, 31,000 ounces of gold from 64,000 tons of quartz, according to the sworn returns made to the Mines office. The gold can be produced at a cost which will leave a very handsome margin of profit.

The mine is operated by machinery worked by water power, the power being transmitted by a line of wire rope running from the water wheel to the mine, a distance of about 4,750 feet, and lying parallel to the outcrop of said veins, at a distance therefrom of about fifty feet. The Salmon river crosses the property twice. It supplies the hoisting and pumping power, and the same water is afterwards used to drive the crusher. The latter has thirty-eight stamps, and there is ample water power to operate three times that number. Sixty stamps can be operated with present machinery. Of the 120 horse-power existing for pumping and hoisting only about twenty-five is used. There are about 700 acres of well timbered and well watered land owned with the mine. This partly covers the areas, and where it does not immediately adjoins them. It is also provided with a steam plant to operate hoisting gear and pumps in case of accident to the transmission power, a sawmill, sufficient for the requirements of the property, a tramway from the mine to the crusher for carrying quartz, and stables, offices, and boarding-houses, sufficient to accommodate a large number of employees.

The mine is owned and has been operated by a partnership, and owing to the death of one of the principal owners it has to be sold to enable his estate to be settled. A good title will be given.

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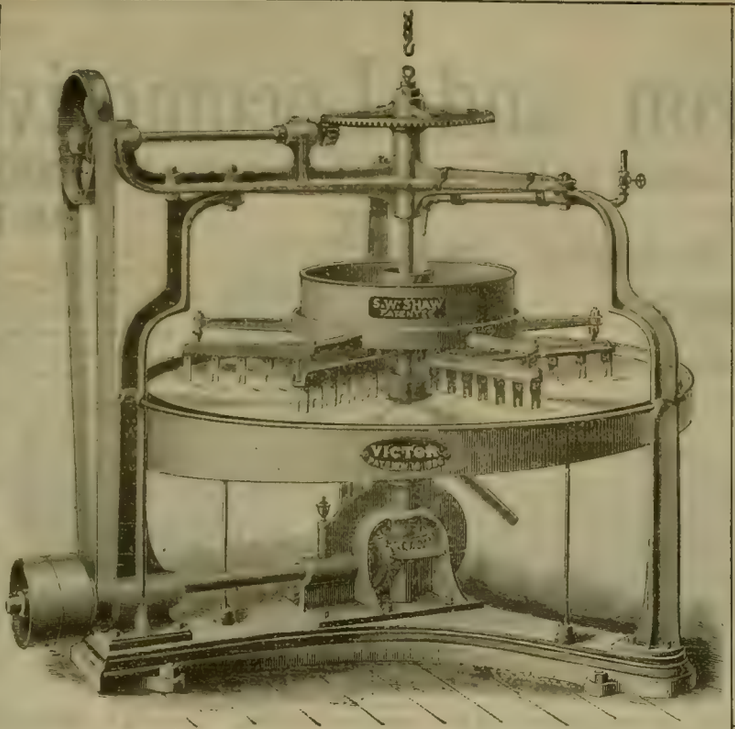

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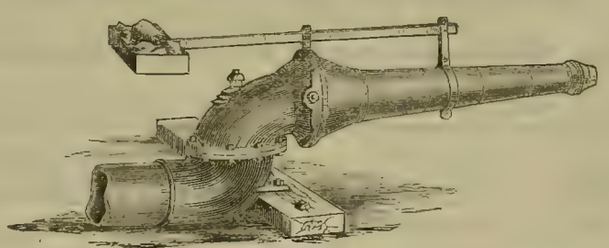

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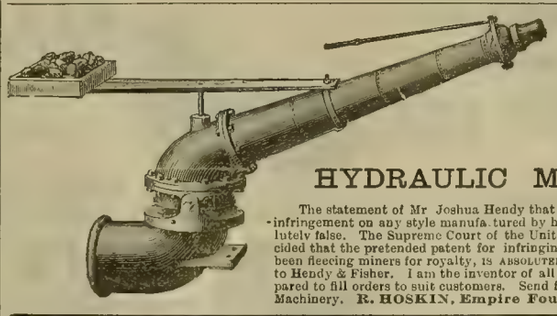

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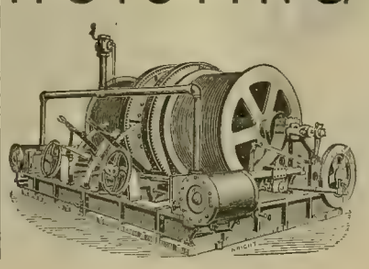

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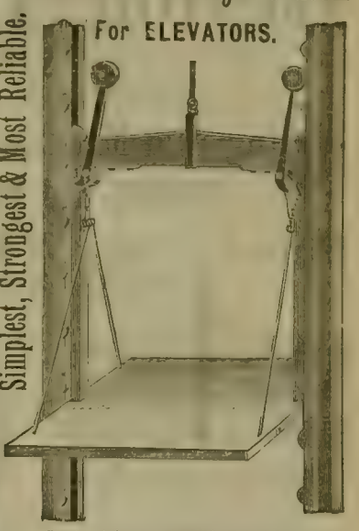

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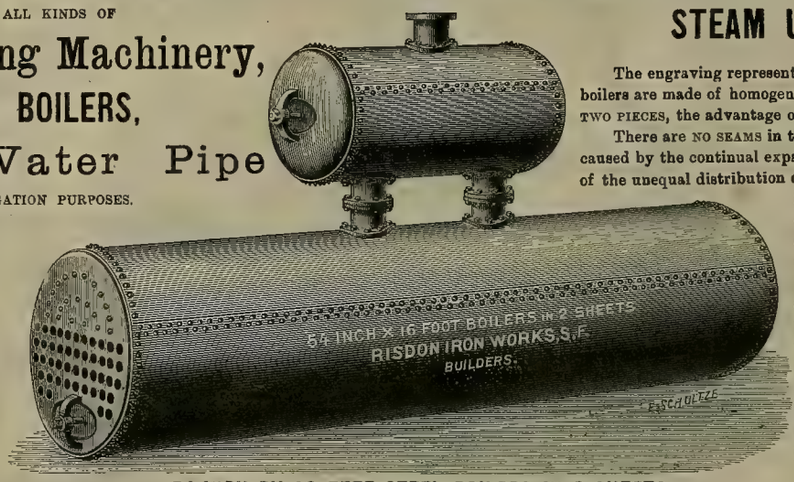

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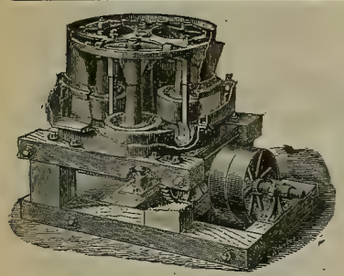
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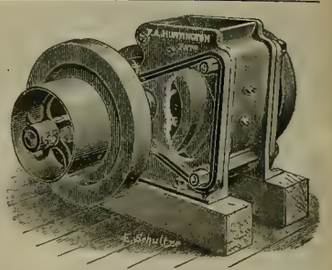
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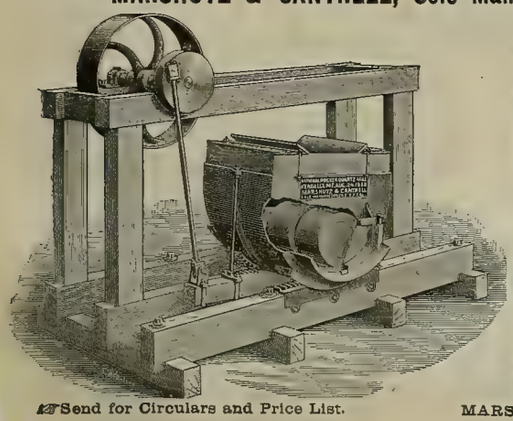

The Patentee and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity.
2. The freight to mine is less than one-half of stamps.
3. The cost of erecting is less than one-fourth of stamps.
4. The power to drive it is less than one-half of stamps.
5. The wear is less than one-quarter of stamps.
6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machine in use.
8. In its simplicity of construction.

We challenge competition with Stamps, Ball Pulverizers or and other ore crushing machines now before the public.

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MANUFACTURERS OF

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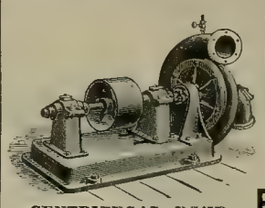
—AND—

MACHINERY

OF ALL KINDS.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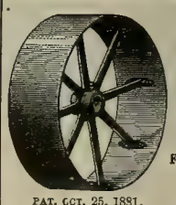
WORKS:

FIRST and STEVENSON STS., S. F.


PAT. OCT. 25, 1881.

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Sole Licensed Manufacturers of the

MEDART PATENT WROUGHT RIM PULLEY

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

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Nos. 129 and 131 FREMONT STREET, - - - SAN FRANCISCO, CAL.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No 1, 32 ft.; No. 2, 9½ ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Leller, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide. Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, March 7, 1889.

General trade continues only fair, yet it is fully up to previous years in this month. The outlook, at this writing, is of the most encouraging character, particularly so if well distributed rains are had on this coast, with large deposits of snow on the mountain ranges. Those who make the climate of this coast a special study, express themselves as being very confident of heavy rains and large deposits of snow within the next 30 days. With this an assured fact, new life will be instilled into all leading industries, with its reflection in general trade. The local money market is reported easier, with the tendency toward a lower rate of interest in the immediate future. It is claimed that more money will set this way for investment. In the speculative markets wheat has engaged more general attention, which created a better call for funds from operators. Local securities have been quite active. The decline in Spring Valley Water Co.'s stock affected the entire list, but with its steadying caused a better feeling along the line. It is claimed that inside manipulators are buying the stock, while in Hawaiian Commercial it is asserted that the inside has sold and are still unloading at present prices. In mining stocks the market has dragged at lower prices. Present appearances warrant the assertion that about everything is being brought to bear to depress the market so as to concentrate certain stocks, and in furthering this object it is very difficult to get reliable news from the Comstock mines outside of the State reports that new drifts and crosscuts have been or are about being started. It is confidently claimed that work in several of the mines which promised the best results within a short time, has been stopped, evidently for stock manipulation, as were also the levying of assessments with reports of others to follow.

The news from the Quijotoa, Bodies and Tuscarora mines is still of favorable character. From the Comstock mines we are advised of an improvement in Hale and Norcross, Savage, Ophir and Crown Point, while from Crown Point and Con. Virginia advices are of the very best character. In Challenge on the 300-foot level, important work is being done. The joint Union-Mexican crosscut, it is claimed, ought to be in ore some time in this month. It is reported that 60 stamps in the Nevada mill will soon be started, with probably 20 run on Hale and Norcross, and the others on Chollar and Potosi ore. It is also said that the California Panmill with 40 stamps will soon start up. Ore shipments from the Yellow Jacket above the milling grade will probably be commenced the coming week. Crown Point's ore is above the milling grade. The Hale and Norcross ore is increasing in assay value.

The San Francisco bank clearings during the month of February were as follows:

	Clearings.	Balances.
1889	$58,555,638	$8 658,179
1888	63,457.972	8,931,824

The coinage at the mint in this last month aggregated as follows: Double eagles, $1,020,000; eagles, $420,000; dimes, $2200. Total, $1,442,200.

The export value of merchandise shipped by sea from this port last month aggregated $2,566,597, against $2,858,643 in February, 1888.

On March 1st there was in the hands of the Assistant United States Treasurer at this port $35,963,409.50 in gold coin, $18,290,205 in standard silver dollars, and $6,821,115.25 in fractional silver.

The last steamer leaving for China took out to Hong Kong, 67,139 Mexican dollars, $7955 gold dust, and $72,000 silver bullion. For Bombay the shipment was $47,000 in silver bullion.

A mining expert of acknowledged ability is on the Comstock inspecting the Confidence and other mines of the Gold Hill group in the interest of stockholders. His report is looked forward to with interest by a class of large outside holders of the stocks in those particular mines.

COPPER—Cables received last Wednesday reported a decided decline in the market value of copper, with fears entertained that the French syndicate formed in October, 1887, was on the eve of a collapse. Color was given to this impression by the suicide of Mr. Deufert Rochereau, a director of the Comptoir d'Escompete, in consequence, it was asserted, of the decline in copper and a consequent fear of a run on the bank. The workings of the syndicate were set forth at considerable length in last week's issue of the MINING AND SCIENTIFIC PRESS, to which we refer patrons for the information. The events of the week only confirmed the tenor of our article, that the syndicate would have to adopt measures to restrict the output of copper, or sooner or later financial ruin, even though backed by the wealth of the Rothschilds, would be the result. This the controllers of the syndicate fully realized, and determined to force a decline in the price of copper even at the expense of losing some of if not all the profit made during the past two years. Bearing on this, we reproduce from an exchange the following interview with Colonel Horace D. Ranlett, who is probably the best authority on the subject. "The collapse of the syndicate," he said, "is out of the question. It is backed by the wealth of the Rothschilds, and is without doubt working at a loss, and putting down the prices to get control of all producers, and thereby limit production. According to latest advices, the syndicate has $60,000,000 worth of copper on hand, enough to supply the world for two years. When the syndicate was organized, about 18 months ago, copper was selling for 10 cents a pound, a price that did not pay. It is now selling for 15 cents, but will speedily descend to the old figure unless the output is restricted. The syndicate aimed to control the market of the world, but failed to limit the production. The consequence is, the vast amount of metal now on hand, which the syndicate will use in bearing the companies until it gets control of their stock, or forces them to agree to diminish production."

There is another thing quite important within itself, that evidently has a direct bearing on the decline in copper; viz.: the capitalists controlling the French syndicate are reported to have had large lines of stocks in the three foreign companies, the price for which was based on that of copper. Buying these stocks at a nominal figure, they were advanced as copper went up to high figures. At the higher figures the cupidity of outside speculators caused them to rush in and buy, which enabled the members of the syndicate to unload at big profits. What this amounted to it is difficult to say, but it can be judged by the decline which has since set in and reported in the copper stock at the East by the telegraph to be over $19,000,000 within the past six months. Of necessity the decline of the stock in the three leading companies in Europe, whose stock was based on the price of copper, must have been proportionately as great.

COAL—The market is fairly steady. It is claimed that with a continuance of the present rain prices will be more apt to appreciate than decline. The imports the past week were as follows: From Nanaimo, 6640 tons; Seattle, 5405; Departure bay, 807; and overland, 30¼. Total, 12,882 tons.

SILVER—The market held to steady prices at from 93⅛@93¼c up to Wednesday, when a weaker tone was manifested, resulting in a decline to-day, now being quoted at 92⅞@93c, in sympathy with a drop of 1-16 d in London and ⅛c in New York. Exchanges being weaker are against silver in our market. The output of silver on this coast is still light, with no material increase looked for in the near future, owing to the gold percentage showing an increase in the ore milled by the Comstock mines.

QUICKSILVER—Receipts the past week were 600 flasks by J. R. Randol, 34 by H. M. Newhall and 53 by Redington. The exports by sea were 440 flasks to Guaymas and 1 to Central America. The market has shaded off. The call continues only fair. The present rains, it is claimed, will probably cause a better demand.

LEAD—The market is reported steady, with a fair call ruling.

IRON—The market continues inactive. At this writing a more cheerful feeling is brought about by to-day's rains, which are said to be general. With the crops assured by well-distributed rains, many contemplated improvements, it is thought, will be started.

TIN—Pig is still heavy, while plate has eased off under freer receipts and more disposition to let go. The demand from Alaska is less marked, while the Columbia and Sacramento canners take sparingly. Fruit-canners have contracted to some extent to arrive. Receipts the past week aggregated 9524 boxes overland. The export clearance was 18,252 boxes to British Columbia.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, March 7, 1889.

ANTIMONY	13 @	14
BORAX—Refined	7½@	7⅝
Powdered	7¼@	7⅜
Concentrated	6¾@	7⅛
COPPER—		
Bolt	26 @	27
Sheathing	26 @	—
Ingot	18 00 @	19 00
Fire Box Sheets	— @	26
IRON—Glengarnock ton	27 @	—
Eglinton, ton	26 @	—
American Soft, No. 1, ton	— @	31 00
Oregon Pig, ton	— @	30 00
Clay Lane White	— @	24 50
Shotts, No. 1	— @	28 50
Bar Iron (base price) ₱ lb	2¾@	3
Chrome iron ore, ₱ ton	00 @	10 00
LEAD—Pig	4¾@	—
Bar	5 @	—
Sheet	8 @	—
Pipe	7 @	—
Shot, discount 10% on 500 bags Drop, ₱ bag	1 55 @	—
Buck, ₱ bag	1 75 @	—
Chilled, do	1 95 @	—
STEEL—English, lb	16 @	20
Canton tool	9½@	—
Black Diamond tool	10 @	16
Pick and Hammer	8 @	10
Machinery	4 @	5
Toe Calk	4¼@	—
TINPLATE—Coke, prompt shipment	4 85 @	4 95
Coke on spot	5 10 @	5 25
Charcoal, 14x20	6 75 @	7 25
do roofing, 14x20	5 50 @	5 62
Pig tin, ₱ lb	22½@	—
QUICKSILVER—By the flask	41 00 @	41 50
Flasks, new	1 05 @	—
Flasks, old	85 @	—
COKE—English, ton, spot	20 00 @	—
Do, do, to load	13 50 @	—

Coal.

TO ARRIVE

	Per Ton.		Per Ton
Australian	$ 6 50 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	10 00 @10 50	Lehigh Lump	16 50@17 00
West Hartley	11 00 @11 50	Cumberland bk	16 00@16 50
Scotch Splint	11 00 @11 25	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Sydney	$ 9 00
Scotch Splint	9 00	Gilman	7 00
West Hartley	10 00	Seattle	7 00
Greta	9 00	Coos Bay	6 00
Westminster Brymbo	9 00	Cannel	10 00
Nanaimo	9 00		

Eastern Metal Markets.

By Telegraph.

NEW YORK, March 7, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42⅝	93½	$16 50	$3 70	$21 55
Friday	42 9-16	93½	16 25	3 70	21 65
Saturday	42 9-16	93½	16 30	3 70	21 60
Monday	42 9 16	93½	16 25	3 72½	21 50
Tuesday	42 9-16	93½	15 75	3 72½	21 50
Wednesday	42 9-16	93½	15 60	3 70	21 00

Quicksilver has fluctuated to a lower level. Tin has eased off some, but the tone is fairly steady at the close. Lead is more inquired for, with several large transactions reported. Copper held up at a lower range up to Tuesday, when under disquieting news from Europe, holders forced sales, causing lower prices. At the close there was a stronger tone, owing to large operators standing under the market.

At the Sutro tunnel they have returned to the old rule and ceased working on Sunday, there being now only repair work to be done. While pushing through the drain drift to connect with the Crown Point, the men were obliged to work on Sundays.

Dredging Operations at San Diego.

A few months since we made mention of the fact that a dredger was being built in San Diego for use on Glorietta bay, a portion of San Diego bay. The machine has been finished and is at work. G. L. Pierce and A. B. Bowers returned from there last week and state that the machine is doing excellent work. It is called the "Bowers dredge No. 3," being the third of the kind built. This was made under the supervision of Mr. Pierce of this city. In a report to the Board of Directors of the Bowers Dredging Company that gentleman says:

The dredge was started up on the 29th of January. In the first ten days little was done other than repairing some small breakages arising from the inexperience of the workmen and in familiarizing the new hands with the working of the machine. Since then the dredge ran steadily up to the time of my leaving on the 22d inst., with exception of delays caused by low tides and changing the position of the machine. Everything is in perfect order, running smoothly, without heating of bearings, and giving entire satisfaction.

The material in which the dredge is working consists of about 90 per cent of sand and shell with sufficient clay to fill the interstices. For several inches from the surface it is quite soft, but gets harder and more compact as you go down, and at the depth of about three feet becomes so hard that the iron-pointed vertical anchor or "spud," weighing 2½ tons, and dropping 12 feet, will penetrate but three inches, or but eight inches on being dropped three times.

The feeding device is a valuable improvement, resulting in a great saving of time, and enabling the machine to be fed forward for a new series of cuts in considerably less than one minute, even when the pivotal anchor has to be raised and dropped three times on account of the hardness of the bottom. This forward feed has sometimes been made in 25 and often in 30 seconds. As a full swing of the dredge, in ordinary material, occupies only about five minutes in shallow cuts, where the machine must be fed forward on every swing, this improvement effects a saving of fully one-half of the time.

The average results of repeated tests made by me are as follows:

1st. The quantity of clear water raised to an elevation of ten feet and delivered through 258 feet of pipe, the end of the discharge pipe being dropped to an elevation of six feet above the water, is from 19,800 to 20,000 gallons per minute; the pump making 160 revolutions, and the direct-acting Westinghouse engine showing an average of 165.77 indicated horse-power.

2d. With the foregoing number of revolutions and length and elevation of pipe, when working in the lower and harder portion of the excavation, the machine cuts, raises, and delivers 4.19 cubic yards of said sand, shells and clay per minute, with an expenditure of 188.79 indicated horse-power on the engine that drives the pump.

3d. Under the same conditions, when working at a depth of five feet below the surface of the bottom, the delivery was 7.66 cubic yards per minute and the indicated horse-power, 192.75.

4th. When working to a depth of three feet from said surface in the less compact material, the delivery was 12 79 cubic yards per minute, with an average indicated horse-power of only 179 98.

On a run of 5 hours and 20 minutes, the total output was 3030 cubic yards, or an average of 9.46 cubic yards per minute.

The coal was of good quality, having an evaporative power of about eight. The average consumption was 800 pounds per hour. The total capacity of all the engines is something over 300 horse power. You are aware that I have built many dredging machines of various kinds and am familiar with all kinds now in use. I congratulate you on having a machine of moderate cost (many machines of less capacity cost from $75,000 to $150,000), economical working and with many advantages for this class of work over all others of which I have any knowledge.

Sucoessful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

A. F. JEWETT—Tulare Co.
F. B. LOGAN—Southern California.
H. G. PARSONS—Southern California.
GEO WILSON—Sacramento Co.
W. W. THEOBALDS—Los Angeles Co.
J. C. HOAG—San Francisco.
CHAS. F. BLACKBURN—Idaho.
FRANK S. CHAPIN—Colusa Co.
MRS. C. J. STEPHENS—Sierra Co.
R. G. HUSTON—Montana.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING FEB. 26, 1889.

398,367.—AUTOMATIC FOG-HORN—A. F. Baatz, Bellingham, W. T.
398,578.—ANIMAL-RELEASING DEVICE—A. R. Brann, S. F.
398,499.—KEY—J. P. Dandmand, Virginia, Nev.
398,711.—HARVESTER—Jabez Draper, Stockton, Cal.
398,773.—WHEELBARROW—John Dupuy, S. F.
398,387.—BEE-HIVE—J. I. Fort, San Diego, Cal.
398,728.—SAFETY-ATTACHMENT FOR ELEVATORS—H. O. Hooper, S. F.
398,406.—AMALGAMATOR—W. & G. W. Johnson, Portland, Ogn.
398,785.—HOISTING APPARATUS—H. Kennedy, S. F.
398,739.—FRUIT-BOX—J. G. Lettelier, Los Angeles, Cal.
398,648.—PLOW—James & William Paterson, Stockton, Cal.
398,798.—GATE—W. O. Pierce, Sacramento, Cal.
398,401.—STEAM OR WATER PACKING—J. T. Smith, S. F.
398,464.—NIPPERS—J. Sponseller, Ft. Apache, A. T.
398,682.—HAY-LOADER—W. M. White, Tacoma, W. T.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

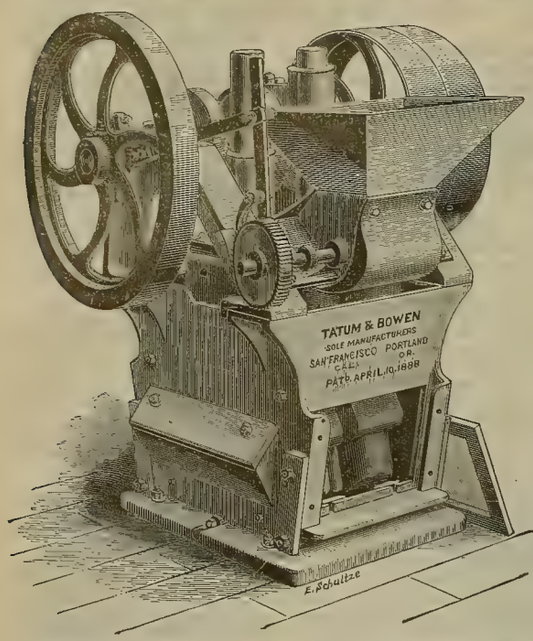
HARVESTING MACHINE.—Jabez Draper, Stockton. No. 398,711. Dated Feb. 26, 1889. This invention relates to certain improvements in the running gear for harvesting machines of that class in which the header and thrasher are connected together and hauled about the field, the grain being cut, thrashed, separated and cleaned during the operation. The invention consists in certain improvements in the turn-table and single front wheel upon which the front portion of the machine is supported.

PLOW.—James and William Paterson, Stockton. No. 398,648. Dated Feb. 26, 1889. This consists of a series of concavo-convex disks centrally journaled so as to turn freely on the ends of arms which project radially from hubs fixed upon a main bearing and driving shaft, through which power is applied to rotate the arms and disks, so that the latter enter and leave the soil intermittently. Various devices have been employed in the place of ordinary plows for turning the soil, some consisting of blades mounted spirally upon a shaft, said blades turning continuously in the soil, others consisting of disks mounted on shafts so their edges turn continuously in the soil, and various modifications of these devices. This invention differs from these in having a series of independent cup-shaped disks so mounted as to turn freely in the ends of radial arms extending outwardly from the driving-shaft, so that said disks are caused to enter the ground and rotate therein intermittently instead of continuously.

SAFETY ATTACHMENT FOR ELEVATORS.—H. O. Hooper, S. F., assignor one-half to John Bresmen, Eureka, Humboldt Co. No. 398,728. Dated Feb. 26, 1889. This safety attachment for elevators consists of a grooved or channeled weight traveling upon a guide or guides and connected with the elevator cage by a rope passing over pulleys at the top, and, in connection therewith, of a wedge-shaped weight fitting into the groove or channel, said wedge being suspended at a point above the channel so as to allow the weight to travel loosely unless the suspending-rope of the cage should break, when, by means of a lever-arm, the wedge falls into the groove or channel and bends between it and the guide-post so as to check the movement of the cage. In order to insure the bending of the wedge against the face of the guide, this face is made slightly tapering from bottom to top, being thinnest or narrowest at the bottom, and thickest at the top, so that as the weight travels upward the wedge-shaped space will continually become narrower, and when the wedge is fixed into the channel the compression wil be made stronger and stronger until the whole is rought to a stop.

A. B. HULL, who has been engaged in mining matters for many years on this coast, died in Oakland on Monday. He has been a director and vice-president of the Consolidated Virginia, California, Gould and Curry, Best and Belcher, Sierra Nevada and other prominent corporations, and was vice-president of the Consolidated California and Virginia Co. at the time of his death.

A. W. HAVENS has been elected vice-president of the Mexican Mining Co., vice A. B. Hull, deceased, and Herman Zadig to the Board of Directors.



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The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

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IMPROVED ROCK BREAKER.

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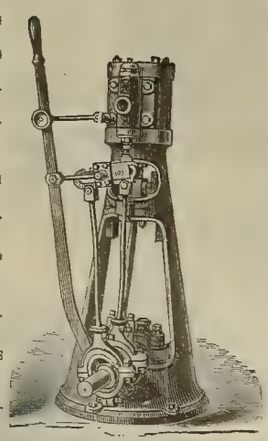
BRAINARD MILLING MACHINES.
TURBINE WATER WHEELS.
BRADLEY CUSHIONED HAMMERS
MASSEY'S STEAM HAMMERS.
SCHLENKER'S BOLT CUTTERS.
HOLLOWAY FIRE EXTINGUISHERS.



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OTTO SILENT GAS ENGINES.
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PICKERING ENGINE GOVERNORS
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STEAM ENGINES,

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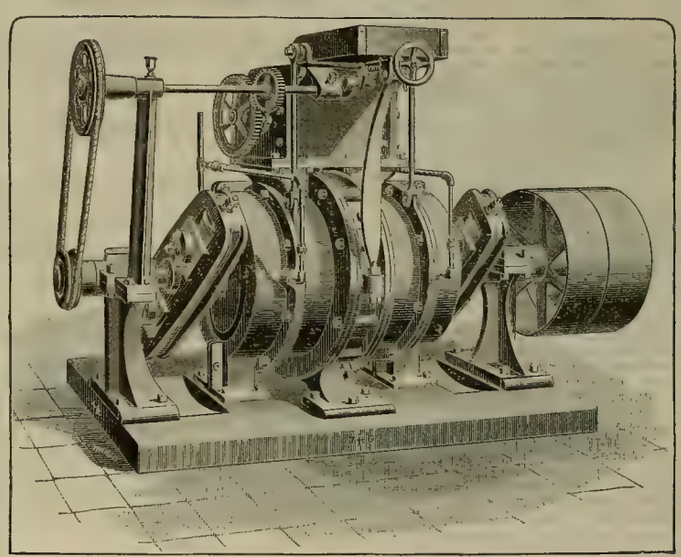
Shafting, Pulleys, Hanger and Boxes, Etc.

Special machinery of all kinds. We have a large list of Standard Patterns, Gears, Pulleys, Boxes, etc. REPAIR WORK SOLICITED.

FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; is in successful operation and we guarantee its work as represented.



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And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

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Improved Corliss and Slide-Valve Steam Engines,
Boilers--Horizontal, Vertical and Sectional,
IMPROVED STEAM STAMPS.

Hoisting Engines, Safety Cages, Safety Hooks, Ore Cars, Water and Ore Buckets, Air Compressors, Rock Drills, Etc. General Mill and Mining Supplies, Etc.

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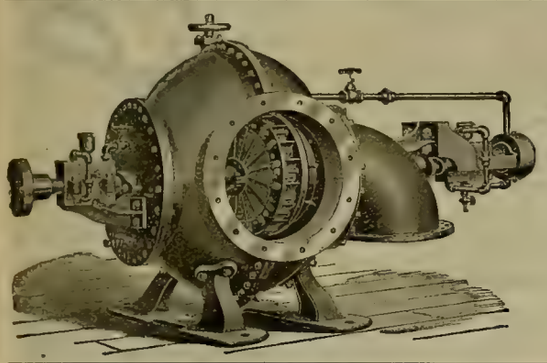

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

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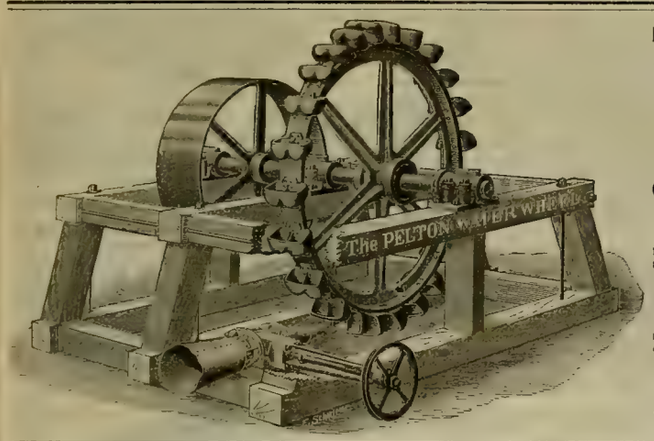

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GIVES THE

Highest Efficiency of any Wheel in the World.

A MARVEL OF ENERGY AND POWER.

Over 600 in use on the Pacific Coast alone, aggregating upwards of 50,000 Horse Power.

It is not only most economical of water, but the most simple and reliable power for Quartz Mills, Compressors, Hoisting, Pumping, or any other purpose where water power can be used.

ELECTRIC TRANSMISSION.

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"De man wot knows it all is alluz a-makin change, a-buyin' ob experience." The man who does *not* think that he "knows it all" about Pumps can find out a great deal about them in *Grimshaw's* PUMP CATECHISM. By mail, postpaid, $1. Dewey & Co., 220 Market St., S. F., Cal.

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CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS,

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.
WORKING TESTS OF ORES BY ALL PROCESSES.
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GOLD AND SILVER REFINERY
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Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

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Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we fee confident from our experience we can well suit the de mand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

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Nevada Metallurgical Works.
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Ores worked by any Process.
Ores Sampled.
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BATTERY SCREENS.
Best and Cheapest in America.

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I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

PERFORATED SHEET METAL

For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass Zinc and other metals punched for all uses.

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JOHN W. QUICK, Proprietor.

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Legislative.

In the Senate on Tuesday Langford's bill to abolish the office of State Engineer came up, and Sprague offered a substitute, which was adopted. It makes the State Mineralogist ex-officio State Engineer, at an increase in salary of $3000 a year. The office is to continue only two years. A motion by Heacock to strike out the salary was lost and the bill was ordered engrossed.

The bill providing for elections on the Australian plan has been defeated.

The General Appropriation bill two years ago aggregated $8,000,000. This year the Controller estimates that the aggregate will be twelve or thirteen millions.

The bill appropriating $40,000 for boring a gas well at the Stockton Insane Asylum has been passed by the Assembly.

The Mutual Insurance bill has passed both houses.

The Senate has passed the Colusa County Division bill.

Mining Share Market.

Though the market has been rather active this week, prices have been irregular. The following mining companies show, by their monthly statements, cash on hand on the 1st inst.: Alpha, $16,215.55; Alta, $35,872.82; Andes, $12,182.23; Best and Belcher, $1797.25; Benton, $95,572.62; Bodie, $30,876.52; Bulwer, $570.83; Bullion, $28,831.59; Caledonia, $13,903.84; Challar, $3136.35; Con. California and Virginia, $64,717.60 and unsold bullion amounting to $56,538.10; Confidence, $62,381.45; Con. Imperial, $16,407.79; Dudley, $152.91; Exchequer, $6866.10; Found Treasure, $100.42; Gould and Curry, $9084.84, and the balance of an assessment to collect amounting to $1175.40; Hale and Norcross, $5229 94, and the gold and other bullion to come in; Independence, $1993.49; Julia, $831.28; Lady Washington, $23,831.30; Locomotive, $1134-55; Mono, $10,797.81; Occidental, $11,001.21; Ophir, $8757.32; Overman, $20,668.56; Navajo, $34,461.83; Scorpion, $7989; Syndicate, $8754.71; Standard, $20,262.78; Union, $13,047.93; Utah, $1570.16; Weldon, $156.47.

The following companies have an indebtedness: Belcher, $15,616.91; Belle Isle, $3407.46; Challenge, $603.99; Commonwealth, $45,513.96; Crocker, $2479.33; Crown Point, $28,779.10; Con. New York, $5605.50; Del Monte, $653.96; Grand Prize, $40,959.66; Holmes, $3491.13; Kentuck, $1062.06; Mt. Cory, $49,817.96; Mexican, $763.31; Nevada Queen, $4013.24; North Belle Isle, $7440.82; North Commonwealth, $14,016.69; Peerless, $7400.92, with an offset in bullion valued at $5143.32; Potosi, $17,248.56; Savage, $17,267.25; Seg. Belcher, $12,360.92; Sierra Nevada, $2803.03; Peer, $6204.79.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

OAK CON. M. CO, Feb. 21. Capital stock, $100,000. Directors—O. P. Evans, E. A. Rix, L. M. Hoeffler, N. S. Farley and W. McP. Hill.

ALAMEDA SUGAR CO., Feb. 26. Capital stock, $25,000. Directors—L. C. Marshutz, W. T. Mau, T. G. Cantrell, E. C. Burr and J. N. Browning.

WEST COAST STEAMSHIP CO., Feb. 25. Capital stock $3,000,000. Directors—J. N. Knowles, Millen Griffith, A. K. P. Harmon, Henry Pierce and W. C. Dean.

ALKI CON. M. CO., Feb. 23. Capital stock $500,000. Directors—H. P. Wood, B. B. Keeler, J. H. Swift, Randolph Crimmins and H. L. Shannon.

TYRO M. & M. CO., Feb. 26. Capital stock $500,000. Directors — Francis C. Jarvis, B. G. Lathrop, Jas. M. Haven, Thos. E. Haven, John O. Doane.

MUTUAL GASLIGHT & FUEL CO., March 4. Object, to manufacture illuminating and heating gas. Capital stock, $3,000,000. Directors—Columbus Bartlett, Robert Dickson, John I. Kennedy, H. L. Coye and Sampson Tams.

SANTA CUEVA M. CO, March 4. Capital stock, $1,500 000. Directors—E. M. Railton, W. B. Saufley, C. H. King, G. E. Neal and Frank Cunningham.

YOUNG PEOPLE'S INSURANCE SOCIETY OF CALIFORNIA, March 4. Object, to mutually insure the members. Directors—A. S. Keser, W. J. Barnes, J. W. Bird, Fred Delature, John R. Mitches and Charles S. Thomas.

GEORGE W. GIBBS CO., March 5. Object to deal in iron and steel. Directors—Geo. W. Gibbs, F. A. Gibbs, E. A. Selfridge, H. J. Morton and H. T. Gibbs.

REDWOOD MANUFACTURERS' ASS'N, March 5. Object, to deal in redwood lumber. Directors—Geo. W. Chandler, E. L. Allen, John Dalheer, J. C. Hawley, Francis Korbell, T. H. Minor, E. C. Williams, Carl E. White, J. G. Jackson, Henry Wetherbel and E. L. Dingley.

SKAGIT CUMBERLAND COAL CO, March 6. Location, Skagit, Washington Territory. Capital stock, $5,000,000. Directors—Patrick N. Mackay, Wm. Johns, Duncan C. Mackay, Robert O. Oakley and Robert E. Doyle.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. California and Virginia, March 2, $64,850; Savage, 2, $8200; Justice, 2, $3337; Hanauer, Feb. 27, $2775; Moulton, 26, $14,016; Hanauer, 28, $2880; Hanauer, March 1, $2880; 2, $3550.

Mt. Diablo, March 5, $5677; total for February, $29,884; Confidence, $16,681; total for February, $48,709.

SAN JOSE'S water rates are reduced 25 per cent.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Baltimore S M Co	Nevada	4	25	Feb 4	Mar 8	Mar 26	A R Grim	402 Montgomery St
Belcher S M Co	Nevada	37	50	Feb 19	Mar 25	Apr 12	J Crockett	327 Pine St
Con Pacific M Co	California	10	15	Feb 5	Mar 11	Apr 2	F E Luty	330 Pine St
Crocker M Co	Arizonia	6	10	Feb 25	Apr 2	Apr 24	A Waterman	309 Montgomery St
Christy M Co	Utah	1	10	Feb 20	Mar 25	Apr 15	G R Spinney	310 Pine St
Golden Prize Con M Co	Nevada	2	30	Feb 16	Mar 20	Apr 10	C D Bennett	328 Montgomery St
Gray Eagle M Co	California	11	03	Jan 23	Feb 26	Mar 19	O H Bogart	327 Pine St
Julia Con M Co	Nevada	23	10	Jan 30	Mar 7	Mar 28	J Stadfeldt Jr	309 Montgomery St
Lapanter Con M Co	Nevada	1	03	Feb 23	Apr 5	Apr 24	J Stadfeld Jr	309 Montgomery St
Martin White M Co	Nevada	22	25	Jan 19	Mar 6	Mar 26	A B Cooper	325 Montgomery St
Mayflower M Co	California	44	50	Jan 14	Feb 18	Mar 11	J Morizio	328 Montgomery St
Mexican M Co	Nevada	37	25	Mar 5	Apr 10	Apr 30	C E Elliott	309 Montgomery St
Mono M Co	California	27	50	Feb 28	Apr 2	May 8	B L Burling	309 Montgomery St
North Peer G & S M Co	Arizona	5	05	Feb 25	Apr 1	Apr 24	H Deas	309 Montgomery St
New Coso M Co	California	22	30	Feb 5	Mar 14	Apr 1	J L Hunt	308 Montgomery St
Overman M Co	Nevada	59	25	Jan 15	Feb 19	Mar 12	G D Edwards	414 California St
Oak Con M Co	California	1	03	Feb 25	Apr 8	Apr 23	E J Ryan	230 Montgomery St
Peer M Co	Arizona	7	10	Jan 28	Mar 5	Mar 28	A Waterman	309 Montgomery St
Piedmont M Co	Nevada	1	05	Jan 28	Mar 6	Mar 27	J J Scoville	309 Montgomery St
St Louis M Co	Nevada	2	05	Jan 14	Feb 18	Mar 16	W E Dean	309 Montgomery St
Scott Bar M & M Co	California	2	10	Jan 23	Feb 28	Mar 19	H Pink	318 Pine St
Sierra Nevada M Co	Nevada	94	25	Mar 5	Apr 9	Apr 29	E L Parker	309 Montgomery St
Utah Con M Co	Nevada	6	25	Mar 5	Apr 10	Apr 29	A H Fish	309 Montgomery St
Western Belle M Co	Nevada	1	20	Jan 24	Mar 1	Mar 21	J H Sayre	328 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Chollar M Co	Nevada	C E Elliott	309 Montgomery St	Annual	Mar 20
El Dorado W & D G M Co	California	R M Welch	524 Sacramento St	Special	Mar 9
Hale & Norcross S M Co	Nevada	E B Holmes	309 Montgomery St	Annual	Mar 13
Potosi M Co	Nevada	C E Elliott	309 Montgomery St	Annual	Mar 13

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M Co	Nevada	A S Cheminant	328 Montgomery St	08	Feb 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Mar 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Dec 10

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 14.		WEEK ENDING Feb. 21.		WEEK ENDING Feb. 28.		WEEK ENDING Mar. 7.	
Alpha	1.75	2.00	1.55	2.10	2.05	2.30	1.90	2.30
Alta	2.15	2.50	1.95	2.30	2.15	2.50	1.90	2.10
Andes	.85	1.05	.80	.95	.90	1.00	.90	1.00
Argenta	.05	.10	....	....	....	.10	....	.10
Belcher	2.80	3.65	2.65	3.15	3.05	3.50	3.10	3.65
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	4.75	5.50	4.25	4.90	4.70	5.25	4.35	5⅛
Bullion	.95	1.10	.80	1.05	1.00	1.10	.90	1.00
Baltimore	.20	.35	....	.90	.20	.30	.20	.30
Belle Isle	....	.35	....	.35	....	....	....	....
Bodie Con	1.60	1.70	1.50	1.60	1.50	1.55	1.35	1.55
Benton	....	3.50	....	....	....	....	3.00	3.50
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.50	.55	.45	.50	....	.50	.40	.50
Con. Va. & Cal	7.50	8⅛	7.50	7⅞	8.00	8.50	7⅞	7.50
Challenge	4.10	4.60	3.80	4.10	4.50	5⅛	4.60	5⅛
Champion	....	....	....	....	....	....	....	....
Chollar	2.55	3.10	2.35	2.80	2.05	3.10	2.55	3.15
Confidence	13⅜	14⅛	13	14	14	16⅛	14	16
Con. Imperial	.70	.75	.60	.70	.70	.80	.70	.80
Caledonia	.35	.45	.35	.40	....	.40	....	.40
Con. Pacific	....	....	....	....	....	....	....	....
Crown Point	4.45	5.25	3.80	4.90	5.00	6⅛	5.25	6⅛
Crocker	.70	.85	.50	.75	.60	.75	.55	.60
Central	....	....	....	....	....	....	....	....
Dudley	....	.15	....	.15	....	....	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	2.00	....	....	....	....	....	2.00
Exchequer	.90	1.05	.80	1.00	1.00	1.15	.95	1.05
Grand Prize	1.05	1.50	1.20	1.30	1.05	1.10	1.00	1.10
Gould & Curry	2.55	2.85	2.55	2.85	2.80	3.20	2.65	3.10
Hale & Norcross	3.90	4.75	3.75	4.10	3.85	4.25	3.85	4.40
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	.25	.30	....	.25	.25	.30	....	.25
Justice	1.85	2.00	1.60	1.75	1.60	1.85	1.60	1.75
Kentuck	2.00	2.20	1.90	2.10	2.25	2.35	2.15	2.30
Lady Wash	.40	.50	.35	.40	.40	.45	.35	.40
Martin White	....	....	....	....	....	....	....	....
Mono	1.00	1.20	....	1.00	....	1.05	....	.85
Mexican	3.05	3.65	2.80	3.60	3.20	4.20	3.50	4.10
Mt. Diablo	....	....	....	....	....	....	....	....
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.40	1.50	....	1.45	1.40	1.50	1.40	1.45
North Belle Isle	2.50	2.80	2.00	2.75	2.55	2.65	2.55	2.65
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.90	3.15	2.80	2.95	2.75	2.80	2.90	3.00
North C. & C	....	....	....	....	....	....	....	....
Occidental	....	....	....	1.50	1.65	1.55	1.70	1.50
Ophir	5⅛	5.75	4.90	5.50	5⅜	6.50	5.25	6.00
Overman	1.15	1.30	1.00	1.45	1.35	1.55	1.40	1.50
Potosi	2.10	2.35	2.00	2.40	2.20	2.60	2.30	2.70
Peerless	.85	1.05	.65	.85	.60	.75	.65	.80
Peer	.25	.35	.25	.30	....	.25	....	.35
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.75	3.30	2.75	3.15	3.05	3.45	2.90	3.30
S. B. & M	2.85	3.20	2.65	3.20	3.00	3.30	3.05	3.20
Sierra Nevada	3.00	3.25	2.80	3.25	3.10	3.80	3.15	3.65
Silver Hill	.75	.80	.65	.70	.70	.75	.65	.75
Silver King	....	1.05	....	....	....	....	....	....
Scorpion	....	.55	.50	.55	.55	.65	.55	.60
Syndicate	....	....	....	.10	....	....	....	....
Union Con	2.85	3.20	2.80	3.15	3.15	4.10	3.60	4.05
Utah	1.20	1.35	1.15	1.30	1.30	1.50	1.30	1.45
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Zauber	....	.80	....	....	....	....	....	....

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250	Alpha	1.80	
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250	B. & Belcher	4.10	
100	Bullion	.90c	
200	Bulwer	.30c	
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150	Bodie	1.30	
200	Caledonia	.35c	
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350	Con. Imperial	.70c	
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20	Confidence	13.75	
100	Commonwealth	5⅛	
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200	Exchequer	.90c	
100	Grand Prize	1.25	
350	Gould & Curry	2.50	
250	Hale & Nor	3.80	
150	Justice	1.55	
400	Mexican	3.45	
250	Mono	.60c	
200	New York	.25c	
230	Nev. Queen	3.05	
100	N. Belle Is	2.55	
100	Opnir	5⅛	
50	Overman	1.40	
100	Occidental Con	1.45	
600	Potosi	2.25	
600	Peerless	.65c	
100	Peer	.35c	
600	Savage	2.90	
420	Sierra Nevada	3.00	
100	S. B. & M	2.90	
100	Silver Hill	.65c	
350	Scorpion	.55c	
150	Utah	1.25	
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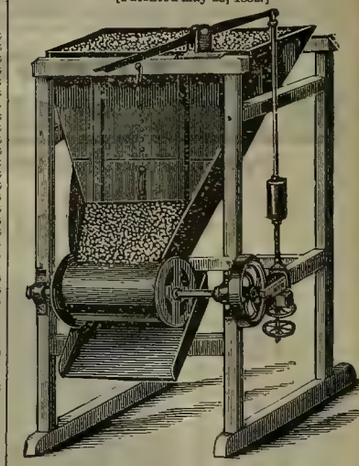

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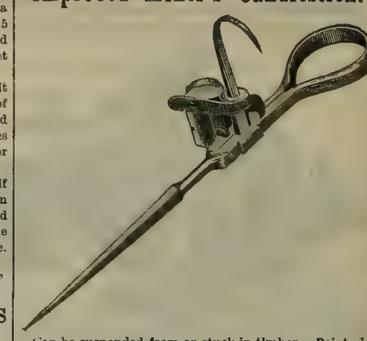

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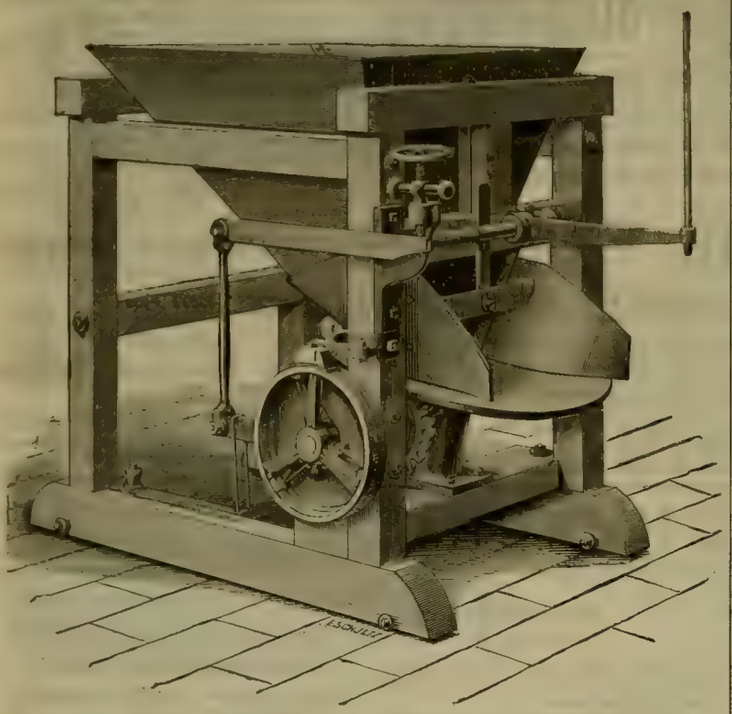

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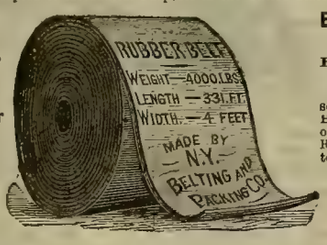

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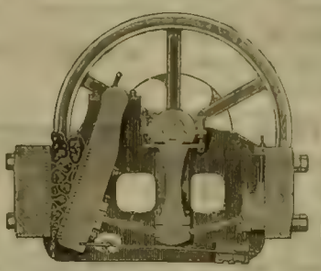

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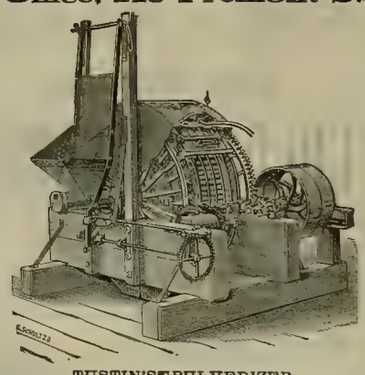

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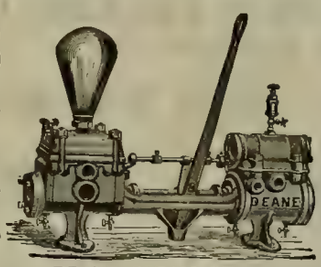

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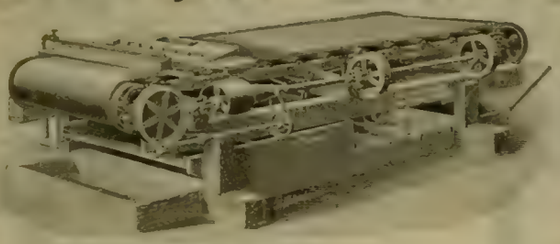

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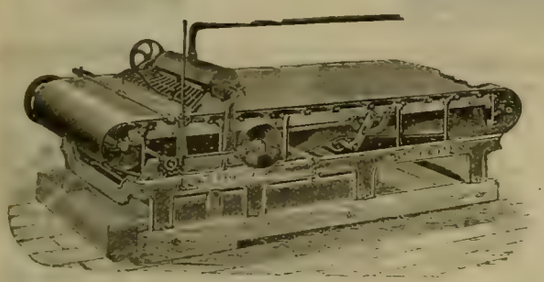

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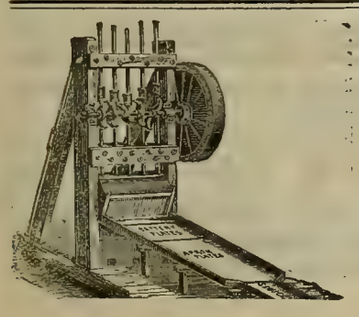

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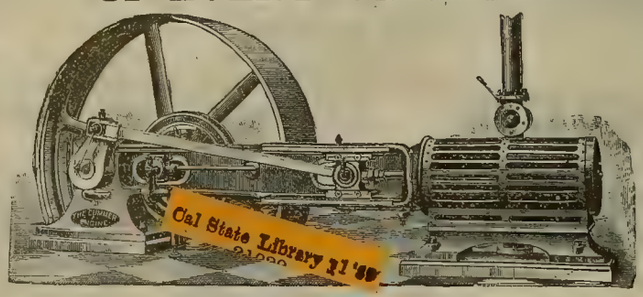

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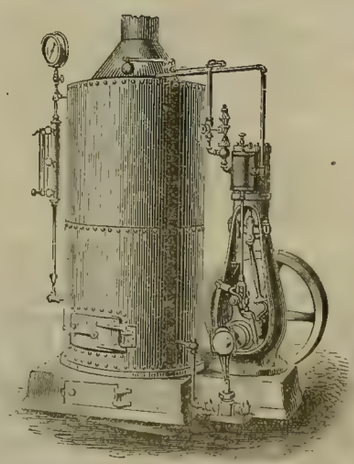

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SAN FRANCISCO, SATURDAY, MARCH 16, 1889.

VOLUME LVIII. Number 11.

The Santa Clara District.

We give on this page a sketch map of the new mining district in Lower California, showing the lines of travel to the mines from San Diego and Ensenada. The steamer is taken to Ensenada, fare $10; but overland the route from San Diego is by way of Tia Juana. The new gold mines in the Santa Clara region are about 60 miles from Ensenada. One route from Ensenada is via Las Animas and La Grulla up the La Grulla canyon to within six miles of the old Santa Clara ranch, where the trail leaves the wagon-road on the right and goes over to the camp about six miles distant. The other route is via Las Cruces, San Rafael valley, Los Alamos to Santa Clara ranch house, and thence by trail over to the mines, ten miles distant. Hay, grain and food can be had on the La Grulla route at Las Animas, 20 miles, and at La Grulla, 28 miles from Ensenada. On the northern route, hay, feed, and meals can be had at the Real del Castillo.

The mines are about 35 miles southeast of the Real del Castillo. Steps have been taken to open a wagon-road from the La Grulla and Santa Clara wagon-road over to the mines, six miles distant. There is plenty of wood, water and grass at and near the mines.

The canyon of the river or creek, Las Animas, is to the southward of Ensenada. Taking conveyance at Ensenada, the drive lies through the "city" of San Carlos, across the Manradero valley and up the Las Animas. La Grulla canyon enters Las Animas some miles from its mouth on the left-hand side. It costs from $20 to $25 per man to get from Ensenada to the mines.

Passengers for Tia Juana leave San Diego on the National City & Otay railroad, if they go overland. Teams, however, drive down there.

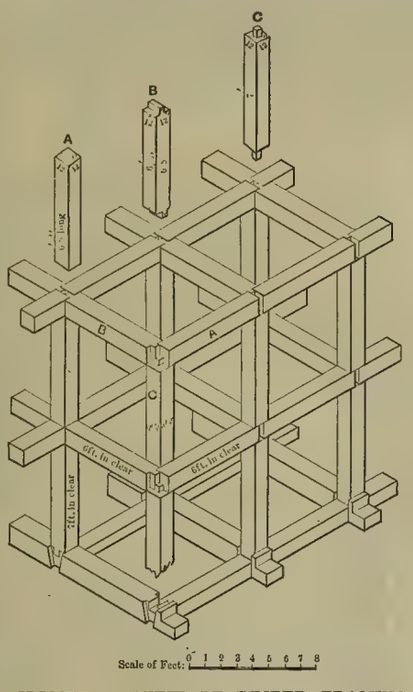
ROUTES TO THE LOWER CALIFORNIA MINES.

At Tia Juana is the Mexican custom-house, where clearance papers are signed. Burros and mares go in free, but horses are taxed $40 each. It is said there is not so much delay here as at first reported. Besides the duties, it costs $6 to pass the custom-house.

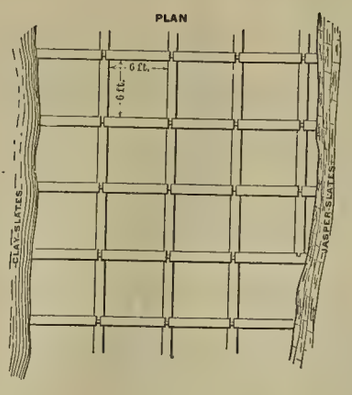
From San Diego to Tia Juana is 20 miles. A stage-line carries passengers for $25. The stage makes its three-night station in the 120 miles' journey at Murphys ranch in the Valley of Palms, at Ryerson's ranch, and at the Real, reaching the mines the following day. The roads appear to be pretty good, and are crowded with all sorts of vehicles. Many men are making the journey on foot. The map shows the line of the wagon-roads both from San Diego and Ensenada.

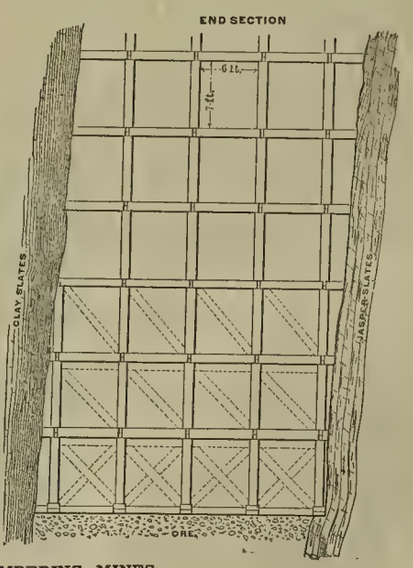
Mine Timbering.

The plan of mine timbering known as the Nevada system consists in filling the space exhausted in the ore body with a series of frame cubes. The drawings on this page will show the value of this system of timbering as related to strength, facility in erecting and its adaptability to all thicknesses of ore deposits or variations in hanging and foot walls. When the walls of the ore deposit are tolerably firm and not easily softened by exposure to the moist atmosphere of the mine, this system possesses great strength, but when the hanging-wall is of soft clay slate, softening rapidly on exposure, this system, with its large timbers, affords only temporary support. Collars and cross-braces are used to arrest a squeeze. The depth to which this system can be carried safely depends on the firmness of the hanging and foot walls more than on the increased pressure from depth. Some very large spaces have been filled on the Comstock with this system, and an immense amount of timber is annually used there.



ISOMETRIC VIEW OF TIMBER FRAMING.





NEVADA SYSTEM OF TIMBERING MINES.

CORRESPONDENCE.

We admit unindorsed, opinions of correspondents.—EDS.

Mexican Gold Mines.

A Prospecting Tour in Sonora, Mexico.

EDITORS PRESS:—We read sometimes, highly colored accounts of the hidden wealth and abandoned gold and silver mines of Sonora, Mexico, and it may interest some of your readers to obtain a plain and unvarnished account of a six-months' prospecting tour, during which some of the most renowned gold districts of that State were visited. It is only of gold regions, and by no means all of them, that this article will treat of the prospects in the Ures, Hermosillo and Montezuma districts, and along the San Miguel, Oposura and Yaqui rivers.

Some of these gold regions are over 30 miles long; others considerably smaller. In all these the canyons and creeks are auriferous, and a multitude of abandoned holes from which gravel, pay dirt was extracted, or in some places many arastras, testify to a former activity in those places. But it is not only in the canyons that gold is found; on some table-lands good prospects can be obtained, and were it possible to apply the hydraulic process, good returns could be obtained; but water is either scarce or ditches would be too costly to allow this kind of operations. In some districts quartz veins are more or less numerous, of which some are worked in a more or less slipshod manner with more or less benefit, or rather with more or less loss, with a few exceptions.

Mentioning the different districts in sequence as I visited or worked them one after the other, I have first to ask indulgence for occasional seemingly irrelevant remarks about the honesty, or rather absence of it, in many with whom I had to deal, foreigners as well as natives, well-to-do as well as common people; but these things are closely related to mining and prospecting operations in this country, and it may prove profitable, to some at least, to be posted in some details. Such experiences when read, noticed and considered by would-be investors are much cheaper than those acquired by one's own trials and investments.

Alluring indeed were the accounts which made me travel up and down the Sonora river. Near Baviacori was represented to be a very rich gold quartz mine, in which father, brother, cousins and other relations of the present proprietor are said to have been killed by Apaches, and thus prevented the present owner, an old man, pursuing further labor on the mine. I may observe in connection with this that such an Apache story is now regularly used and imposed upon would-be investigators. In every instance the miners took rich ore out of their claims, when they were surprised and nearly all killed by these Indians; generally one survivor escaped, who afterward covered up the shaft or tunnel, having had since no opportunity nor means to reopen the mine. For a consideration the aforesaid survivor is said to be willing to show the place and to sell his claim. To such an Apache story I was treated, and, thinking it worth while, I made the trip. In Baviacori we found the old man, who proved, as far as honesty is concerned, an exception to the general rule. Inquiring for the average yield of the quartz in an arastra, he confessed it was $9 per ton, the ledge three feet wide, and a small tunnel, an opening a few feet deep made; but he could not come along just now. The location was ten miles up in these rough and barren mountains, with neither road nor trail, nor had he mules to carry water along, as there was none nearer than nine miles. Concluding on the spot that I would not further trouble this excellent man, I mounted my horse, and wiser and tired, began the return march.

Shortly afterward an American living in Hermosillo pretended to have a good thing which he was willing to divide with some one who would open the mine, build a mill and advance him a few hundred *pesos*. A quartz ledge half a mile long, eight feet wide, running into a steep hill, well situated for tunneling, with wood and water in abundance, near a wagon-road, and averaging $60 per ton, free gold. Did this not seem too good to be true? So it was. And yet it was nearly true with one single yet important exception. Galena and pyrites of iron were in abundance; of gold, scarcely any. The feelings of the owner of this ledge were considerably ruffled, as is often the case, when I had to decline his generous offer. Shortly afterward an advertisement in a local paper offered this eight-foot $61 free-gold-per-ton ledge for sale—as if such a property needed advertising. Concluding to leave it to some Eastern or English capitalists, I went to the Yaqui River, near San Antonio de la Huerta, a rough mountainous country, where one meets in the gulches many abandoned gravel-holes. Another great and grand gold mine was offered, which on inspection proved to consist of an eight-foot deep hole in an apparent quartz vein of undefined size, no walls having been reached; the stuff was rotten quartz and oxide of iron and looked promising, and showed in the horn a few colors, seeing which the owner lost his head, so to say, for when I hinted that I might open the mine and eventually put up some machinery for half an interest, he felt indignant, saying there were English companies on the lookout for such brilliant prospects, offering large sums cash down. Well, I concluded not to interfere with his cash-down English companies. A few months afterward the same fellow offered me the whole thing for a song, but the offer was thankfully declined, as the water privilege in the canyon had in the meantime been taken up by other parties. This unprofitable experience cost me two weeks hardships, sleeping on the ground during that cold spell, with icicles on the blanket in the morning, sometimes no breakfast, and at all times poor fare, frijoles and tortillas.

In the Hermosillo district, some miles distant from the railroad station of Torres, is situated the Las Priestas mine and mill, of which mention was made in this paper; the shaft is over 600 feet deep, but the ledge has at last accounts not produced its usual quantity of good ore, so that the mill was run for more than a year on its tailings. *Quien sabe* where the fault lies and when it will pay again. The Las Prietas ledge, with its extension, is one of the most important mines in Sonora, yet in its neighborhood nothing of importance has yet been discovered.

From the Recorder of Mines of the district, as well as from some Americans, I learned of another important mine on the San Miguel river in Ures district. This Mina Santo Domingo was said to produce $35 quartz in an 80 foot shaft from a 20-foot ledge; good roads, wood and water, and yet the proprietors were poor and wanted to sell. On examination, it proved to be so, but again with the exception of the quality of the quartz. On the first day, prospecting with a proprietor, and letting him choose the samples, all was lovely, for good prospects were found in nearly every horn. On the second day, prospecting alone, things wore a different aspect; in short, the ore was found to average about one dollar per ton all through. The ledge contained some good-looking, yet poor, quartz, bunches of oxide of iron containing the gold, and at the bottom of the shaft solid barytspar. Such variations are often met in these ledges whenever they are opened to some depth; so was it with another mine in the same district, La Dorado, which was opened by a 100-foot shaft in a 30-foot orechute; ledge 10 feet wide, free gold on top. By sinking, some galena and carbonate of lead appeared, which increased in depth, while the gold decreased, and finally the whole thing will turn out to be a lead mine.

In the same district lies the "Cerro de Oro" (gold hill), an irregular cone some 700 feet high, clearly distinguished from surrounding mountains by its reddish color. This hill is traversed in all directions by small veins of quartz, some of them good ones, but invariably pinching out at little depth; only a few natives were making a precarious living there with an arastra.

A more important and inviting district lies south of Matape toward Santa Barbara and Sibachicory, west of the Oposura river, 30 to 40 miles in length. In nearly all canyons and on some flats, more or less—generally less—gold can be found. It was formerly a favorite resort of the Apaches, and this is the principal reason alleged why little work is done there. Numerous quartz veins are met with, as for instance, in La Bota, where quite a network of ledges can easily be traced; in some of these the color can be found on the surface; sinking 30 feet on two of the most promising ledges, no trace of gold could be found at the bottom. The formation is granite and porphyry.

In La Ramada, near Santa Barbara, some mining is yet going on, which consists in digging holes 10 or more feet in diameter and depth till pay gravel is met, which is then washed in a batea; some use blowers for dry-washing, as water is not abundant. When the gravel is extracted, another hole is dug; the gravel bed is about one foot thick, and the people make just their living (and a poor one in the bargain).

About 10 miles northwest of Santa Barbara lie the Amargoza and the Colorada mines, the latter the most important I have yet seen in Sonora. The Amargoza can scarcely be called a vein, but rather a large bunch, 20 or more feet wide, excavated to a depth of 30 or 40 feet, till the water could not be handled any longer. The ore contains galena, iron glance, copper pyrites and peacock copper ore. A few specimens show free gold and metallic copper joining—a rare occurrence; 110 arastras in the immediate neighborhood indicate lively times in former years. Crossing, or rather adjoining the Amargoza, is the Colorada la Reina, as far as can be seen over 12 feet wide and traceable on the surface for a few hundred feet, the ore of which consists of a clayey, rusty stuff mixed with decayed quartz, all containing free gold. It would be a splendid properity here in California, or even down there if well managed. It has a tolerably well-defined wall on one side, and lies in a talcose schist. In the hole of the adjoining Amargoza is met the only water for miles around, but it is bitter to the taste, hence the name Amargoza—bitter. The water acts as a laxative "till one gets used to it."

Near by is the Rosales group, a promising property consisting of several gold, silver and copper-bearing veins, two of them opened by a 100-foot shaft. There also is little and bad water. These mines are being developed now by a St. Louis company, the former owners not having succeeded in interesting Californians in these promising mines.

I might cite more names and descriptions of prospects and of ledges, of holes and of outcroppings, but *cui bono?* There is very little or no disposition evinced by Californians to invest in Sonora, and, judging by my own experience, they are not altogether to be blamed.

THEO. G. ED. WOLLEB.

Timber on Government Land.

The Other Side of the Situation at Eureka.

EDITORS PRESS:—In your issue of Feb. 23, 1889, I notice an article concerning the timber suits that have been instituted by the Government against certain mining companies in Eastern Nevada. Great stress seems to be placed upon the fact that Commissioner Stockslager refused to produce a certain letter written by Henry Rives, assistant counsel in the cases. Being somewhat familiar with a majority of the facts concerning these cases, I believe that the Commissioner has acted as any man of principle would or should act under the same circumstances; the letter referred to was one that was marked "personal and confidential," and was not an official letter, consequently Commissioner Stockslager could not under any circumstances have used the same unless he first obtained permission from the writer. Such permission was asked through telegram, but was refused on the grounds that no opportunity was given to the writer to sustain the position he had taken in said letter; but that if the Committee on Mines and Mining, who are making the investigation, would subpœna certain witnesses to sustain the writer, the Commissioner had full authority to use the same.

How could a more fair proposition be offered? Mr. Rives had stated certain things in his letter which could be proved by reliable and credible witnesses; but it seems that the committee would not allow him that privilege, and under those circumstances Mr. Rives was justified in not allowing said letter to be used. These timber cases are misunderstood by the general public, inasmuch as they have been led to believe that they were working a hardship to the mining enterprises of the country, but such is not the fact. Neither one of the companies shut down in Eureka had any intention of running through the winter months; in fact, they had all their arrangements made to shut down on the first of the year. The Richmond Mining Co. had on hand when the seizures were made 16 cords of cedar wood and about 2000 bushels of charcoal. The Eureka Con. had neither wood nor charcoal seized. That does not look as if either one of the companies intended to run very long. Considering, moreover, the fact that the worst part of the winter was near at hand, it would have been utterly impossible on account of bad roads to get further supplies in. The only case wherein a mining company could have been interfered with was in the case of the Sweetwater Mining Co. at Seligman, White Pine county, and in that case, the Deputy U. S. Marshal, who went there to make the seizure, did not seize any wood, on the ground that if he did, he would be interfering with the mining operations then being prosecuted. In all the cases so far brought by the Government wherein seizures have been made, the Marshal or deputies who made the same received written instructions not to seize when the Act would interfere with mining operations.

There are always two sides to a case, and although these cases may at first glance seem to work a hardship, it is really something that should have been attended to years ago.

The Richmond Mining Company, a foreign corporation, has denuded the public domain of hundreds of thousands of cords of wood for which they have never paid this Government one cent. They have even refused American citizens the right to pick up dead wood from off the ground for domestic purposes, when they had no more title to the land than any one else, never having purchased the same from the Government. Why should they not be made to pay for the same? Where on God's green earth could an American go and do the same act unless he was made to suffer for it? This investigation at Washington is a one-sided affair. No one outside of a special agent and Stockslager has been subpœnaed to testify on the part of the Government. Why not give both sides a fair and impartial hearing and sift the matter thoroughly? Then the U. S. Senate can act understandingly in the premises when the report of the committee is laid before them, but such does not seem to be the intent or desire of those interested in the matter; they desire to all intents and purposes to obtain only evidence that will benefit the defendants, and will not allow anything to be done or said that will be of benefit to the Government. Why, sirs, the joint resolution that was passed by the present Nevada Legislature was introduced in the Assembly by Mr. Cheney (of the law firm of Wren & Cheney), who is one of the regularly employed counsel for the defendants in these timber cases and a partner of ex-Congressman Wren, one of the principal witnesses for the defense at Washington, and it was introduced in the Senate by Mr. Comins of White Pine, who is representative or agent for two companies in White Pine county who have cut thousands and thousands of feet of lumber from off the public domain without having rendered to the Government its equivalent in cash, and who, no doubt, in course of time, unless Congress interferes in the matter, will be called to account by the Government for the cutting of the same.

I do not blame these gentlemen for their actions. It is an old saying, and a true one, that "a stitch in time saves nine," and if by any hook or crook they can have the suits discontinued, they and their clients will be so much the richer in the end.

I wonder what they intend doing with the E. & P. R. R. Company, who are also being sued. This company certainly has no right under the law to use the wood, railroads being especially prohibited from using the same. Now, Mr. Editor, I have the interests of Nevada as much at heart as any one of its citizens. It is my home, and I expect to remain here for years to come; but I do desire to see justice meted out to all concerned. If these companies have transgressed the laws of our country I believe they should be made to suffer for it, even if they are large and powerful corporations, and one of them an entirely foreign one at that. And on the other hand if they have not, I want to see their skirts cleared and be allowed to proceed with their workings, for things are now—in this section of the country—in a very unsatisfactory condition, although I am free to confess that I do not believe these timber cases have anything to do with the present state of affairs as they exist. I believe that the trouble arises from the fact that the Richmond and Eureka Con. Companies entered into a mutual agreement concerning the purchase and reduction of ore, which forced the miners to the wall, they demanding such an exorbitant price for working the same, etc., that all that would be left the poor miners would be the mountain air to live on. What Eureka county needs at present is new companies—such ones that will deal fair and squarely with the men who risk their lives in delving in the bowels of the earth, and who will give a fair price for ores and ask a reasonable rate for reducing same. When such a company commences operations in this camp, then will Eureka take its place again as one of the largest ore-producing camps in the country, and not until then, for the manner in which the present companies have been working it has been all one-sided, the companies getting everything, and the miners—in the common parlance of the day—"soup." THOS. PEABODY.

Eureka, Nev. March 1, 1889.

The Victor Concentrator.

EDITORS PRESS:—While in the mountains of El Dorado a few days ago I found myself at the plant of the Church Gold-Mining Co., three miles from Mud Springs. The owners are making extensive improvements in their hoisting works preparatory to sinking deeper on the vein, and everything about the plant betokens good ore and plenty of it. The rock at this mine is a brittle quartz lying in black talc-slate and is crushed in a ten-stamp battery, after which it is passed over concentrators to save the sulphurets, which are very light and fine. At the time I was there, the pulp from five stamps was run over two Frue vanners, while one Victor concentrator handled the pulp of the other five stamps.

Being familiar with concentrating machinery, it was a source of much satisfaction to me to witness the working of the latter machine which does so much apparently so well. The concentrates are discharged from a spout which leads from the center of the machine into a bucket, and, to the eye, seem absolutely pure, while I was assured by those in charge that there was no value whatever in the tailings. The millmen say that, other than oiling, no attention is required to operate the machine, a great advance in this class of machinery. This is the most compact and efficient concentrator I have yet seen. All the works of the mine except the hoist are operated by water-power under a pressure of 460 feet. X.

Mud Springs, March 8, 1889.

Sutro Tunnel Finances.

Receipts and Disbursements Since 1884.

Theodore Sutro, president of the Sutro Tunnel Co., furnishes the *Engineering and Mining Journal* with the following interesting figures, never before published, of the company's receipts and disbursements for the past five years:

	Receipts.	Disbursements.	Profits.
1884	$133 508 92	$ 95,652 55	$ 37,856 37
1885	193 280 25	80,085 50	113,194 84
1886	259,247 25	79 304 83	179,944 44
1887	271,343 47	98,414 53	172,808 94
1888	309,095 54	126,594 55	183,400 99

In commenting upon these figures Mr. Sutro said: "The increased disbursements in 1887 and 1888 were caused by extraordinary expenses connected with the foreclosure litigation; the reorganization and issue of new bonds and the work done for mining companies, for which we received compensation, of course, such as excavating the Chollar station and the Crown Point drift. It would be a safe estimate to say that the ordinary expenses for the past two years have not exceeded $84,000 per year. This year, 1889, there will be few extraordinary expenses. The total charge on the new bonds, of the face value of not quite $2,200,000, will be for the first year about $88,000, but as the bonds are redeemed, this amount will be steadily reduced. The receipts from royalties during January were $22,000." The stock is quiet at from 9 to 11 cents, but the business in the Trust certificates was large, and amounted to 54,500 shares, at prices ranging from 58 to 60 cents.

AN ABANDONED MINE PROVES VALUABLE.—There has been a rich strike made in the old Pack mine, about 35 miles south of Prescott, Arizona. The mine has lain idle for a long time and the owners have had for the last two months men in the mine clearing it out. A body of ore was struck in a tunnel and it is said to be equally as rich as any ever taken out of the mine. A big force of men will be put in the mine immediately and a lot more machinery ordered.

Mines on Railroad Lands.

Full Text of a Recent Decision.

Much comment has been excited by the Supreme Court decision in the case of Gale (plaintiff and respondent) vs. Best (defendant and appellant), in which the rights of miners have apparently been further curtailed. Appellant claimed certain land held by respondent as agricultural under a Central Pacific railroad patent to be mineral, and on that ground asserted his right to possession of it.

The decision, rendered by McFarland and concurred in by his confreres without exception, relates:

The rule is well settled by numerous decisions of the Supreme Court of the United States that when a law of Congress provides for the disposal and patenting of certain public lands upon the ascertainment of certain facts, the proper officers of the Land Department of the General Government have jurisdiction to inquire into and determine those facts; that the issuance of a patent is an official declaration that such facts have been found in favor of the patentee; and that in such a case the patent is conclusive in a court of law and cannot be attacked collaterally. Of course, if the patent be void upon its face, or if looking beyond the patent for a law upon which it is based, it is found that there is no law which authorizes such a patent under any state of facts, or, that the particular tract named in the patent has been absolutely reserved from disposal, then the patent would be worthless and assailable from any quarter. For instance, if a certain section of a certain township described by legal subdivisions should be expressly and unconditionally reserved by Congress from disposal under any statute, a patent for any part of such tract would be void. But if a large body of public lands be subjected to sale or other disposition under a law which has merely a general reservation of such parts of those lands as may be found to be of a particular character —such as swamp or mineral—then the Land Department has jurisdiction to determine the character of any part thereof, and a patent is conclusive evidence that such jurisdiction has been exercised. In such a case the patent could be attacked only by a direct proceeding, and by a person who connects himself directly with the title of the Government.

United States Supreme Court decisions in support of these views are cited, reference in particular being made to the cases of Smelting Co. vs. Kemp (104 U. S., 636,) and Steel vs. Smelting Co. (106 *Id.*, 447). The decision then proceeds:

It is contended by appellants that former decisions of this court, in McLaughlin vs. Powell (50 Cal., 64); Carr vs. Quigley (57 *Id.*, 394); and Chicago Q. M. Co. vs. Oliver (16 Pac Rep., 780), are in conflict with the doctrine above stated. Whether or not there be any expressions in the opinion in either of those cases inconsistent with the views of the highest Federal Court on the subject (which views, in the end, on a question like this must prevail), it is not necessary here to consider. In order to affirm the judgment in the case at bar, there is no necessity to upset either of those cases. In McLaughlin vs. Powell the patent itself excepted "all mineral lands, should any be found to exist in the tracts" embraced by the patent. And the decision is expressly put upon the ground that there was that exception, and that it was "part of the description" of the lands conveyed. And it may be strongly argued that, in such case, although it was the duty of the Land Department to determine the character of the land before the issuance of the patent, yet, as the patent shows upon its face that such duty was not performed, the patentee must be held to have taken it knowing its uncertain and unsubstantial character. On the other hand, Judge Sawyer has held, in an opinion of great force and ability, that the issuance of a patent in such a case was a conclusive declaration that the land was of the character to be properly patented under the law—that is, agricultural land; that there is no authority to make in such a patent a general reservation of mineral lands—any more than there is in case of a pre-emption patent; and that such a reservation is void. (10 Sawyer, U. S. C., 2 Rep., 8th Circuit, 246.) At all events, as in the case at bar the patent contains no reservation whatever, the case of McLaughlin vs. Powell is not authority here. And the same may be said of Chicago Q. M. Co. vs. Oliver. In that case the patent also excepted "all mineral lands, should any be found to exist," etc. Carr vs. Quigley is not in point at all. In that case there was no question about the character of the land patented. It was claimed to be within a "Government reservation;" and that the body of land itself involved in that case, without reference to its character, was expressly reserved from the operation of the law under which the attempt was made to patent it.

Our opinion is that where a patent issues for public land under a law which provides for its disposal as agricultural land—either to a railroad company or to pre-emption or homestead claimants—and there is no reservation in the law except a general one of mineral lands, and no reservation at all in the patent, then the patent must be considered as a conclusive determination by the Government that the land is agricultural; and afterward, in an action in a court of law, it is not competent to reopen the question of the character of the land. The opposite view would render the titles to a large region of California, now filling up with agricultural settlers, unstable, insecure and almost worthless. It would affect, also, those holding through patents under the pre-emption and homestead laws, for mineral lands are exempted from the provisions of those laws. The theory of that view is that if the land previously patented as agricultural can at any time be shown to be in fact mineral, then the title to it never passed from the United States, but had always remained a part of the public domain; and, as no statute of limitation runs against the Government, the insecurity of the title under the patent would be perpetual, and an attack upon it could be made as successfully 100 years hence as now.

The view taken of the question presented by the court below was correct, and we see no error in the record.

NEW RAILROAD AND REDUCTION WORKS.—Advices from Butte, M. T., state that Manager Law of the Montana Union railroad has returned from Omaha, where he went to confer with Union Pacific officials in regard to laying a double track and doubling the capacity of the present road. This will take an expenditure of $1,000,000. Anaconda City is to have new shops, a new depot and a new road laid with 75-pound steel rails from Silver Bow canyon to Anaconda, a distance of 11 miles. The new road is to be for freight and ore, while the old road is to be used for passenger service. The Anaconda Co. will commence at once the erection of immense lead and refining works. Manager Law has already ordered 20 new engines and 200 dump ore cars for the additional road.

THE NEW STATES.—Delegates to constitutional conventions in each of the proposed States of North Dakota, South Dakota, Montana and Washington, will be elected on the Tuesday after the first Monday in next May, and will meet to draft constitutions July 4th. Elections to ratify the constitutions thus agreed upon will be held on the first Tuesday in October, and when adopted it becomes the duty of the President by proclamation to admit the States formally into the Union. Each will be entitled to one member of the House of Representatives, except South Dakota, which will have two.

THE amount carried by the General Appropriation bills passed at this session of Congress is $281,879,000 against $306,986,000 appropriated for the current year.

Ensenada, Lower California.

We give on this page a view of the harbor and city of Ensenada, Lower California. This place has only been founded a few years, and is now coming into prominence as the point where the steamers from San Diego land passengers for the new mining-fields which are causing such an excitement in the southern part of the State. The steamer makes trips two or three times a week between this place and San Diego. From Ensenada the traveler goes overland by horse or mule to the new mines.

Ensenada is an American colony on land belonging to the International Company. It has attracted quite a population in the past year, but has now become almost deserted for the time being, owing to the mining excitement in the region back of it.

GENERAL VIEW OF THE HARBOR AND CITY OF ENSENADA, LOWER CALIFORNIA.

END OF A MINING SUIT.—In the case of Peter L. Kimberly against Chas. D. Arms and others, the United States Supreme Court has rendered a decision in favor of the plaintiff. The amount involved in the suit is $1,200,000. Kimberly claimed in substance that he sent Arms as his agent to Arizona on a prospecting tour and furnished the necessary funds, and that Arms located a number of valuable claims, which have since paid heavy dividends, and refused to make any accounting to him for any of the transactions. Arms denied that he was the agent of Kimberly, and claimed that whatever investments he made were with his own funds, and that Kimberly had no interest in them. Arms is in affluent circumstances and recently completed the finest residence in Youngstown, Ohio, at a cost of over $100,000.

HORSESHOEING BY ELECTRICITY.—A novel use of electricity is about to be tested in sharpening the shoes of car horses in icy weather without removing them from the stable. This important application of electricity is being made by the Baxter Electric Manufacturing Company of Baltimore, and is likely to prove one of the most useful applications yet made of this subtle force, and will especially commend itself to the Society for the Prevention of Cruelty to Animals.

THE COINAGE OF SILVER.—Senator Stewart says he intends to test the sense of the Senate on his silver resolution at the first opportunity. He appreciates the fact that no legislation can be enacted during a special session, but his resolution is in the nature of an instruction or suggestion to the Secretary of the Treasury. Under the law he has discretion to act on the suggestion without any other legislation.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NORTH STAR.—Amador *Dispatch*, March 9: At this mine they have commenced to drift north from the hanging-wall. The tunnel running south is now 280 feet from the shaft. The work in this last tunnel has been temporarily suspended, but will be resumed as soon as the tunnel running north gets in far enough so as to prevent blasting from interfering with the south tunnel air-pipe. It is claimed by old miners that the south tunnel will strike the chimney when in about 100 feet more, as the surface indications at that point are considered good.

MORLEY.—Hearing so much of this mine, and the 20-stamp mill to be erected thereon, we concluded to pay a visit to the place last Sunday, and were very much disappointed at the outlook. From present indications there has been no work done lately, and we were informed that what work had been done revealed only a few small stringers. We were unable to find any ore on the dump, and all the quartz we saw consisted of croppings which could be traced a hundred feet or so. It seems to us absurd to think of erecting a 20-stamp mill there. On our way down we passed two mills, one of them within 300 yards of the Morley property, both of which are going to rack, and we are told they were erected on prospects far brighter than the Morley. This thing of building mills for speculative purposes is only a drawback to the mining interests of the county.

AMADOR GOLD MINE.—Work is going steadily on this mine. Several improvements have been put on the property of late. The new Kendall one-stamp mill is about completed. With this little mill they can make a milling test of the ore at any time. The large mill is also nearly ready for operating; the stamps are all in position, but the concentrators are not yet set, nor the belting put in place. The new assay office is neat and handy,

ALPI.—W. T. Robinson, J. E. Hagerman and E. F. Henderson were awarded the contract for sinking the shaft at this mine 50 feet below the tunnel level. The contract price was $4.75 per foot, contractors to furnish powder, caps, candles and fuse. A station is being cut at the tunnel level. How the company expects to utilize the tunnel with a hoist on the surface, we are at a loss to know.

DRYTOWN CON. — The company is pushing work. The ditch has been cleaned out to the Gover mill; the cut for the pipe has been dug up China street, and the pipe is being laid as fast as possible. The shaft has been cleaned out down to the water, and found in good order.

COSMOPOLITAN.—Work has been resumed on the 500-foot level. The station has been finished at the 300-foot level. The new boiler has been set, and the brick-work completed; it will be connected to the engine in a few days.

NORTH CALIFORNIA.—The mill is running again, after a few days idleness. The cleanup for last month was beyond expectation. The Gover mill has started again on very good ore.

WILDMAN.—This mine is looking well. They have a fine ledge of $5 rock at the 100-foot level. The mine paid $1000 over expenses in January, and did about as well last month.

PLYMOUTH CON.—About 50 men are at work at this mine, and more men are being put on every few days. The mill is running 40 stamps; the other 40 will start up soon.

Calaveras.

GOLDEN EAGLE.—Calaveras *Chronicle*, March 9: The Golden Eagle mine is situated near the Lockwood in the West Point district, and is owned by G. W. Moore and William, Eugene and Elmer Holbrook. The shaft on the mine is 70 feet in depth, at the bottom of which a drift has been run north 90 feet. The vein averages from 20 inches to two feet in width. Six tons of unassorted rock from this mine, crushed in the Blazing Star mill, yielded at the rate of $20 a ton free gold, and about 1000 pounds of sulphurets that assayed at the rate of $150 a ton. The natural facilities for working the mine are excellent, and we understand it is the intention of the owners to erect suitable machinery for the further development of the mine.

THE UTICA MINE is running in full blast day and night. The large 60-stamp mill, with all its modern appliances for saving the gold and sulphurets, is kept in constant motion. Work is going on actively in the stopes of the south shaft, while sinking is carried on with a vim in the north shaft. A vein of high-grade ore, we are informed, and some of it immensely rich, has been tapped in the south shaft. The rock is said to be superior to any taken out of this mine in many days. As nearly as we could learn, the Utica is surpassing the expectations of its owners as a gold-producer.

OTHER MINES in this section are being worked energetically, while there are others preparing to begin operations on an extensive scale. The Tulloch & Lane mine, situated a short distance south of this town, is in constant operation and yielding good returns. The Calaveras mine, situated at Robinson's Ferry, is being put in shape for operations on a large scale.

THE ANGELS MINE is being worked day and night, and is making an excellent showing. The ore now being mined is said to be of a good milling grade, and there is an immense body of it in sight.

El Dorado.

PAY GRAVEL.—Georgetown *Gazette*, March 7: The Kentucky Flat tunnel, belonging to A. J. Wilton, is in 650 feet at a depth of 100 feet. An upraise of 18 feet in face of tunnel opens up a bed of gray and blue pay gravel from three to five feet in thickness.

THE LAST CHANCE MINING CO., under Supt. E. C. Cheek, has put a force of men at work on their mine adjoining the Whiteside or Crane's Gulch mine. They are now digging a ditch for conveying water to the mine. Extensive and ample preparations will be energetically carried on and the mine put in good shape for systematic and economic working by sluicing process. This mine cannot fail to yield up handsome returns under the present plans of working.

Inyo.

AROUND KEELER.—*Reporter*, March 9: Eight experienced Italian marble-cutters are now at work at the marble works, and the indications are that enterprise will assume large proportions in a very few months. The soda works on the lake have lately been improved by large additions to the reduction machinery and appliances. Among the additions is the refining plant, which is now in active operation and doing finely. The approach of warm weather will close this part of the work down, as a certain degree of cold is essential in this process. A large furnace for making soda-ash will then be erected, and altogether the prospect is that these soda works will soon be the most extensive not only in this country, but in the world.

Mariposa.

HITE MINE SHUT DOWN.—*News*, March 9: The celebrated Hite mine at Hite's Cove was shut down last week by the men refusing to work. Judge Walker, who had it bonded, was behind with the men from two months up and in amounts ranging from $120 to about $850. Walker is behind about $20,000 in this county. He is now in the city and has written to most of his creditors that he is trying to get the cash to pay them. It is a public calamity to shut down this mine, especially when those in position to know say it has paid and can be made to pay.

COULTERVILLE.—The Red Cloud is being pumped out again, and work will be resumed at once. The death of Seth Cook makes the change of the Cook mines here one of the possibilities of the near future.

WHITLOCKS.—The contract of sinking the shaft on the Gerove & Ellingham mine was completed last week. The rock on the bottom looks well.

GRANITE SPRINGS.—Mariposa *Gazette*, March 9: The Mignonette mine is temporarily idle. It is reported that A. Rihn and others are taking out some very rich ore from a ledge on the ranch of the former.

KENDALL.—The Kendall claim on the Cathey's valley mountain, owned by Dr. Turner, was lately sold to Alex Rattray and Charles Anderson, for $750. This is a good mine for a small capital to work.

Nevada.

METROPOLITAN MINE.—*Tidings*, March 7: News from the Metropolitan mine, owned by "Happy George" Abram and situated near Moor's-Flat, is to the effect that the character of the ore has improved since the late visit of Capt. Stocks and D. McKay of this city. The ledge is somewhat smaller. Ore now being extracted will mill from $20 to $30 a ton. Four companies are negotiating for the property, but Abram does not care much about selling for a month or two, by which time he expects to cut his cross ledge.

Placer.

AT WORK.—Placer *Herald*, March 9: Fred Randall, who owns about 120 acres of good mining land east of town, along the American river, is hard at work on his claim. He has run a tunnel of some length which has developed a fine body of gravel, and the indications are very flattering that Fred will strike it rich. The gold already taken out is of high grade.

GOLD.—Placer *Republican*, March 6: The second cleanup at the Hathaway mine near Ophir was made last Friday after a run of 24 days. The yield was about 16 pounds of gold. Ophir people hope that this success will be the cause of new activity in the other quartz mines of that vicinity.

Plumas.

NEW MINING OPERATION.—Greenville *Bulletin*, March 6: From C. H. Lee, who arrived in Greenville Monday, we learn that he and several others have formed a company to turn the North Fork out of its present channel and work about one-half mile of the river bed. A short distance below the Glazier mine a large wing dam will be put in to turn the river into a slough. Much work will be required, but the enterprise is considered quite practicable.

Sierra.

RUBY MINE.—*Mountain Messenger*, March 9: Under the able management of Supt. John Co'man, the mine is prospering. It gives employment to 35 men. Ten new cars have lately been added. Forest City men are well represented here.

THE RAINBOW QUARTZ CO. of Chips Flat is reported to have at last found the true Rainbow ledge in their tunnel. The claim at Happy hollow, of which J. H. Frissell is superintendent, is paying nicely. This will give Port Wine quite a boom. Pearson's ranch and gravel mine at St. Charles hill has been sold for $15,000, it is said. The yield of the Young America mine for the short month of February was about $24,000.

THE BALD MT. EX. new main tunnel was in last Saturday night 2508 feet. The rock at the face is soft, black slate, easily picked and no blasting needed. Thirty-six feet were made last week.

QUARTZ.—A find of some very rich quartz is reported in the quartz ledge near Alleghany, formerly owned by Theodore Smith, now the property of Charles Heintzen of Forest City.

RIFFLE.—The Riffle Co.'s drift claim, above Port Wine, is paying handsomely. It is owned principally by the Prosser family.

DAYTON CON.—Sierra *Tribune*, March 8: The Dayton Consolidated is a short distance above the Salinas and Mercer and about six miles from Sierra City. It is owned principally by Grass Valley parties. Some time ago a contract was let to Messrs. Hammill & Johns to run the tunnel ahead 200 feet, making it in all 269 feet in length. This was done for the purpose of tapping the ledge which stands out in prominence on the surface top. According to their expectations a fine-looking ledge was opened up just at the finishing of the contract. The ledge is fully two and one-half feet wide and increases in size as it is entered in upon. Free gold can be seen in considerable of the rock. Frank Roberts, general manager for the company, arrived here Sunday night from Grass Valley to see about having further work done at the mine. Mr. Roberts informed us that the company will probably lease the mine to Messrs. Hammill & Johns, so that it may be opened up and further developments made. These two gentlemen feel sanguine that the ledge encountered is a good one.

THE SACRED MOUNT MINE is gaining a good reputation. The men who have the 200-foot contract are pushing the tunnel ahead rapidly. A good-looking ledge was encountered. The rock is filled with sulphurets and gold can be seen in some of it. Nearly all of it prospects well. The cleanup of the Sierra Buttes Mining Company for the month of February is $20,000. This storm, if it will only keep on for a few days, will give the Salinas & Mercer Mining Co. water to start their mill running.

BUFFALO.—Messrs. Frank Cook and Dr. Tully visited the Buffalo mine Wednesday. They brought down quite a number of pieces of nice-looking rock taken from different parts of the mine. All of it showed free gold.

Shasta.

KLINE'S GULCH QUARTZ MINES. — Cor. Shasta *Courier*, March 9: A brighter era is dawning on old Shasta, for it is now basking in the golden sunshine of success; at least such can be said of this favored part. When your correspondent got to French Gulch last Saturday, Harrison Fox and Tom Baker were running a free hotel for awhile; the cause was a rich strike in their mine adjoining Wheeler's claims. At a depth of 140 feet they cut a four-foot ledge that bristled all over with coarse gold. Fox says it will mill $100 per ton; Baker says $60. Frank Wheeler struck a new ledge which mills higher than any heretofore found in the claims. J. L. Carson is working steadily on his two 10-foot ledges, one of which shows free gold all over the face of the opening. The Gladstone mill and mines are being worked by a force of 16 men. They have just finished milling the old dumps that were extracted while prospecting the mines, which paid handsome dividends. Now they have reached a greater depth, the ledge is more compact and solid. Coarse gold can be seen in every piece of ore coming out of the double compartment shaft which is being sunk from the tunnel level. The ledge here is four feet wide. They are building a road and ore chutes on the Helena mine, in which gold is visible all through the rock. There are now eight locations on the Kline gulch lead adjoining each other in a straight line, any single one of which is a bonanza. There is no reason why more mines could not be found between the Gladstone and Squaw creek, for the ledge can be seen cropping out where it crosses the ridges. In the distance of six miles gold has been found in several places along its course.

GOVERNMENT PATENTS.—A sale of good mining property was declared off this week on account of there being no Government patent, and last week a sale failed to be made in French Gulch district for a similar reason. Fox, Johnson and Tom Baker of French Gulch district have tapped the ledge on the Gray Eagle claim 90 feet below the surface, and by a 140-foot tunnel. The quartz is of the free gold variety.

PROSPECTING.—Prospecting for quartz and pocket mines was never more lively in this vicinity and north of here than at present, and in many instances the prospector is not unrewarded.

Siskiyou.

SAWYERS BAR.—Cor. Yreka *Union*, March 9: The Gold Ball mine is in full blast, and 4 stamps running in the mill. The Uncle Sam mill has been hung up since last season, there being no water to run with. The Independence Co. are opening up the claim and getting ready for work. The owners are very happy over the prospects of a large fortune the coming summer. The Gold Hill is all rigged up ready for use.

San Bernardino.

THE GOLDEN BAR. — Redlands *Citrograph*, March 9: The Golden Bar M. & M. Co. has been organized with a capital stock of $300,000 and the following directors: B. F. Watrous, San Bernardino; H. L. Martin, San Bernardino; H. A. Nelson, Carlsbad, San Diego county; J. T. Colliver, San Bernardino; Jas. S. Robinson, San Bernardino. The mines are in the Yucaipa, some eight miles east of Redlands. There has been a great deal of prospecting done in days long gone by, but that was at a time when the cost of hauling rock to where it could be worked—unless the crude arastra process was sufficient—was $50 to $60 per ton, and when provisions were high and labor commanded a big price. Under these conditions ore that would not run considerable more than $100 to the ton was "no good." Now that these conditions have materially changed for the better, these old claims are being hunted up and relocated. It is the intention of the company to immediately proceed to open up their property and thoroughly develop it. They will also put up a small mill during the exploitation, to be succeeded by a larger one should the ledge prove to hold out as well as they expect. That there is gold in this Yucaipa region has been known for many years. Owing to the difficulties mentioned above, it has been supposed that the mines would not pay. It is now proving that they will pay, and pay well.

Trinity.

GOOD PROSPECTS.—*Journal*, March 9: S. J. Hensley returned from New River last week and says that the prospects of a lively summer in that camp are good. The mines are improving and a large force of men is at work.

EAST FORK.—From George Bailey we learn that East Fork is moving along as a new mining camp should. Work on the Yellowstone is progressing and all arrangements are being made for a mill which will be put up as soon as the wagon-road is completed. Bailey, Zuello, Nichol & Co. have run a tunnel on the Alaska 105 feet and expect to tap the ledge in about 15 feet more, at a depth of about 160 feet. Should the ledge prove as good at that depth as it is on the surface it will be a bonanza. Wagner & Trask have made a new strike just above the Yellowstone that shows very well, and is thought to be an extension on that ledge. The North Star is showing well and it is thought to be one of the best mines in the county. The miners are all at work and the summer will see the camp lively and many men employed. As soon as the wagon-road is completed there will be a chance for a more rapid development in the camp by getting a milling test of all ore, and assays of specimens will no longer be in order, but every ledge will come down to its merits; and we believe a working test will be a great advantage to the district, as it has nothing to fear from such a test.

Tuolumne.

MILLING VEIN.—Tuolumne *Independent*, March 9: At Brown's Flat, John Wainwright is sinking a new shaft on what was formerly known as the Dr. Franklin lode. It is a milling vein—and strange to say, is supposed to be the only milling vein in that section. Some 25 or 30 years ago some rich ore was taken from this vein, and the claim has not been operated since. Two years ago the lode was relocated by Mr. Wainwright, and he is now proceeding to develop it, and expects in a short time to prove the value of the property. He is sanguine he has a good thing. The Bonanza is at it again. In the last three days they have taken out about $28,000, and the end is not yet. Up to Thursday night they have taken out of this pocket, $110,000. Gold still in sight and mill still running.

NEVADA.

Washoe District.

YELLOW JACKET.—Virginia *Enterprise*, March 9: Explorations are in progress on all the levels from the 360 down to 900. Some good ore is being found on the 360 level.

HALE AND NORCROSS.—The vein continues to look well in all parts. The ore extracted is coming from the stopes on the 400, 500 and 600 levels. On all these levels a good deal of prospecting is being done. The company has $68,500 on the February bullion account.

CON. CAL. AND VIRGINIA.—Ore is being extracted on all the levels from the 1400 to the 1950. The 1600 level is that which shows the most and best ore. The shipments to the river-mills continue about the same, and the average of the pulp assays will be about as usual.

OCCIDENTAL.—Ore is still being extracted from the 300 and 350 levels. Quartz showing some metal is being found on the 450 and 650 levels. A new 20-stamp mill is being built by the company. The mill will be provided with concentrating machinery.

CHALLENGE.—Are shipping over 150 tons of ore a week to the Brunswick mill. The average assay is $21 a ton. A large amount of prospecting is being done on the 300, 1100 and 1300 levels. Most of the exploring drifts are in favorable vein material.

BEST AND BELCHER.—Prospecting is vigorously prosecuted on the 350 and 400 levels. On both levels quartz carrying some metal is being found. In all the openings the quartz found is of a fine and fertile appearance.

SAVAGE.—Are shipping nearly 500 tons a week to the Rock Point mill at Dayton. It averages $22.18 a ton. This ore comes from the 400, 500 and 600 levels, all the stopes on which continue to look well.

BELCHER.—The north drift on the 200 level has been connected with the 160 drift. Also the 1100 winze has been connected with the 1300 raise. Both are important connections in several respects.

CONFIDENCE.—Large shipments of ore continue to be made to the Brunswick mill. It averages over $21 a ton. The prospecting work joint with Challenge is showing favorable material.

POTOSI.—The mine is yielding over 800 tons of ore a week. The average assay is $21.50 a ton. The ore-producing sections continue to look well.

CON. IMPERIAL.—A considerable amount of prospecting is being done on the 1100 level. Also some repairing work is in progress.

NORTH OCCIDENTAL.—Good ore is being taken from raise above the 400 level. On the 250 level the prospects are good in the north drift.

SEG. BELCHER.—Connection has been made between the 1100 winze and the 1300 raise. It gives a fine circulation of air.

JUSTICE.—The mine is looking well and the mill is kept running steadily. It crushes 30 tons of ore a day.

UNION CON.—The north lateral drift is making good progress in ground of a favorable character.

UTAH.—The drifts north and south on the 600 level are still in a formation of clay and quartz.

SIERRA NEVADA.—Fair prospects are being found in the drifts on the 520 level.

BULLION.—Nothing new in explorations on the 500 level and in sinking below the 600.

ANDES.—Good progress is making in repairing and extending drifts on the 175 level.

OVERMAN.—The mine is sending about 280 tons of ore a week to the Vivian mill.

ALTA.—Continue crushing and concentrating daily about 30 tons of ore.

BALTIMORE.—Some high-grade ore is being extracted from the 225 level.

CROWN POINT.—Shipped over 600 tons of ore last week to the Mexican mill.

MEXICAN.—West crosscut No. 1 is cutting quartz of a promising character.

GOULD AND CURRY.—Work of repairing south shaft is still in progress.

OPHIR.—The ore in the upraise above the 1465 level is looking well.

SCORPION.—The crosscut on the 300 level is making fair headway.

SILVER HILL.—Still repairing the shaft timbering below the 400 level.

NEW YORK CON.—Still reopening the 300 level north drift.

Morey District.

AT WORK.—Belmont *Courier*, March 9: The work of development is prosecuted as usual in the mines at Morey.

Spanish Belt District.

BARCELONA.—Belmont *Courier*, March 9: The new stone mill at the Barcelona mine, Spanish Belt, is completed, and started up on ore from the dump Feb. 27th. The mill is equipped with a six-foot Huntington mill 30 tons capacity, rock-breaker, ore-feeder and six concentrating tables. The mine is looking well and producing good milling ore, with plenty of concentrating ore in sight. The Monitor-Belmont mill is still producing bullion. Since last November it has produced 58 bars; total weight, 71,890 ounces, all from Barcelona ore. The lessee, J. E. Severance, thinks without a doubt, with the aid of the new concentrating plant, he will be able to make a long and successful run the present year.

Reese River District.

DOWN TO THE BOTTOM.—*Reveille*, March 8: The Plymouth shaft has been timbered down to the bottom, a distance of 400 feet, and by to-morrow it

will be cleaned out and put in readiness for sinking. To-day the men on this morning's shift found a few drills, which they sent up to the surface in the bucket. They have been hoisting water in the bucket for about a week. W. H. Judson had the contract for fitting the sets and cribbing, employing Wm. Yeager to assist him. He is now an old hand at the business.

Silver Star District.

MILL FINISHED.—The completion of the stamp-mill for the Occidental company will be followed by an increase of nearly $50,000 per month in the bullion yield of the lode. There is a large area of ore stripped in the mine which shows an average assay value of above $31 per ton. There is a strong probability that the North Occidental and St. John, in the same district as the Occidental, will be added to the list of Comstock bullion-producing mines before next fall.

Tuscarora District.

BELLE ISLE.—*Times-Review*, March 8: The west crosscut from north drift, 250-foot level, has been extended 22 feet.

COMMONWEALTH.—100-foot level: No. 1 west crosscut from south drift has been extended 18 feet, showing good ore in the face. South drift from No. 1 west crosscut has been extended 16 feet, showing some high-grade ore. 300-foot level: The south drift from No. 1 west crosscut has been extended 12 feet, the ore improving in quality as the drift advances.

NEVADA QUEEN.—The north end stopes do not look quite so well; all the rest continue about the same. Average assay of concentrating ore hoisted during the week, $28 per ton. The concentrating works are running steadily and doing good work. The ore-chutes at the mill are being put up as fast as possible.

FOUND TREASURE.—Everything in and about the mine is in good order, and work can be resumed at a moment's notice. The steam pump now being used is capable to handle the water another 100 feet.

NORTH BELLE ISLE.—The stopes above the 300-foot level continue in ore. During the week the station timbers on the 300-foot level have been renewed.

GRAND PRIZE.—Face of south drift has been advanced 14 feet; vein four feet wide, carrying bunches of good ore. An east crosscut from the south drift has been started near the face, and is in 17 feet.

COMBINATION SHAFT.—The rock in the bottom is looking very favorable for ore.

NAVAJO.—The stopes are looking well and have yielded the usual quantity of ore.

Tybo District.

DIMICK.—Belmont *Courier*, March 9: From J. B. Gilmore we learn that there are ten men working in the Dimick mine at Tybo.

LOWER CALIFORNIA.

LATE DIRECT NEWS. — Cor. San Diego *Sun*, March 8: The latest direct news from the mines is contained in a letter written by I. E. Bennett, the Lower California correspondent. He says: American gulch, a branch of Mexican gulch, and widening at the head into a wide mesa, bears indications of still greater richness than the little gulch where work is now being done. By the time you receive this a string of locations will be made along the seam, which is quite large, and good developments are expected. The head of American gulch is bounded by high hills, and in these, especially Gold hill, most of the locations of quartz ledges have been made. L. H. Gaskill, Chas. Bennett, John Vipon and others have been exploring this region, and both Mr. Gaskill and Mr. Bennett tell me that indications point to richer developments than have been made anywhere for years. The Centipede lead which passes through the center of Gold hill is about 12 feet wide, and specimens pulverized in a mortar yield at the rate of $300 to $500 per ton. No quicksilver was used, but only a gold pan, so that much of the fine gold was lost. A close assay would doubtless show an average of $500 per ton. The Centipede, in Mr. Gaskill's opinion, is the mother vein of the district, as its length already discovered—eight miles—and richness would seem to indicate. The ledge is composed of rose quartz with an iron stain. Mr. Gaskill and his company have also located and denounced six other ledges, as follows: Mescal, one mile north of the Centipede; Bonita, on Burro hill, adjoining American gulch; Oro Fino, on Gold hill; Gold Queen and Cholla, both at the head of American gulch. Several more locations have been made by the same parties, and other ledges have been located by a company of ten organized last Tuesday in Ensenada. There is no doubt but that Santa Clara will in the end be known for the wonderful richness of its quartz mines, rather than of the placers, for though the latter are rich, the question of water will, in another month, be a serious one, and only choice locations will have a sufficient supply. The water will probably hold out till the middle of April, and in the interval we may expect to hear of big strikes being made. As was to be expected, good locations for quartz-mills, where ore, water and timber are accessible, are scarce, and in many cases will cost a high figure. Owing to misinformation as to the trail from La Grulla to the camp, a number of teams were compelled to stop about five miles down the canyon, being unable to push through. Those who came in via Real del Castillo and the Santa Clara ranch arrived all right, though the road is fearfully rough. Many Mexicans have brought their wives and families, and intend to stay here till they make their pile. The camp is strung along Mexican gulch for two miles, the Mexicans occupying the head of the gulch and most of the Americans clustering at the foot. The whole district presents a busy scene, and work is going on in all directions. Gold is found in every pan and enthusiasm in every camp. No one is to presume that all are getting rich "hand over fist," striking pockets at every blow of the pick, etc., or that this differs from the ordinary mining camp. On the contrary, many are barely paying their grub, and occasionally an unfortunate argonaut is encountered who came here on great expectations, and who is compelled to apply to his fellow-miners for rations. But these are exceptional; the majority are making good wages, and $25 to $100 a day is not uncommon. As was remarked by Chas. Bennett, the richness of the diggings is so wonderful that the average prospector, if he does not find nuggets in his panful throws it away in disgust, not stopping to wash out the fine gold. All gold taken out here is very coarse in size, from a pea to an inch in diameter. Color has been found in every gulch so far prospected, and even on the hills, near a ledge, a panful yielded ten cents of fine gold. There is room here for a thousand prospectors, and it would take that number of men three months to prospect this district. Six miles to the southeast of Alamo butte, which is the base of all measurements here, the Lopez brothers are opening a ledge of promising ore. There are several fine locations for millsites near their mine, with water (temporary) in the adjacent canyon. The extent of the district is wonderful, and it all promises equally well. If half is realized which now appears on the surface, this district will excel anything discovered since 1849. A healthy sign is found in the way the veteran prospectors are sticking to this country. They do not say much, but their silence speaks. A word to new-comers: Let all bummers and gamblers stay away. The police is well organized in this camp, perfect order is maintained, and no lawless claim-jumping or other customary mining-camp antics will be tolerated. All peaceable prospectors, willing to work, will find a welcome and plenty of room and material. All outfitting should be done in Ensenada or San Diego, as grub and tools cannot be obtained here. Fresh beef can be had, however, at 25 cents a pound, and an enterprising Mexican has established a portable blacksmith shop. Now is the time to come if work in the placers is contemplated. As I write, reports come in of rich quartz finds near the Lopez mines, and this afternoon four parties in Mexican gulch took out over $200, one nugget weighing $28. Several pockets have been struck during the day, but it is difficult to ascertain the amount, as the boys are not quick to give away their affairs. It is sufficient to say that this is the most promising gold-field on the coast.

THE NEW PLACERS.—San Diego *Sun*, March 9: H. H. McAllister writes from Ensenada on the 3d to C. H. Olinger that a great many of the rumors are exaggerations. "It is true," he continues, "that a great deal of gold has been taken out and that more yet remains. Mexicans and Indians are the most fortunate. An estimation places the amount of gold taken out at between $10,000 and $12,000. Every one there is not getting rich by any means. Some work all day and get nothing while a man ten feet away gets a pound. The opinion of several old prospectors with whom I have talked is that the placers will not last long, as they are very shallow, being not more than three feet deep. The belt is said to be several miles long, but only a small portion has been prospected. Water is not expected to last longer than the 1st of May. The quartz in the vicinity is well spoken of; it is a rose color and shows free gold. The nearest timber is about 50 miles from the mines. This is the pine region which extends very far to the southward. It is not a good variety for manufacturing purposes, as the limbs begin from the ground, making it very knotty. The root of them is good. I am referring now to the Hanson ranch and Camp National district. The trees are very tall and from two to three feet in diameter. All who could get away from here have gone out. I would not advise any one to stay away nor to go. A trip to the camp would do no harm."

AN UNLUCKY MINER.—Lesseps Story, brother of Hampton Story, writes under date of the 3d from the survey camp of the Martier engineering party on the Peninsula Air Line: "I have just returned from the gold mines, having staid there two days prospecting and working like a Trojan for gold. But a 'divil-a-bit I got.' As I wrote before, I thought the accounts were exaggerated, and so they are. So far I think about $2000 to $3000 has been taken out. The claim I took up was not worth a cent. Washing and digging for two days, I managed only to get colors. Dr. Allen of the International Co. is out there and he says that six miles from the placers rich quartz has been discovered. No doubt gold is around in large quantities. It would be well if you can manage it to provision for a month and shoot down this way to go prospecting. The mines are 15 miles from where we are camped. Captain Friend is out there reporting for the *Union-Bee*. I left him yesterday afternoon going to his camp to hatch up, as he said, a glorious account of the gold discovery and very little gold he saw. I suppose the people of San Diego are waiting anxiously for reports. It will be a good thing for the International Co. if true."

ANOTHER CORROBORATION of the gold find comes from Ensenada in a letter from H. H. Keeler to John A. C. Snyder, commission merchant, at 346 Fifth street. He says: "I saw one man who had $55 in gold that he took out in one day. He stated that the people are just running about, and if they cannot find much in one dig they go on. It is so easy to get, they don't stop to dig much. Provisions are very high and seem very scarce. People are crowding in here by the hundreds, and I heard from the camp to-night that things are getting richer and richer."

SANTA CLARA DISTRICT. — San Diego *Sun*, March 9: Interest in the gold-fields will be increased by the statement which comes from Dr. Garcia de Leon of this city. He is authority for the announcement that the mineral region about 45 miles southeast of Santa Clara is to be opened up by himself and Castro de Beraza, a colonel of the Mexican army, backed by the Mexican treasury. Improved mining machinery, mills and reduction works will be put in and a railroad will be built to a connection with the Ensenada road. San Diego is to be the headquarters of the company. Senor Beraza, who secured the concession for the Valledares mining territory, which is not a great distance from the new company's location, is now in the City of Mexico. Under date of Feb. 21st, he writes to the doctor that his mission had been successful. Dr. de Leon knows every foot of the peninsula. He is a member of the Medical Geographical Society of Mexico. As its representative he traveled over the territory from August 1886 to June 1887, and a year ago he made his report. His account of the mineral value of the lands was exactly what he says to-day, that the peninsula is rich in precious ores beyond belief. The doctor made locations in the Arroyo de Santa Gertrudez and on the ex-mission of San Borja. He brought back with him nuggets of great richness, but could get no one to believe with him that the great mines of the near future would be found there. Now it appears that the Mexican Government had become convinced of the value of Lower California minerals before the Santa Clara find was made. The territory that de Leon and Beraza propose to open is 60 miles long by 10 wide. A special method for reducing ores, which de Leon learned at the mining school in the City of Mexico, will be employed. He says that by this treatment color can be made to yield $60 to the ton, and that as high as $20,000 a ton may be realized with the high-grade ores. Operations will be begun in April. The doctor says there is no humbug about the Santa Clara district, it is very rich, but that people must work with some intelligence and method if they expect to gain anything. "I would," he concluded, "most certainly advise people to go to the mines."

DAKOTA.

REDUCTION WORKS.—Deadwood *Pioneer*, March 8: The embers have ceased to smolder, and the furnace for roasting what sulphides were saved from the wreck has been completed. Roasting began yesterday morning. When completed the sulphides will be shipped to Omaha and there retorted. What percentage has been saved is not now known. The probabilities are the loss is heavy. Insurance adjusters are due from Chicago to-day or to-morrow. Their labors will be brief, and it is hoped and confidently believed that settlement will promptly follow. Until, however, these preliminaries have been concluded, no meeting of stockholders is likely to be held, and consequently nothing official can therefore now be promulgated. Conversation, however, with a number of parties owning stock in the company, has convinced the reporter that all of them are in favor of rebuilding as speedily as possible, and are willing to meet any assessments which may be found necessary. Besides this, it is only half a secret that other parties of ample means to carry out their purposes have about made up their minds to put up works of their own. Thus we are certain to have one plant as large as that destroyed last Friday, and have fair prospects of another of equal capacity.

MEN DISCHARGED.—Deadwood *Pioneer*, March 2: One effect of the destruction of the reduction works was the immediate discharge of the entire force—21 men—at the Golden Reward, and also the cessation of work at the Ruby Bell, Maggie and one or two other Bald mountain corporations.

IDAHO.

A STRIKE IN THE SOLACE.—Wood River *Times*, March 9: News comes of a strike which was made in the Solace mine, at Vienna, about two weeks ago by the leasers. They struck a vein which carries from four to six inches of ore assaying between $400 and $500. The strike was made below the old tunnel level.

CŒUR D'ALENE MINES.—Wardner *News*, March 2: Spring is with us at last, our mountains have doffed their snow caps and old winter with its chains of ice and clogs of snow has gone where the woodbine twineth. How different our climate from that of the East. There, February and March are often the worst two months, and even in April plenty of winter weather exists. Cœur d'Alene offers greater attractions than any other portion of the Northwest, not only to the traveler but also to the speculative man, who seeks to combine business with pleasure. While enjoying the salubrity of our mountains the capitalist can find the very best opportunities for profitable investment. Miles of the richest mining country known to man are open for inspection, while our old and well-developed mines yielding up their thousands daily and weekly is a spectacle that never fails to interest, but always enlists the attention of the enterprising and ambitious observer. The coming season will be one of unusual activity and prosperity. The amount of development work in our various districts will exceed all previous records, while the quantity of rich ore brought to the surface will more than realize the expectations of those interested in the product. New machinery will be erected at various points, the number of our mills will be vastly augmented, and our immigration will be in keeping with the great advancement of the country. Let the workingman and capitalist both come. The field for each is proportionally good, and while the first named cannot fail in bettering his condition, the latter will find, if he has the money, we have the mines to command immediate attention, while they are fully worth all the capital that can possibly be invested in them.

MILLING NOTES.—The concentrating works of the Stemwinder Co. at Kellogg resumed work on Wednesday morning, and the bucket tramway is again in motion conveying ore from the mine above Wardner to the mill. The Poorman mill at Burke recommenced operations this week and will continue to supply its concentrates uninterruptedly. The machinery of the Hunter mill at Mullen is all in place, and will be started in about two weeks.

MONTANA.

GEORGETOWN GOLD MINES.—*Inter Mountain*, March 7: A proposition is understood on pretty good authority to be on foot for the sale of the Pyrenees mine and mill at a big figure. The mill has been running steadily for several years and the output of gold bars has been large. The latest development in the Southern Cross is in the east drift from the 250-foot station. The face of the east drift is seven feet from the shaft and is in fine ore. The Red Lion Co., which owns a property about ten miles north of Georgetown, yesterday hauled in the material and machinery for a five-stamp mill. The directors expect to put up their mill within 30 to 60 days. At Silver Lake the fine prospect of a mining boom has caused the springing up of quite a town. Some 20 houses, of logs, are in course of construction.

THE MINNIE PALMER MINING CO.—*New Northwest*, March 9: Mr. Sam Ritchie, manager of this company operating on the Minnie Palmer lode near Beartown, is very much elated with the showing he now has on the property. They have run 415 feet on the tunnel and have not yet struck the lode, which has dropped at an angle of 45 degrees. Sixty-five feet of this tunnel have been driven since Dec. 8th, when the new company began work. It is now in talcose slate and believed to be near the vein. But on Jan. 24th they began again on the shaft, sunk it 10 feet, cut out a station and run a level eastward 28 feet on the ledge. It shows ore 8 to 10 inches wide at the top of the level and two feet at the bottom of the level, all apparently free milling gold ore. The walls are five feet apart, a granulated limestone footwall and a granite hanging-wall. The quartz is in a body on the hanging-wall and the balance of the vein matter is talc and stringers of quartz. Mr. Ritchie brought up what he believed to be fair average samples, from which Mr. Strang, assayer, got the following results: No. 1, $82.50; No. 2, $100.50; No. 3, $240 25; No. 4, $241.00; average, $144.06. This Mr. Ritchie believes a fair average of the two-foot body.

BONDED TO ARIZONA PARTIES.—*Mining Review*, March 9: We learn that Wm. Dolman & Co., who are operating on Johnnie's Gulch, about 12 miles from Radersburg, have bonded their property to Arizona parties for $50,000, with a payment of $2000 down, the bond to expire in 30 days. This is the prospect which was mentioned some time since as being so promising. The ore is dry in character and of very high grade. The vein stone is composed of baryta, or heavy spar, which is considered by mining men to be the very best indication of permanency.

NEW MEXICO.

DEVELOPMENT WORK.—Silver City *Enterprise*, March 9: Charles Brakebill is taking out some fine horn silver ore from his Bear mountain mines. Fielder and Ward are pushing work on the Centralia. They made a shipment of ore last week. The Aztec, 300-foot level, north drift is now carrying 20 inches of ore and widening northward. It is settled, for the present at least, that the Aztec and Pacific mills will be located just above this city. Lindauer and Woods are working eight men on the Central mine, Central district. They have 60 or 70 tons of ore on the dump. A strike was made in the south drift of the Wagner lead at Pinos Altos this week, that surpasses all former discoveries. The ore streak is three feet wide and runs 1½ ounces in gold. Johnson and Fowler, of this city, have a lease on the San Jose copper mine, and are putting it in shape for extensive working. E. G. Payne and John Spiller have leased the Rain-in-the-face mine and mill, in East camp, and will resume active operations there at once. The Aztec mill started up again last Tuesday morning, and will continue to run steadily unless the roads again become unpassable. Downey, Dennis and Gleason, who have the American mine, Hachita, under lease, are taking out large quantities of ore for shipment to El Paso. The ore runs high in iron and averages about $40 in silver. Superintendent Harrison of the Pacific will shortly commence the sinking of a development shaft on the Cleptomania vein of the Pacific. B. B. Lewis and Col. H. L. Pickett have leased and bonded the Smith and Ailman mine and mill at Pinos Altos. Work was commenced on the mine under the new management to-day. Denver parties have secured a bond and a lease on the Thunderbolt zinc mine, Hanover district, owned by "Scotty" Mungall and Mrs. John Black. They will commence work on the property in a few days. The general impression seems to prevail that the Mogollon country is on the eve of a grand mining boom. The last two coaches from that section have each brought down a handsome silver brick, the output of the Cooney five-stamp mill. Mr. Cooney assures the *Enterprise* that he has an abundance of ore for a 20-stamp mill, and the probabilities are that he will have a plant of that capacity running ere long. All of the mines now being worked in that section seem to be doing well. The reckless wild-cat days have passed in that camp, and mining is now being carried on in a legitimate manner.

OREGON.

BAKER COUNTY MINES.—Bedrock *Democrat*, March 7: The mildness of the past winter and the slight snowfall has been most favorable for the working of the numerous quartz mines of Baker county, and development work has progressed without interruption all winter. In the districts of Sumpter, Cracker creek, Cable Cove and Granite is this noticeable where all of the more prominent mines have been worked continually and the most favorable results obtained. These districts never presented a more encouraging outlook than at the present time and will stand the inspection of the most competent experts that ever made an assay or wrote a report. The Cracker creek mines—the Eureka & Excelsior, Columbia, North Pole, Gray Eagle and dozens of other locations in the immediate vicinity, never looked better and have developed to the extent that there is no longer any speculation as to their merit. They are mines that any country could well feel proud of. The Eureka & Excelsior, owned by a St. Louis syndicate, have been developed to a high state of perfection and the wealthy company owning them have made arrangements for the erection of a large mill, some of the machinery for which has already been hauled from this city to the mines. The same may be said of the Columbia company. The mine has been under rigid development all winter under the superintendency of H. Stevenson, who has had in his employ from 25 to 30 miners. A mill will be erected on this property at an early day. A mill will also be erected on the North Pole mine, owned by an English company, early in the season. The Gray Eagle is now listed for sale to a wealthy Eastern syndicate and the sale of the property is assured. The La Bellevue, in the Granite district, is said by every one who has inspected it to be the best mine on the Pacific coast, and the result of practical demonstration certainly proves it. Carload after carload of concentrates have been hauled to this city this winter and shipped to Salt Lake for reduction, and the returns have been magnificent.

WASHINGTON TERRITORY.

CONCONULLY.—Ellensburg *Capital*, March 8: Mr. McGrath, who has been absent in the mines of Conconully for the past month, has returned to Ellensburg, bringing good reports from all the districts. He sold the third interest of McGrath & Palmer in the War Eagle and Black Bear, in Wanicut district, for $4000, or at the rate of $12,000 for the whole property, which is a good price for it in its undeveloped condition. He reports considerable activity in the way of development and great confidence in the richness and permanency of the mines. Capital is being interested and the prospects of ore output of considerable magnitude are quite flattering.

MECHANICAL PROGRESS.

Effect of Rolling and Wire-Drawing Upon Mild Steel.

An interesting paper was recently contributed to the British Institution of Civil Engineers by Mr. Horace Allen, which is summarized by the *Ironmonger*. That gentleman made a series of tests in order to prove that the manipulation of steel, during its formation into wire, had greatly increased its tensile strength. He selected a mild-steel billet, two inches square in section, and having the following chemical composition: Carbon 0.115; silicon, 0.009; sulphur, 0.068; phosphorus, 0.072; manganese, 0.410, and iron, 99,326. A portion of this billet was turned down for testing, and sustained a breaking load of 28.08 tons per square inch, with an elongation of 28.1 per cent. Another portion of the billet was rolled into wire rod. In this case the rods were found to have increased in elastic limit by from 17 tons in the billet to 25 tons in a No. 5 wire rod, or an increase of 47 per cent. The breaking-stress was raised in all cases, a No. 1 rod increasing from 28 to 32 tons. The reduction of area at the point of fracture was increased in all the specimens, being from 54 per cent in the billet to 67 per cent in the No. 5 rod. The specific gravity was increased by rolling from 7826 in the original billet to 7865 in the rolled wire rod, and 7852 in the annealed wire rod.

The author of the paper says it is evident that the density of the steel is considerably and permanently affected by the effect of rolling the iron. Although the billets were strongly heated before the commencement of rolling, the temperature fell rapidly during the operation, on account of the sectional area becoming very much reduced; and the temperature of the finished rod, on leaving the rolls at a red heat, continued to fall rapidly, consequent on the relatively large surface of the rod, the molecules of which had not time to rearrange themselves in the same manner as they probably had done in the billet, in which case the section of the rolled steel was comparatively large, and the rate of cooling much slower. The alteration in the physical properties of the wire rod, compared with the original billets, as shown by the increased elasticity and tenacity and diminished elongation of the rod, is doubtless due in some measure to the effect of rapid cooling in the process of manufacture. This is proved by the fact that after annealing the wire rod, by placing it between pieces of white-hot steel and allowing them to cool slowly together, the results of tensile tests showed that the steel was brought a little nearer to the condition of the original billet. Rolling the steel down to such small sizes at a high temperature induces absolute molecular contact, closing up any microscopic cavities left in the steel when in the form of a billet. This probably accounts, to some extent, for the increase of the elastic limit and breaking-stress, because the continuity of the molecules is less broken than in steel which has had less work upon it. Mr. Allen deems remarkable the increased contraction of area in the wire rod. Generally, the effect of putting mechanical work upon steel is the production of increased tenacity, accompanied by a diminished contraction of area, yet in wire rod the tenacity and the contraction of area are greater.

IRON AND STEEL ANALYSES.—W. Shimer Porter has recently described a new method for the estimation of phosphorus in iron and steel, which gives very accurate results. The procedure which he recommends is as follows: One gramme of the iron is dissolved in 20 cubic cm. of nitric acid, 20 cubic cm. of potassium permanganate solution of known strength is then added, and the peroxide which is produced is dissolved by means of hydrochloric acid. Sulphuric acid is next added to the mixture, and the solution is evaporated until sulphuric acid fumes are given off. The residue is then dissolved in dilute nitric acid and filtered. In the filtrate the phosphoric acid is precipitated by means of ammonium molybdate solution. Two new methods for the estimation of the sulphur in iron and steel have also been published by Messrs. Arnold & Hardy. They are both based on the fact that when iron is in a finely divided state, on heating with dilute sulphuric acid all the sulphur present is evolved as sulphureted hydrogen. The gas produced is absorbed and its amount determined either by a calorimetric or volumetric method. The former plan is the shorter of the two, and both give very satisfactory results.

BRAZING WITH BRASS OR COPPER.—A correspondent of the *Blacksmith* describes his way of doing such work as follows: "I file the parts to be joined clean, wire them in place or rivet them; then take a few lumps of borax and burn them on a piece of sheet iron, then pulverize them, dissolve some on the article to be brazed in it, then lay on the piece of brass or copper, tie it fast, sprinkle some of the borax over it and put it in a clear fire, blowing very slow at first till the iron gets red; then I will see a blue flame which is the melting point of brass and copper. I allow it to lie in the fire a minute without blowing, then take it out and lay it down gently on the hearth to cool. Very delicate articles should be dipped in a batter of clay to keep them from burning. When the clay begins to glaze it is time to take them out of the fire. Brass of copper should be brazed with silver. Copper can be brazed with brass, but the melting points of copper and brass are only a few degrees apart, and no such work is safe unless you have to deal with a large piece of copper. Brass and copper for brazing should be melted. When silver is used it should be old coin or Mexican coin—such silver being purer. The blowpipe is the best to braze with, but it requires some practice to use it successfully."

Pyrometers—What They Are.

The methods employed for the determination of high temperatures—the temperature of furnace fires, flue gases, molten metals, etc.—may be divided into four classes: (1) Those which depend for their indications upon a change of dimensions of a body employed in the test; (2) those based on the amount of heat imparted to a body of water or air by the heated body; (3) those dependent upon the melting points of metals and metallic alloys; and (4) those dependent upon the measurement of the electrical resistance of metals.

The first method was employed by Wedgewood, who constructed, in 1782, the first instrument by which high temperatures could be measured with any approach to accuracy. His instrument is based on the property possessed by clay to contract when exposed to high heat, an effect which is believed to be due partly to the loss of its water and partly to the process of vitrification which sets in subsequently. It has been found, however, that the assumption by Wedgewood that the contraction of clay is proportional to the degree of heat to which it is subjected, is incorrect; and that a long-continued heat of moderate intensity will cause the same amount of contraction as a more intense heat for a shorter time; and, further, that different clays differ considerably in the degree of contraction which they suffer when subjected to the same temperature. For these reasons, the method of Wedgewood has been abandoned in scientific measurements, as unreliable, although it gives results in many cases approximating sufficiently to the truth for all practical purposes.

In the pyrometer of Daniell the temperature is measured by the expansion of a metal bar inclosed in a black-lead earthenware case. The metal of the bar is either platinum or soft iron. The expansion of the bar causes the motion of an index of porcelain on a suitably graduated scale. The second method, which is that most generally in use in metallurgical operations, consists in placing a mass of platinum of known weight in the medium whose temperature is to be ascertained, and, when it has acquired the same temperature, plunging it into a body of water of known weight and temperature. From the indicated rise of temperature of the water, the known relation between the weights of the platinum and the water, and their relative specific heats, the data are given for the estimation of the temperature to which the platinum was originally heated.

A method similar in principle to this is in common use to determine the heat of furnace and flue gases. It is based on the plan of mingling with the heated furnace or flue gases a definite volume of air of known temperature, the assumption being that if an equal volume of air is mingled with the hot gases, their temperature will be reduced one-half; if twice the volume, two-thirds; if three times, three-fourths; if nine times the volume, nine-tenths, etc. By thus mingling a large volume of cold air with the hot gases, the temperature of the mixture will be reduced sufficiently to permit it to be measured by means of thermometers, or by the expansion of a metal bar.

The third method, based on the melting points of certain metals and alloys, is practiced by simply suspending in the heated medium a piece of metal the melting point of which is known, or, if necessary, several pieces of different (but known) melting points. According to the observation of the pieces which are melted, and those which continue to remain solid, the temperature of the medium may be ascertained within a very narrow limit of error.

The fourth method is a much more refined and scientific one, devised by Siemens, and is based on the principle that the electrical resistance of metals stands in a certain relation to the temperature, an increase of the latter causing a corresponding increase of resistance. The resistance of a given piece of metal of known material and dimensions being ascertained by measurement with the aid of suitable apparatus, its resistance for any given temperature can be calculated, and vice versa. This treatment will be found described in the special treatises on electricity.—*Manufacturer and Builder.*

IRON PIPES.—We read that less than a century ago iron pipes did not practically exist in Great Britain, and yet it is undeniable that the use of pipes dates back to a very early period. In a description of the palace of Abdurrahman III, extant about 750, and situated at Zahra, in Spain, we find that metal pipes were used to convey both hot and cold water to the marble baths. A year after the battle of Waterloo iron-flange pipes were cast in 2½-feet lengths, and packed at the joints with old hats. In 1811 and 1817 patents were taken out for welding barrels of fire-arms, and in 1824 Mr. James Russell took out a patent for constructing iron tubing, but about a year after Mr. Whitehouse took out a patent for an improved system, which was the beginning of our great tube industry.

SCIENTIFIC PROGRESS.

The Order of Nature.

Dr. Jenkins is unfortunate in confronting the kind of "exceptions" which I aver science cannot recognize with the fact that water, in opposition to all other material substances, expands under a certain degree of cold. But is there any known exception to this law of water? Has water ever been known to reverse this process in freezing? If so, the exception would indeed stagger science—it would be a miracle. A child born of a woman, but without an earthly father, and of a superhuman species, is the kind of exception which I averred science cannot recognize. But does this bear any analogy to the exceptional behavior of water while freezing, when compared with other substances? It used to be believed that in every animal that possessed a circulation, the blood always took one definite and invariable direction; but in 1824, Huxley says, it was discovered that a class of animals called *Ascidians* furnished an exception; the heart of these animals, after beating a certain number of times, stops, and then begins to beat in the opposite way, so as to reverse the course of the blood, which returns by-and-by to its original direction. Such an exception does not disturb the man of science; it only teaches him greater caution in making his deductions. But if one Ascidian, and but one, could be found whose heart beat like that of other animals, that would be a puzzle to him; or, if one comet, and only one, should appear, carrying its tail toward the sun instead of from it, cometary astronomy would be reduced to chaos. A floating feather is no exception to the law of gravitation, but a floating stone and a falling feather would be an exception. Science as well as experience finds exceptions to general rules everywhere, but these exceptions are constant and as strictly the result of natural law as anything else. Faith in the continuity of nature, upon which the scientist builds, no less than every man in the conduct of his life, does not mean sameness or identity of all physical processes, but it means identity of these processes under like conditions. Given the same conditions, and the same results always follow.—*John Burroughs in Popular Science Monthly.*

CHANGE OF MOTION INTO HEAT.—The opinion is now commonly accepted by scientific men that all bodies, substances, gases and liquids, are composed of multitudes of particles or molecules of almost inconceivable smallness, and these are supposed to be in motion among themselves—this motion, moreover, being heat; that is to say, heat is neither more nor less than a kind of motion, and this internal vibration can be transmitted into a perceptible mechanical movement; or, on the other hand, mechanical movement can be converted into the invisible motion called heat. How the change takes place no one knows, but the change is none the less a fact. As illustrating this point, a writer in the *Mechanical Engineer* cites the fact that the difference between a solid and a gas is simply that the motion of the particles or the molecules of the gas is much greater in extent than is the motion of the particles of the solid, some gases also having a greater range of motion than other gases; and if by any means the motion be taken out of gas, say by compressing it into a vessel, the sides and ends of which reduce the range of movement, then, as nothing is lost in nature, the invisible and insensible motion of the gas, which it has lost, reappears as heat in a visible form, and it is found that the sides of the vessel become hot. Further, the oxygen, which has combined with coal, has a very considerable range of internal motion, but when the oxygen has combined with the coal, another gas, known as carbonic acid gas, is produced; and, the particles of this gas having a much smaller range of motion than the particles of the oxygen have, the difference appears in the form of heat.—*Boston Journal of Commerce.*

BRASS TUBES FOR CLOCK BELLS.—It has been found that brass tubes, when properly annealed, and suspended in a vertical position from a point near the top, and struck at a point above the point of suspension, have resonant qualities far superior to bells, especially when comparative weight and cost are considered. This fact has been made the subject of a German patent, and tubes are being used there for chimes in church towers. Some idea of the comparative efficiency of tubes for the purpose is obtained from the fact, as stated, that a tube three inches diameter outside and one-half inch thick, 12 feet long, can be easily heard a distance of one mile, and under favorable circumstances two or three miles. Walter H. Durfee of Providence, R. I., is making use of these tubes for chimes, which are rung by the clock movement at regular intervals.

EXPERIMENTS WITH LIGHT.—Dr. O. J. Lodge, a holder of the theory that light is an electrical vibration of the ether, has been endeavoring to produce these waves by direct electric action without the intervention of heat. The means adopted was the oscillating discharge of a Leyden jar, with a rate of vibration as high as 1,000,000 per second. The waves thus obtained were about three yards long, but, according to Dr. Lodge, were light in every particular except wave length. To reach the wave length of light, however, they would require to be shortened from three yards to the hundred-thousandth of an inch. The electrical waves of Dr. Lodge travel through space at the same speed as light, and are refracted and absorbed by material substances according to the same laws. Hence Dr. Lodge concludes that if we can only generate electric waves sufficiently small we may entirely revolutionize our present modes of obtaining artificial light. In connection with this subject, we may refer to the important discovery which has been made by Dr. Hertz of Vienna, to the effect that blue light is capable of starting the electric spark when it otherwise would not pass between the sparking points. That is to say, for example, that if the sparking points of an induction coil be drawn just too far apart for the spark to leap across the intervening air, a ray of violent light falling on the gap will start the spark. Dr. Oliver Lodge infers from this discovery that the mere blaze of one lightning flash may precipitate other flashes.

WATER HEAVIER AT NIGHT THAN IN THE DAY.—Some one who has evidently been reading wishes to know if it is true that water is a trifle heavier at night than in the daytime, and if so, how much does it amount to. It is well understood by mechanics in general that the sun's attraction, if it amounts to anything at all, must attract upward at midday as much as it attracts downward at midnight, and however slight this attraction may be, it must make a difference in favor of a greater driving force to work with in the night-time. The force of the sun's attraction amounts to one pound in a mass of water of 146 cubic feet. If half of this amount of water could be weighed at midday and again at midnight, it would be found to have gained a pound in weight, as a half pound has been added and then subtracted by the operation due to the sun's attraction, but it will not do to test this action on a set of Fairbanks' scales, as the sun will attract the weight on the levers as well as the weight on the scales. Something like the spring balance must be used. —*Boston Journal of Commerce.*

WHY CAR-RAILS IN ACTIVE SERVICE DO NOT RUST.—The fact that car-rails in active service seldom suffer deterioration from rust, while others less used do, is susceptible of a very simple explanation. The iron hydrate, the ordinary iron rust, is forced by the pressure of passing wheels into combination with the iron of the rails, forming a magnetic oxide which protects the rail from further action. The rust which forms on all rails during a rain or damp weather has hardly time to dry before this combination takes place on the rails in active use. In an experiment quoted in proof of this explanation, the scales on that surface of a rail which received the greatest pressure were removed by the aid of a wire brush and submitted to analysis. They were found to be composed of magnetic oxide mixed with a variable quantity of ferric oxide, and apparently a small proportion of free iron.

CURRENT COUNTERS.—A very ingenious current counter has been devised by Prof. Geyer and Mr. Bristol, two American electricians, which is equally adapted to the measurement of direct and alternating currents. Two pieces of German silver—one a flat band and the other a fine wire—have their ends soldered together. On passing a current through the composite strip the fine wire loses heat more rapidly than the flat band, and consequently attains a higher temperature, deforming the strip in much the same way as in Breguet's metallic thermometer, and this deformation is a measure of the intensity of the current. By suitable arrangements a record is formed on a paper band.

A POSSIBLY NEW TEXTILE.—A French paper reports that from a plant called kanaff, which grows in the summer on the shores of the Caspian, M. G. Blakenbourg, a chemist, has obtained an admirable textile matter, which is soft, elastic, tough and silky, and which can be bleached chemically without losing these properties. The resistance of this new material is said to be far greater than that of hemp, while its specific weight is much less.

NICKEL FOR LIGHTNING RODS.—It is reported that at Dresden the experiment has been tried of placing a nickel lightning-rod on a building. The advantages claimed for this metal are that, being non-corrodible, it will last longer than iron, and will also keep bright at the points, which latter is very essential to the efficiency of rods as conductors of electricity.

HAS BECOME EXTINCT.—One of Scotland's rare marshy plants, the Scheuchzerta palustris, a genus of the order of arrow grasses, has, according to Prof. Hillhouse, become extinct. It was to be found only on the moor of Methven in Perthshire; but some 300 or 400 black-headed gulls have settled down on this moor and annihilated every trace of vegetation.

THE ELECTRIC LIGHT IN LONDON.—The great central station at London which is to supply electric light on an extensive scale for the city is being built with facilities for furnishing 250,000 incandescent lights in the near future, and a final capacity of 1,000,000 lamps.

THE FIRST PHOTOGRAPHER.—The man who made the first photograph ever produced in the United States, Franz George Schreiber, is still living in Philadelphia, hale and hearty, at the age of 86.

GOOD HEALTH.

The Passion and Danger of Anger.

Anger is a passion most generally excited on the moment, which subsides more or less rapidly, according to the nature of its cause. It always exerts a powerful and deleterious influence upon the system, which becomes augmented in proportion as the passion approaches toward insanity, as, when it becomes furious and ungovernable.

A person in a fit of anger may be at once recognized by the redness of the face, the furious sparkling of the eyes, and the violent agitation of the whole system. Some are unable to speak, while others are extremely voluble and vociferous; not unfrequently, persons foam at the mouth in a fit of anger. Some persons when angry, gesticulate violently, stamp their feet and display an uncommon degree of physical strength; others involuntarily shed tears.

Violent anger is very deleterious to health, and the more often it is suffered to be aroused, the more frequently will it develop itself upon even trivial causes. From its action upon all the functions of the system, it is liable to cause epilepsy, the rupture of a blood-vessel, convulsions, fainting, apoplexy, and even sudden death. Moderate anger is apt to be longer continued, and accompanied with hatred, malice, revenge, regrets, etc., rendering the person fretful and petulant, and gradually inducing some permanent disease. They who lead a life of voluptuousness and dissipation are the more ready subjects of this passion. Suckling infants have often been thrown into convulsions after having partaken of the breast-milk of a previous angered nurse.

To overcome the propensity to angry feelings requires much resolution and perseverance. As with fear, it is necessary to have a constant watch upon our minds, maintaining a degree of presence of mind upon the most sudden emergencies, and promptly repressing every angry feeling as it arises. The most powerful means of suppressing this passion is at once to concentrate the whole of the mental powers and resolve to overcome it; let the higher powers of the mind control the person. It is the power of thinking, reasoning and judging that renders man superior to the brute. When angry, contentious words only tend to fan the flame; it is better, therefore, to be silent, to take a draught of cold water, to withdraw one's self from the exciting cause, or adopt any other simple means, until the anger has passed away and reason resumed its sway. Never attempt to settle business when the mind is in an irritable or fretful condition. Persons of an inflammable disposition should be temperate in food and drink, especially avoiding the use of stimulating food and intoxicating drinks. The true gentleman, the man of proper education, can always hold command over this passion.

Children should be carefully guarded from those causes which will arouse and cultivate their angry passions. Improper punishment, dispppointments, tyrannical conduct, partial justice, etc., should be carefully avoided. Children have their rights, which should be held sacred by every parent and teacher. Instead of being treated as mere machines, slaves, or brutes, they should be governed by such methods as will repress evil and cultivate virtuous propensities, remembering that they are but men and women in miniature, possessing every mental attribute common to the adult, though more keenly susceptible and alive to external impressions. "Train up a child in the way he should go, and when he is old he will not depart from it," is a truth too little understood, or too little acted upon in the present age, for instead of training and properly educating them, they are more frequently driven up as one would drive cattle to market.—*Yolo Democrat.*

THE CARE OF THE NAILS.—Very few people know how to properly care for the nails. In cleaning them a sharp knife ought never to be employed, but between the ends of the nails and fingers the space should be filled with soap, and then removed by brushing them with the so-called nail-brush. Many improperly cut away that part of the flesh which grows over the nail from the bottom; but it should be simply pressed backward, and sufficiently to show the white part, considered by some to be a mark of beauty. If the flesh is adherent to the nail, the operation may be facilitated by passing the sharp point of a knife underneath the fold of flesh and separating it from its attachments. With this done, it can be pushed back more readily. Scissors should never be used to cut the nails; that should only be done with a sharp penknife.—*Boston Journal of Health.*

DANGER IN THE CORN-COB PIPE.—"Your head aches, your eyes bother you, and your throat is always parched," said a well-known physician, diagnosing the case of a patient. "Now, I can tell just what brings on these difficulties. You smoke a corn-cob pipe. Isn't that a fact?" The sufferer replied in the affirmative, but was curious to know how the doctor learned what kind of a pipe he used. "I see so much of this that I couldn't help knowing what ailed you," explained the medical man. "Men apparently enjoying perfect health come to me every day. They are great big robust fellows, and they all suffer from the same cause. At first I was nonplussed, and led myself to believe that it was a new disease, but I finally discovered that the whole trouble was caused by corn-cob pipes. It needs no credulity on your part. Notice yourself when you are smoking a corn-cob, a sickly, overpowering odor, which fills up your throat and lungs and causes a smarting sensation of the tongue. That is the smoke of the burning cob, and it contains enough creosote to cure a ham."—*N. Y. Sun.*

NATURE'S METHODS.—Dr. Wythe, Professor of Microscopy in Medicine, lectured on "The Bright Side of Disease" at Cooper Medical College some time since. He said disease was not a wicked demon, as the Chinese believe; not an effort of nature to throw off morbid matter; not an affair of the imagination to be cured by an effort of will—all these were bugaboos. Nature's methods should be observed. "Take, for instance, a fainting spell," continued the doctor. "The prostrate position into which a fainting person falls is the best possible posture. Consequently, a person who has fainted should never be lifted to an upright position. In a fever one wants liquids because the stomach is weak and cannot digest solid food. A physician's duty is not to prescribe an antidote, but to remove obstacles in the way of nature, then the *vis medicatrix naturæ* will do the rest. When a limb is broken and the surgeon has fitted the broken parts together, Nature pours a kind of fluid all around them which hardens into a perfect cylinder, fitting the bone exactly. Besides this, a plug appears in the hollow center of the bone, uniting the parts until perfect union has taken place. Then cylinder and plug are gradually dissolved."

ICE AS A REMEDY.—Prof. Stewart, after telling us that the seat of nausea is not in the stomach, but in the brain, informs us that relief from this distressing sensation may be obtained by cooling the base of the brain. He has tested this often and thoroughly in the case of sick headache, bilious colic, cholera morbus and other ills in which nausea is a distressing symptom, without a single failure; and once relieved the nausea resulting from cancer of the stomach by the application of ice to the back of the neck and occipital bone. The ice is to be broken and the bits placed between the folds of a towel. Relief may be obtained by holding the head over a sink, or tub, and pouring a small stream of water on the back of the neck. This is worth remembering as a relief for sick headache, to which so many women are subject.

POISONOUS MACKEREL.—There has been a correspondence in the *British Medical Journal* on the subject of poisoning from the eating of mackerel. Details are given of several cases, and in commenting upon them, Dr. A. W. Flood, surgeon R. N., retired, writes from Bandoran: "I believe the cases that I have seen were caused, not by eating the mackerel when out of season, but rather to the fish being too long kept, and, in addition, being exposed on a cart to the heat of the sun for sale. I believe mackerel to be a most dangerous fish for food, unless great care be taken to get them fresh, as ptomaines are developed very rapidly in them. I may say the residents here do not consider them safe when they are more than 24 hours out of the water."

USEFUL INFORMATION.

WHY PHOTOGRAPHS ON CARDBOARD GROW DIM WITH AGE.—Common photographs, in which the dark parts consist of finely divided silver on a film of albumen, rarely remain unchanged in appearance for 20 years. The white parts sooner or later take on a sickly yellow tinge, and when this change has begun the picture is doomed unless immediate steps are taken to preserve it. Treatment by skillful hands with a weak solution of mercuric chloride (corrosive sublimate) may arrest decay, but will not restore the clearness and freshness of the print. A better plan is to have the picture copied by some platinum-printing or carbon-printing photographer who does a large enough business to employ a skillful retoucher. The process of getting a good, permanent photograph from a bad, fading one is complicated and requires skill. Photographs in which the dark parts are formed of platinum-black are the most durable sort known. The best photographers will furnish permanent pictures if their sitters demand them, but such pictures are in plain black and white—without the chocolate tinge of the common style—unless the carbon process with a pigment of the requisite color is employed. The greatest enemies to the permanence of common silver-prints are traces of chemicals not fully washed out of the print, dampness and the action of sulphur or its compounds. The last of these agencies is the most difficult to guard against. The albumen with which the photograph paper is coated contains sulphur, and a familiar instance of its action is the blackening of silver eggspoons. The air also, especially in cities, contains sulphurous gases derived from sewers and from the burning of coal and gas.—*Popular Science Monthly.*

HOW TO MAKE AN ÆOLIAN HARP.—The simplest style of this melodious instrument is that which fits into an ordinary window-frame. Out of thin, well-planed boards of common wood make a box as long as the window for which it is intended is wide, four inches deep and five inches wide. Glue the pieces together, making the joints as true and clean as possible. The boards, by the way, should not be thicker than one-eighth of an inch, and the more carefully you make the box the better the harp will be when it is done. Three inches from each end of the box, glue on a bridge for the strings to pass over. The bridges should be made of some kind of hard wood. The strings are of catgut and are tightened by means of pegs fitted into holes bored for the purpose at each end of the box. Six or eight strings may be used, and they should be tuned in unison. Three inches above them place a thin board supported on four pegs, one at each corner of the box. Then put the box in the window and bring down the sash on the upper board. The air passes in and out between it and the sounding-box, and the strings, being set in vibration by it, give off that soft, melodious murmur for which the æolian harp is noted.

A PEAR TREE OVER THREE CENTURIES OLD. The *Garden* (London) gives the following description of a remarkable French pear tree, which, although over three centuries old, is still bearing fine fruit in abundance: There exists in the garden of M. Mengnot, at Pollet, France, outside the town of Dieppe, *Seine-Inferieure*, an espalier pear tree, the oldest and largest that probably can be found in Europe. This is a tree of the pear Oueillette or Epargne, grafted on the free stock; it is planted against a wall eight meters high, and in a clayey soil. The stem is one meter in thickness; each lateral branch is 70 centimeters in diameter; it is 30 meters in width, and is in a southern exposure. Its growth is vigorous, and the tree bears each year from 3000 to 4000 pears. Its date of planting, written on a stone placed in the wall, was 1580, in the reign of Henry III. The property where it was found planted was formerly a hospital. This venerable tree is taken care of by the owners, so that even now a long life is assured it.

THE MARINER'S COMPASS.—The statement that the compass was invented by Flavio Gioia, or Fra Diavolo, or some other Dutchman, has long since been declared erroneous. As early as 1268 Pierre de Maricourt not only described the compass, but calculated its variations, and the calculation shows that the needle wobbled with as much certainty then as it does now. Paul must have been familiar with the compass, for we are told that he "fetched a compass." We are not told, however, where he fetched it from, or why he hadn't it on board when he started.

THE REVOLUTION IN SLEEPING CARS.—In view of the movement in some States to compel a reduction of sleeping-car charges, it is reported that the Pullman Company contemplates furnishing a less luxurious car, to be used on roads in States where such laws may be enacted. A person interested in the business is quoted as saying: "The States that insist on cheap fares are to have cheap cars."

ODDS AND ENDS OF SOAP.—Every piece that becomes too small to use, lay aside, and when a sufficient number have accumulated, boil them in a little hot water till all are melted, then pour into a mold, and when cold you will have a nice cake of soap. You can use a glass dish for a mold by heating it thoroughly before pouring the melted soap into it.

INK STAINS may be removed from silk or woolen goods by saturating the spot with spirits of turpentine and letting it remain several hours, then rubbing it between the hands. To remove ink stains from cotton and linen goods, apply alternately a strong aqueous solution of oxalic acid and chloride of lime; then rinse well in clear water.

RAILROAD CROSSINGS.—According to the report of a Massachusetts legislative committee, all the grade crossings of railroads in that State must be abolished. There are 2902 intersections of highways and railroads, and to carry out the purposes of the law would necessitate the expenditure of $48,000,000.

NATURALLY REFINED COAL OIL. — What proves to be a veritable gold mine, says a Pittsburg paper, is an oil well on the Summerville farm, near Brady's Bend, which is producing pure refined oil. The output is about one barrel a day. The oil is clear, odorless, and a fine illuminant.

KEEPING PIANOS IN TUNE.—A French engineer has recently invented an improved key, which, it is said, simplifies and renders lasting the tuning of stringed instruments. The violoncellists of the Grand opera at Paris have had them adapted to their instruments.

THE advantage of technical schools has been illustrated in Crefeld, Germany, where over $1,000,000 has been spent on its lower schools, and $250,000 on a special weaving school. It has doubled its population and quadrupled its trade.

WROUGHT IRON can be made to contract to some little extent by heating it to a low red heat and quenching it in water. The first heating is the only one really effective, as subsequent heatings make little or no difference.

COPPER may be hardened by melting with it and thoroughly stirring into it 1 to 6 per cent of manganese oxide. The other ingredients for bronze may then be added.

ENGINEERING NOTES.

MARVELOUS RAILWAY GROWTH.—The *Railway Age* has published a most interesting table, showing the increase and decrease of earnings of the various leading railway companies of the United States for the year 1888. The companies which show a decrease are, with one exception, operating Eastern roads. Those which have made the heaviest gains are in the far West—notably in California. Thus, the New York Central shows decreased earnings from those of 1887 of $1,012,440; the Lake Shore, $677,027; the Chicago, Milwaukee & St. Paul, $503,124; and the Denver & Rio Grande, $319,153. On the other hand, the Southern Pacific shows total earnings of $43,000,000 in round figures, an increase over 1887 of $7,250,000. The Northern Pacific shows an increase of $4,186,882, and the Canadian Pacific, $1,589,681. Even the Atlantic & Pacific shows an increase of $338,346. These figures illustrate in a forceful way the tremendous growth and development going on in the Pacific States and Territories. The increased earnings of the Southern Pacific alone are more than one-third of the total income of the Lake Shore, and those of all the roads tapping the Pacific Coast combined are more than half of the total earnings of the Milwaukee & St. Paul, one of the greatest railway systems in the country. At the present rate of increase, what in ten years will be the total annual income of the railway system owned by Stanford, Huntington & Co.? The question is one worthy of thought by all who may feel apprehensive of the growth of monetary power in the hands of a few.

A CRADLE FOR AN ISTHMIAN SHIP RAILROAD. George M. Copeland, president of the Brockton city common council, according to a correspondent, has been working for 40 years on a plan for a ship railroad across the Isthmus of Panama. His plan includes a vehicle constructed in a cradle fashion, which is 400 feet long and 100 feet wide, resting on some 1600 wheels, the size of an ordinary car-wheel. These rest on an ordinary track, similar in construction to a railroad. The engines constructed for the purpose of hauling the vessels on this road across the isthmus are to be of 4000-horse power. Each engine has 200 large driving-wheels, and they are on either side of the cradle. These will give the engines as much power as that furnished on the largest ocean steamers. The cradle is eight feet deep, and is made of timber, bolted together, and provided with heavy rubber cushions at each joint, which will carry the largest vessel without jarring it in the least. On the inclined railway the cradle is run down into proper position. Then the vessel is floated over it. The roadway is composed of 16 parallel rails, 15 feet from outside to outside, in a bed not less than 125 feet wide at the top. Over this the cradle will readily travel at a speed of 8 to 10 miles an hour. Arrived at its destination, the vessel would be unloaded from the cradle by a reversal of the operation of loading.

THE MISSISSIPPI TO BE BRIDGED AT NEW ORLEANS.—The charter of a company organized for the purpose of building a bridge across the Mississippi a short distance above the city has been published. It is understood that the company proposes to build a suspension bridge which will span the river at or near Southport, in the Parish of Jefferson. For some weeks engineers have been at work running lines through the plantations and lands on both sides of the river. The general impression is that Collis P. Huntington, the millionaire president of the Southern Pacific railway system, is the moving spirit of the bridge company, and that he will build the bridge in order to more closely connect his Chesapeake & Ohio and Southern Pacific systems, and to have an unbroken railway line from the Atlantic to the Pacific Ocean.

REMARKABLE ENGINEERING FEAT IN CHINA. One of the most remarkable engineering feats appears to have been achieved in China, in the face of extraordinary physical difficulties, namely, the successful stretching of a steel-wire cable of seven strands across the river Lunann, this feat having been accomplished by the Danish engineer Delinde, assisted only by unskilled native labor. The cable extends between two points, at a distance of nearly 4700 feet apart, the hight of the first support being about 450 feet above the present level of the river, and the second about 740 feet. The cable in question is said to be the longest in the world, with a single exception, namely, the cable across the Kistna, measuring some 5070 feet. There are also two cables across the Ganges, of 2900 and 2830 feet respectively.

THE DANISH SOUND TUNNEL has found a successor in the shape of a projected bridge across the sound at its narrowest place, between Elsinore, in Denmark, and Helsinborg, in Sweden. The distance is there 18,000 feet, and the greatest water depth is about 70 feet.

LIEUTENANT FRED SCHWATKA, the Arctic explorer, started on the 5th to make an exploration of the country along the line of the Sonora, Sinaloa & Chihuahua railway from Deming south in the States of Chihuahua, Sonora and Sinaloa.

THE slightest vein of iron or steel can readily be detected by the application of aquafortis to the surface.

MINING AND SCIENTIFIC PRESS.

A. T. DEWEY. W. B. EWER.

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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO
Saturday Morning March 16, 1889.

TABLE OF CONTENTS.

EDITORIALS.—The Santa Clara District; Mine Timbering, 181. Passing Events; The Lime Industry in California; Prospecting; The Mining Bureau; Officials for Alaska, 188. Settling-Vat for Trough Lixiviation; Chrome Iron Ores, 189.
ILLUSTRATIONS.—Routes to the Lower California Mines; Nevada System of Timbering Mines, 181. Settling Tank Arranged for Sluicing in Trough Lixiviation, 189.
CORRESPONDENCE—Mexican Gold Mines; Timber on Goverment Land; The Victor Concentrator, 182.
MISCELLANEOUS.—Sutro Tunnel Finances; An Abandoned Mine Proves Valuable, 182. Mines on Railroad Lands; The New States; Ensenada, Lower California; Horseshoeing by Electricity; The Coinage of Silver, 183.
MECHANICAL PROGRESS.—Effect of Rolling and Wire-Drawing Upon Mild Steel; Iron and Steel Analyses; Brazing with Brass or Copper; Pyrometers —What They Are; Iron Pipes, 186.
SCIENTIFIC PROGRESS.—The Order of Nature; Change of Motion Into Heat; Brass Tubes for Clock Bells; Experiments with Light; Water Heavier at Night Than in the Day; Why Car-Rails in Active Service Do Not Rust; Current Counters; A Possibly New Textile; Nickel for Lightning Rods; The Electric Light in London; The First Photographer, 186.
GOOD HEALTH.—The Passion and Danger of Anger; The Care of the Nails; Danger in the Corn-Cob Pipe; Nature's Methods; Ice as a Remedy; Poisonous Mackerel, 187.
USEFUL INFORMATION.—Why Photographs On Cardboard Grow Dim with Age; How to Make an Æolian Harp; A Pear Tree Over Three Centuries Old; The Mariner's Compass; The Revolution in Sleeping Cars; Odds and Ends of Soap; Railroad Crossings; Naturally Refined Coal Oil; Keeping Pianos in Tune, 187.
ENGINEERING NOTES.—Marvelous Railway Growth; A Cradle for an Isthmian Ship Railroad; The Mississippi to be Bridged at New Orleans; Remarkable Engineering Feat in China, 187.
SHOP NOTES.—A Profitable Foreman; No Such Thing as Perfection; A Good Rule to Follow; Belt Speed and Power; Worth of Perseverance; A Labor Union View of Piece Work, 190.
STEAM BOILER NOTES.—Improved Steam-Boiler Furnace; Economy in Steam-Boilers; A New Boiler Arrangement; The Wear and Care of Engines; Firing Boilers; Alum in Boilers; Triple Expansion; Boiler Testing, 190.
MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 184-85.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 196.

Business Announcements.

[NEW THIS ISSUE.]

Split Pulleys—Simonds Saw Co.
Partner Wanted—W. H. Williscraft, Juniper, A. T.
California Electrical Works.
Real Estate—McAfee & Baldwin.
☞ *See Advertising Columns.*

Passing Events.

The glorious rains which have fallen during the past week have been worth an immense amount to California. The agricultural and mining interests were both suffering, but this storm has set the streams running, filled the reservoirs and soaked the ground. All fears of a "dry season" are set at rest.

The mining excitement in Lower California still continues. It has attracted thousands of people, though late reports are by no means encouraging. In our mining summary and other columns considerable information is given concerning the new camp of Santa Clara.

The decision of Chicago capitalists to build large smelting works at Portland, Oregon, is of importance. If the works are established as proposed they will be of great benefit to the Cœur d'Alene region of Idaho as well as other sections in the Northwest.

It has been decided to rebuild the reduction works at Deadwood, Dakota, which were destroyed by fire last week. The works cost about $90,000, but were more or less experimental in their nature. It is unfortunate for the section that so disastrous a loss should have occurred just at this time.

The transmission of motive-power by electricity from the Sutro tunnel level of the Cholar incline to operate the Nevada mill in conjunction with the surface Pelton wheel, has proven a success, and will be a great thing for the Comstock milling interests. We shall shortly describe and illustrate this underground electric plant.

The Lime Industry in California.

The increase in population on this coast, particularly within the past half decade, gave quite an impetus last year to the manufacture of lime, which was still further influenced by a higher range in values. Many of the new kilns established have since been discontinued, but they have, so far as ascertainable, been left in such condition that they can be started up at any time the market justifies.

Although deposits of limestone are found in about every county in this State, yet the principal source of supply is in Santa Cruz, where are located the limekilns of the firms of H. T. Holmes & Co. and Davis & Cowell. Those of the former are located near Felton. Their capacity is given at 100,000 barrels a year, with an actual production in 1888 of about 83,000 barrels. The kilns of Davis & Cowell are situated near the town of Santa Cruz. As near as can be ascertained, the output of the kilns in 1888 was about 70,000 barrels. Outside of the above the two firms have kilns in El Dorado county, as follows: Holmes & Co. at Alabaster cave, and one at Antelope canyon, which last year had an output of about 25,000 barrels each. Davis & Cowell have kilns near Auburn and another in Marble valley; in these two the output last year is put at about 25,000 barrels. The product of the Santa Cruz kilns is generally marketed in this city, while that from El Dorado county is marketed in the northern part of the State.

Besides the above firms the I. X. L. Co. of this city have kilns near Felton, Santa Cruz county, that turn out from 35,000 to 50,000 barrels of lime a year. Last year the Rockland Lime and Lumber Company started up their works in Monterey county, 28 miles below Point Sur. They have in use four patent perpetual kilns, with a capacity of 400 barrels of lime a day. As the company did not get thoroughly at work until toward the close of 1888, last year's output cannot be ascertained. The lime from these kilns is marketed in this city. In San Bernardino, at the base of Slover mountain, large quantities of lime are reported to have been burnt last year, but how much is not obtainable. At one time there were 16 kilns in operation, but at the close of the year there were only four. In San Benito county lime is burnt chiefly, if not entirely, for local purposes, quantity and other particulars not known. In Shasta county, near Kennett station, lime is burnt to meet local requirements. In Solano county, near Benicia, lime was formerly burnt, but is not now. In Sonoma county, at Mark West Springs, there is a large deposit of limestone, but which is not now worked. In Kern county, at Pine Grove, Godfrey Poirier has built a kiln and is burning lime. In Antelope canyon, El Dorado county, besides the kilns owned by Holmes & Co. there, a kiln was built the past year by a Mr. Anderson, while still further down the canyon a patent perpetual kiln was built by a firm, name not given. In Santa Clara county the Guadalupe Lime Co. has in operation a patent perpetual kiln; capacity, 60,000 barrels a year. Near Los Gatos, in the same county, there are extensive limestone deposits, which were worked up to 1886 by J. E. Ellis, when work was discontinued but resumed again last year. The output for 1888 was about 120 tons, against about 700 tons in 1885. In Fresno county, near the town of Dunlap, there are two kilns; capacity, 120 barrels a day, actual output not obtainable. The limestone deposit in Hot Springs valley, Alpine county, was not worked in 1888. Work on the limestone deposit at the headwaters of San Mateo creek was not resumed last year.

The outlook for this year is favorable to a large home consumption of lime and a free-shipping movement, but it is claimed by some that with increased production prices will not be so remunerative.

Prospecting.

Judge Baskin says there is a need in Utah of young blood among the prospectors, and a pushing of this valuable branch of the mining industry.—*Salt Lake Tribune.*

The same need is doubtless felt elsewhere. Prospectors are not nearly as numerous as was formerly the case, perhaps because many people feel that the mineral field has been so much narrowed. Yet it should be remembered that there are still large areas of mineral lands in many places on this coast, and that hundreds of mines are annually found. There are men who have followed the business of prospecting for many years, and who no sooner find a claim than they want to sell it and hunt up another one. They have experience in their line, and will not, as a general thing, settle down to the hard work of developing, preferring rather to indulge in their wandering occupation. Most of these men confine themselves to a region with which they are familiar, and work in a desultory way.

There is plenty of room, however, for newcomers. There are areas in the mountain regions which have scarcely been skimmed over. Young, active and energetic men, not "hide-bound" in any particular fads or theories, can take up this kind of work with fair prospects of success. Very little money is necessary, for prospectors' fare is cheap and the living very simple. A summer spent in the mountains in prospecting would be conducive to health and strength, aside from the possibilities of finding a good claim.

It is strange that some of the young men who come to the cities and spend months in search of employment, which, in the end, yields only a bare living, do not strike out for themselves and prospect in the hills and mountains. They spend more money in a couple of months waiting in the city than would suffice to support a prospector all summer. It is true the life is a rough one to some extent, and the luck uncertain. But there are possibilities connected with it which men without capital will not elsewhere find. Even in or near old settled districts mines are sometimes found, and in more remote regions the chances are largely increased. Men without others depending on them for support can well afford to try their chances in the mineral fields of this and other Pacific Coast States.

The Mining Bureau.

The State Mining Bureau receives this year a larger appropriation than ever before—$100,000, as against $60,000 last time. The last Legislature specified that a certain percentage should be spent on work in the field, and this time the same wise provision is made. Of the total $100,000, the sum of $70,000 must be spent in geological or field work. State Mineralogist Wm. Irelan, Jr., has been reappointed for another term by Governor Waterman.

We have no doubt that the publication of the last report of the Bureau had much to do with this favorable legislation. The report was of more practical value to the mining industry than any which have preceded it, and for the reason that the information had been gathered in the mining regions rather than in libraries. The personnel of the assistants was not all that could have been desired last year, but doubtless the Mineralogist and Trustees will profit by experience and obtain other assistants as good as some already employed. There is now money enough to employ good men at good salaries rather than a larger number at small ones. The field can be more carefully studied and available information obtained and put in shape as a practical aid to those engaged in the mining industry.

MORE DEBRIS INJUNCTIONS.—It is stated that the U. S. Government has taken action to stop hydraulic mining on creeks in Shasta county discharging into the Upper Sacramento river. It is learned that a complaint was recently filed in the United States Circuit Court and that Judge Sawyer granted the injunctions which have just been served. Ex Judge A. L. Rhodes of San Francisco is said to be retained by the Government for the express purpose of prosecuting the debris cases affecting navigable waters.

A NUMBER of Comstock miners have left for Trinidad, Sonora, Mexico, where they are engaged to work.

Officials for Alaska.

The time approaches when a corps of new officials is to be appointed for Alaska, the appointees consisting of a Governor, four Commissioners, a Clerk, or Secretary, and a Marshal, who is ex-officio Surveyor-General of the Territory. There is a danger that these places may be filled in part, at least, by Eastern applicants, a thing that for many and obvious reasons should not occur. Instead of this, they should be filled with residents of the Pacific Coast, if not wholly of this State.

In a certain sense Alaska may be considered an appendage of California. The country is largely populated by former residents of this State, the miners being nearly all from here. Her trade and commercial relations are mostly with San Francisco, three-fourths of the vessels visiting that region being dispatched from this port. Whatever industries have been established or improvements made up there have been with California capital. The fisheries, the canneries, the quartz-mills and mining developments are nearly all the results of our enterprise and energy. It would be highly proper, then, that the interests and preferences of our people should be consulted in filling these several official positions.

In the case of Alaska the Governorship and the judiciary are hardly more important than the marshalship, carrying with it, as in this instance, the office of Surveyor-General. The former have their duties pretty well defined by law, their discretionary powers being comparatively limited. But with this purely ministerial officer it is otherwise. In serving the processes of the court he has to deal largely with the rough element incident to these pioneer countries, and is much the better to have had some experience in frontier life. In order to discharge his duties with as little friction as possible, and yet promptly and efficiently, he requires to be a man of nerve—firm and brave, and at the same time cautious and conciliatory. As surveyor, while he should be master of his business, he should also be familiar with the land and mineral laws, the latter already extended to that Territory; and that the entire code relating to the public domain will soon come in force there may be expected.

With a single exception we do not hear that there are any California candidates for civil service in Alaska, though presumably there are a number of aspirants to the places to be filled there. For the position of Marshal, Francis Tagliabue is, we are informed, an applicant. Concerning his fitness for the office this may be said: Mr. Tagliabue, now a resident of San Francisco, came to California over 30 years ago, being then a very young man, who had just finished his school training for surveyor and civil engineer.

In 1858 he went to British Columbia, and for one year was engaged on the new wagon-road built by the local government for connecting the Lower with the Upper Fraser river, a costly and important work. Returning to this city the following summer, he proceeded at once to Western Utah, where he made his home for the next 15 years, and during which time he filled the following positions: Assistant Marshal for the new Territory of Nevada; county surveyor, first of Lyon and afterward of Lander county, under appointments by Governor Nye, the "gray eagle" of Republicanism. Later on, Tagliabue was elected county surveyor of Nye county and afterward of White Pine county, discharging the functions of the office always to the entire satisfaction of his constituents. In 1864 this gentleman was a member of the Constitutional Convention that framed the fundamental law adopted by the State of Nevada on its admission to the Union.

He has already made several visits to Alaska, and owns what are supposed to be valuable mining and other interests there.

Though so long on the "borders," Mr. Tagliabue has never been involved in any difficulties, personal or professional, his official life having been little disturbed by the scenes of turbulence and strife by which he has so often been surrounded. With such qualifications and such an experience, it might reasonably be expected that this gentleman would make a good marshal for the outlying and remote Territory of Alaska.

IT is stated that the best mine at Harqua Ha'la, A. T., has been sold to George Hearst of California for $200,000.

Settling-Vat for Trough Lixiviation.

In continuing the descriptions of the appliances used in Hoffmann's trough-lixiviation process which have appeared in recent numbers of the PRESS, we give on this page cuts of the settling-tank. Fig. 1 represents the vertical section, Fig. 2 the horizontal view, and Fig. 3 the front view of a settling-tank arranged for sluicing. Fig. 4 is a detail of *F* in Figs. 1 and 3. In the center of the bottom is the discharge opening, six inches in diameter. The cast-iron discharge tube *K* of the same inside diameter, tightly fastened to the outside of the tank-bottom, corresponds with the discharge hole. The lower end of the tube is at right angles with the upper end, and provided with flange *o*. The valve *m*, which is provided with a rubber gasket, can be pressed tightly against flange *o* by turning the wheel *F*. Flange *o* and valve *m* are made of brass. Fig. 4 shows in detail the construction of wheel *F*. Around the discharge opening, and fastened to the bottom of the tank, is the wooden polygon *v*, in which is cut the groove *p'*. Around the inner periphery of the tank, and high enough to give the filter-bottom an inclination of at least three-fourths' inch to the foot, is the groove *p*. Fig. 2 illustrates the construction of the filter-bottom, which is made in section.

The filter cloth is well fastened, and kept in position by driving tightly a rope into the grooves *p'* and *p*. The air-escape pipe *d*, which reaches to the rim of the tank, enters the latter close under the filter bottom. A piece of hose is fastened to the upper end, and can be closed by a hose-clamp. In Fig. 3, *q q* are solution outlets; *s*, filter outlet. Connecting pipes *g* and *h* (Figs. 1 and 3) have, like the discharge tube *k*, to be well coated with asphaltum varnish. In the same figures, *z* is the water pipe; *n*, the central hose, which reaches down into the discharge tube *k*, where it has to remain during the process of charging. This hose ought to be very stiff. Before charging the tank the discharge pipe is filled with water through the central hose, in order to keep the latter filled with water, which will prevent the inside of the hose from being obstructed by ore. In the base-metal department the central hose has to be connected with the water and solution pipe to allow the application of either, while in the silver department they need only to be connected with the water pipe.

When a tank is ready to be discharged, the wheel *F* is turned, and thus the valve *m* pulled back. The water is injected through the central hose, while the latter is gently moved up and down. The stream undermines the tightly-packed sand and causes a continual caving-in, until a funnel-shaped opening is made through its depth to the surface. Then several streams are made to play on the top, while the central hose, with checked stream, is left in position to avoid obstruction of the discharge pipe by a too sudden rush of sand.

The central position of the discharge opening and the funnel shape of the filter permit a quick and clean sluicing. The pulp leaving the discharge tube enters the sluice-trough *t* underneath the tank, which leads to the tailings-trough *u* in the silver department, or to the silver-leach trough in the base-metal department. The charge being sluiced out, tank and filter have to be well rinsed, the valve of the branch pipe *a* is opened, and the adhering sand washed off from flange *o* and valve *m* by the double sprinkler *w*. Then the discharge valve is closed again, and the tank is ready to be connected with the other tank. In Figs. 1 and 3 *y* represents the silver-leach trough; *b*, the intersecting-box above the tank; and *i*, a short hose made of duck.

FIG. 1.

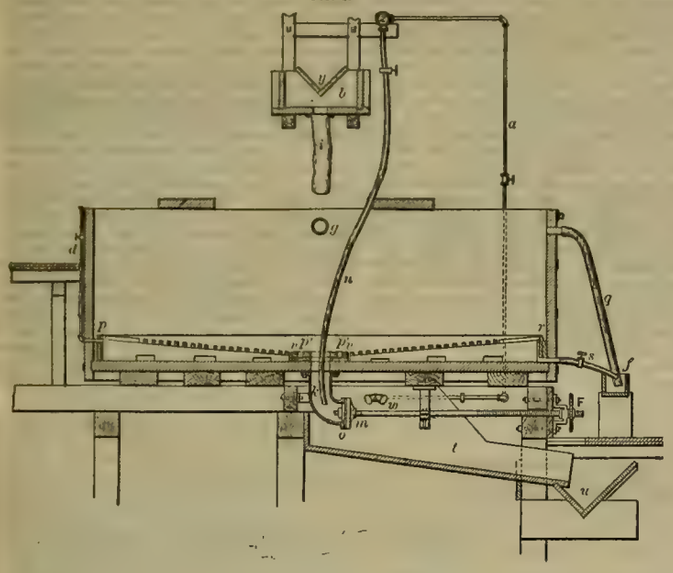
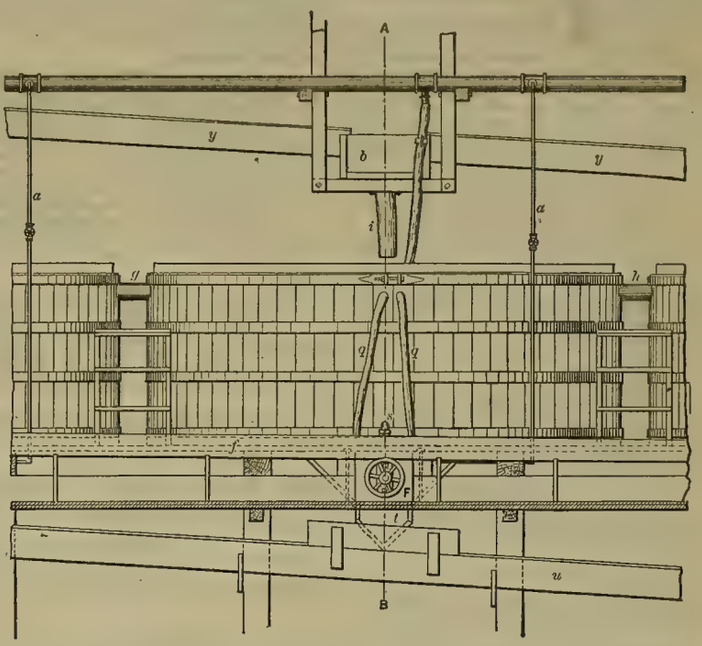


FIG. 3.



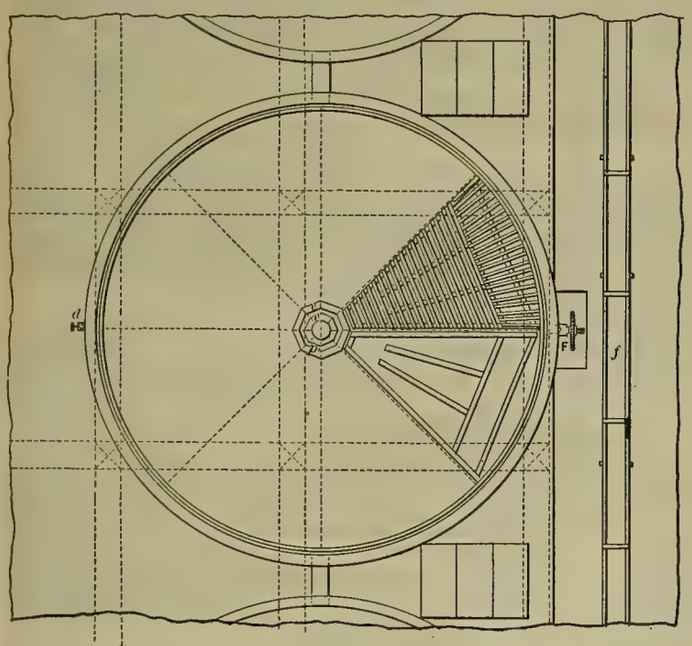


FIG. 2.

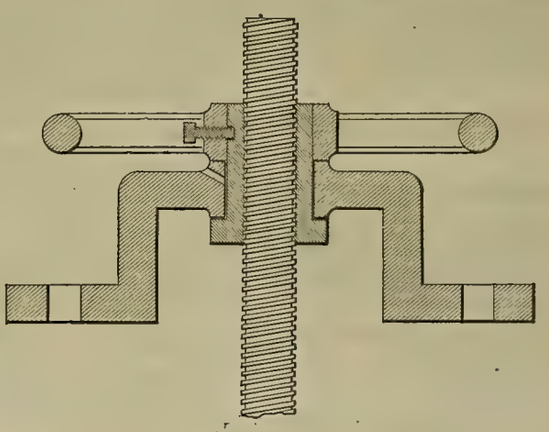


FIG. 4.

SETTLING TANK ARRANGED FOR SLUICING IN TROUGH LIXIVIATION.

Chrome-Iron Ores.

We have received several letters of inquiry during the past week concerning chrome-iron ore. This ore is found in several counties of California, especially in San Luis Obispo, Alameda, Del Norte, Placer and Shasta. The production of California runs from 2000 to 3000 tons a year. Chromium is not now mined elsewhere in the United States, though some has been worked in Maryland and North Carolina. Large importations come from Turkey and Asia Minor. The low price which must necessarily be received in this State for material which is to compete with foreign importations in the Eastern market has discouraged mining here. The mines here are seldom carried far below the surface. The deposits found are irregular in nature, the ore being in bunches more or less scattered. It occurs in no regular ledges as does quartz, so the extent of supply is always uncertain. The majority of openings made for chrome ore in California have yielded comparatively small amounts of ore. The San Luis Obispo and Del Norte deposits are the best thus far found.

These ores are shipped to Baltimore and Philadelphia, where potassium and sodium bichromate are manufactured from them. Some is also used in the manufacture of chrome steel used in making safes and machine tools. The bichromate is used in calico printing. It is also made into the pigments chrome yellow and chrome green. A small quantity is used in electric batteries. Most of the chrome ore is worked up in Baltimore.

With lower freight rates the chrome-iron industry of this State would be in a much more flourishing condition, and, were the tariff higher on foreign material, California would soon produce all that the United States requires. As it is, however, production is limited, since only the best deposits are worked, and there is not very much money in the business. The duty is $3 per ton. The last U. S. Geological Survey report credits California with a total annual product of chrome-iron ore of 3000 long tons, worth in San Francisco $40,000. The cost of mining chrome ore in California and shipping to Eastern ports ranges from $17.25 to $20.95 per ton in different localities.

THE Occidental Mining Company has closed a contract for the erection of a 20-stamp mill on a site convenient to the mine, with concentrators attached, the whole to cost $45,000, and to be in complete running order by July 1st. The Occidental has an area of many thousand tons of ore stripped on the upper levels ready for extraction. This ore will all show a value of above $30 per ton by battery sample assays, and can be run out through the various tunnel levels to the new mill without entailing the cost of expensive hoisting.

SHOP NOTES.

A Profitable Foreman.

Every manufacturer that employs a number of workmen requires the service of a competent foreman or overseer to look after the help.

No doubt that a great deal more money could be made if the proper man's service for the place was secured. I presume there are a great many foremen to-day in our shops that are unprofitable, but hold their positions simply because they are good workmen and reliable judges of work. These qualities are necessary, of course; but, nevertheless, few foremen possess the qualifications that are the make-up of a practical "boss." And they usually lack the most essential one—the gift of command. Without it success never becomes a realization, only a dream of the ever future. A man in a position of this kind should be a student of human nature and court the courtesy of his subordinates. The benefits of this are clearly demonstrated as we turn back the pages of history and see them dotted here and there with a general's name that has made a success as a foreman of his army.

If Washington had not had thorough control of his soldiers they would have deserted him at Valley Forge. If they had not respected him, his pleadings would have had little weight, his command would have been ignored. Upon the Emperor Napoleon's return from Elba his former followers flocked around him ready to lay down their lives for his glory, proving their fidelity to him and showing his command over them. Cæsar overran the Roman Empire, overthrew his rival and conquered all before him, simply because he commanded the respect of his soldiers, thereby commanding their will to such an extent that they were ready to suffer death at his dictation. And so it is with a foreman. He should have his help at his command—have them interested in their work—and to do this he should keep in mind the fact that *to command a man's respect is in a certain degree to command his will.* That is the secret of success, in my mind, to any one that has charge of men.

If the workmen dislike a foreman on account of pomposity or some similar reason, they are not apt to do more than they are really obliged to. A man gets disinterested in his work and then proves an unprofitable hand. He is then discharged, a new man hired in his place; he has to get acquainted with the shop, and for a time may not be worth his money, causing a loss to the firm. By the time he gets the "ropes" learned, some one else gets through for the same reason, and another loss is made; and so it goes during his stay. A foreman makes a mistake when he shows his authority in a self-conceited way. A man of that description cannot get as much work from his men, and they are constantly leaving him. A little courtesy often goes a great way toward winning the good-will of a man, and it is human nature for a man to please those he likes. A thorough, práctical workman that will treat the help with the same respect that he would demand, is the man for such a position every time.

No Such Thing as Perfection.

The mechanic who thinks he has arrived at perfection may be written down as an ass. There is no such thing as "perfection" in the mechanical arts, and the man who claims to be a complete and finished mechanic knows in his heart he claims that which does not belong to him, and he will soon discover his vanity, for his fraudulent pretenses do not deceive the employer to any great extent. Blow and bluster will not make good work or pass for efficiency, and the man who uses that sort of weapons seldom deceives an employer. "I never employ a man who knows it all," said a large contractor to us the other day. "Give me a modest, neat-looking man," he continued, "and I'll hold you a dollar he is a good workman and one that may be relied upon; though, of course, that sort of man seldom comes in search of employment. Bragging fellows, who state they can do anything from dressing a board to designing a cathedral, are quite numerous, and may be had at any moment." Doubtless this is true, but it does not argue that there are not many of the modest workmen. There are plenty of them, good, reliable fellows—fellows that seldom or never have need to seek employment. They are always engaged. Most of them own their homes, are intelligent chaps, models in their own neighborhood, best of citizens, have neat, thrifty wives and healthy, happy children, and their country is proud of them, for it understands that they are towers of strength and bulwarks of true freedom. It is not from this class anarchists or noisy demagogues are drawn; they do nothing until they have first considered the results, and all their actions are tempered with wisdom; hence their ability to become good mechanics.—*The Timber Worker.*

A GOOD RULE TO FOLLOW.—All who have made any marked success in any calling or profession have made it the rule of life to be always in advance of their enemies, so as to meet them in battle when they least expected them. This had much to do with their success. They led the age by always being in advance of it. This rule should be applied to trade as well. Be the leader in your line; keep ahead instead of being behind. Do the thinking yourself, and not leave it to others. Exercise your own judgment in all things. The man who lays his plans carefully, and considers well everything that relates to or concerns his business, and relies upon himself for directions, always succeeds. The one who puts off for another time that which should be done to-day, who depends upon others for suggestions and advice, rarely, if ever, succeeds. Strong individuality, self-reliance and promptitude of decision mark the pathway of the successful merchant. When united with a clear head, quick eye to look ahead before making a move, they achieve success, create wealth, honor, and quicken the life of trade and commerce.

Belt Speed and Power.

We say that the amount of force transmitted by a belt of given width depends upon the speed of the belt; that if 600 feet per minute will give ten-horse power, then 1200 feet will give 20-horse power, and that if we only run the belt fast enough we could drive a whole machine-shop with a three-inch belt. This is a correct statement and may not appear at all difficult of comprehension, but unless we bear in mind that the increase of velocity must be accompanied with an increase of leverage, we may make a mistake.

In running a lathe with the belt on the slowest belt-speed, taking all the cut it will carry, suppose that we stop the feed, withdraw the tool and then change the belt to the next faster step on the cone, then we will have increased the speed of the belt; but if we undertake the same cut again, the belt will not carry it at all, because, although we have increased the speed of the belt, we have not increased its leverage. But if we now put in the back gearing, the leverage will be increased and the belt will carry a heavier cut than it did in the first instance.

Again, suppose the belt from the line shaft to the countershaft be too narrow for its work, we cannot increase its efficiency by running the line shaft faster; for, although that would make the belt run faster, it would not increase its leverage, or, in other words, it would not change its speed in relation to the speed of the work.

To make the narrow belt do an increased amount of work, or do its work easier, we must put a larger pulley on the line shaft, and also increase the size of the pulley on the countershaft in the same proportion. This will give the belt a greater distance to travel in the same time, and will give it a greater leverage, while the lathe and the line shaft will both run at the same speed that they did before the change of pulley; but the efficiency of the belt will be greater.—*Western Machinist.*

WORTH OF PERSEVERANCE.—In any line of business, says the *Scientific American*, the man who uses reasonable economy and has the ability to give fair management, and the perseverance to hold on, will in a great majority of cases make a success; while, on the other hand, the one who rushes into whatever he has undertaken with a spasmodic effort to win all at once, as a rule wastes his energies and often fails for sheer want of perseverance. The man who starts in to do a day's work, and attempts to do as much in one hour as ought to be done in two, will usually find it necessary to take a rest, and while he is resting will lose valuable time which he evidently feels that he ought to make up, judging from the spasmodic efforts he will make when he starts in to work again. But at night the man who works steadily and perseveringly will be found to have accomplished the most, while usually he will be found in a much better condition to commence again the next day. So it is in business. The man who is constantly shifting about is always making a change at the wrong time, when a little perseverance would have brought him through all right. In all lines of business there are fluctuations, ups and downs, and in order to succeed we must persevere. It is when the odds seem against us that it seems the most important to persevere.

A LABOR UNION VIEW OF PIECE WORK.—An organization composed of Pittsburg iron-molders recently refused to arrange with the employers to work by the piece, claiming that such an arrangement would be a violation of a rule of their union. The result was that large contracts were driven from Pittsburg and sent to establishments where the men were willing to adopt the method refused by the Pittsburg molders. In commenting on that fact the *Western Manufacturer* expressed the opinion that the policy of the Pittsburg workers was a most unwise one. The *Labor Tribune* apparently took the same view of the matter, as is shown in the following editorial clipped from the latest issue: "There should be no cast-iron rules governing in such matters. They work too often to the disadvantage of both employers and employes of union establishments. Besides, it has not been many years since piece work was regarded as the fairest and best all around. All tonnage work of the mills and mines is piece work, and the system is infinitely better than day wages. So is piece work wherever it can be employed, for it gives the industrious and skillful man his earnings, while the other way handicaps him by strapping the unskillful and not overly industrious on his back."

STEAM BOILER NOTES.

Improved Steam-Boiler Furnace.

The Hoperaft Furnace Company of Walbrook, London, is the proprietor of a new steam-boiler rotating furnace, which is self-feeding, self-maintaining and self-discharging. Only small or slack coal is used.

The construction of the furnace is described by the English correspondent of the *American Manufacturer* as follows:

The fuel, which is small coal, is charged into a hopper in front of the furnace, which is inclosed on account of the forced draught. From the bottom of the hopper a pipe rises with a gentle curve to the outside of the furnace. Inside this tube works an ingenious vertebrated archimedean screw, by which the coal is slowly fed upward into the center of the body of incandescent fuel in the grate. The grate, which is circular, consists of concentric rings of cast iron, with air spaces between them, and it slowly rotates on its axis, which is inclined toward the bridge at a slight angle. A supplementary grate is fitted beyond this, and receives and automatically discharges the clinkers, which are continuously delivered on to it by the circular grate. The inclination thus given to the grate beneficially directs the radiant heat of the fire toward the heating surface of the boiler, and promotes the uniform and constant distribution of the fuel, which tends to fall toward the lower level and is gradually elevated to the higher level in the course of the revolution of the grate.

The products of distillation—otherwise the smoke-producing constituents of the coal—having to pass up through the incandescent fuel on the grate, become highly heated, and, meeting with streams of atmospheric air which are also being forced through the incandescent fuel on the grate, ignite, producing brilliant flame. The residue of coke is burned on the grate, and forms the incandescent fuel which renders the process constant and regular so long as the furnace is at work, and so long as coal and air are supplied in due proportions.

The forced draught is supplied by a Sturtevant fan driven by a small auxiliary engine, which also drives the gearing for revolving the grate, the speed of which is about one revolution in five minutes. The air supply being in direct communication with, and controlled by, the coal feed, the relative proportion of air to coal remains practically constant whether 10 pounds or 40 pounds of coal are being consumed per square foot of grate surface per hour.

The trials made with the Hoporaft furnace prove that slack can be burned without smoke and at a saving of from 40 to 50 per cent, the engines indicating the same horse-power as when best Welch coal is used, under the continuous action of a steam blast in the fuel.

ECONOMY IN STEAM BOILERS.—Mr. Robert Scott of Newcastle-on-Tyne has constructed a new boiler, built upon new principles first experimentally utilized by him in the spring of 1886. At a recent trial common duff coals were used, costing 2s per ton, and with these a splendid fire was produced. The boiler with the fire-grate system would represent about 16-horse power, but, owing to the rapid generation of the steam under Mr. Scott's method, he claims that it is over 30-horse power. The inventor states that the system will save upward of 40 per cent in quantity of fuel, but, as the most inferior kinds of coal can be thoroughly utilized, the saving in money value varies from 40 to 75 per cent, according to the kinds of fuel used. An important feature of the system is the almost total absence of smoke, due to the completeness of the combustion; no ashes are produced; everything is consumed except the clinkers. Stoking and cleaning the furnace are easily accomplished. Mr. Scott is conducting further experiments, by which he hopes ultimately to make his process quite smokeless.

A NEW BOILER ARRANGEMENT.—A Russian engineer has arranged the fire tube of a horizontal boiler in such a manner that it may be removed in its entirety without any disturbance of the boiler end. The fire tube is of conical shape, and it has an approximately elliptical cross-section. Flanges are formed upon the ends, by means of which it is secured to the body of the boiler, the back flange on the small end of the fire tube abutting against the rear end of the boiler, and the larger end abutting on the outside of the front end. The opening in the front of the boiler for the admission of the fire tube is of sufficient size to allow of the insertion of the back flange, and after the bolts have been unfastened, the fire tube may be withdrawn without disturbing the body of the boiler itself. The fire tube is provided with vertical cylindrical tubes of small diameter, and by the oval cross-section of the fire tube a greater number of these cross tubes may be inserted than has been hitherto possible, and the heating surface increased in consequence.

THE WEAR AND CARE OF ENGINES.—Engines are subjected to two different kinds of wear. One is due entirely to the unavoidable friction of the working parts on each other; as, for instance, the brasses on the pins and journals, crosshead brasses on their guides, piston rings in the cylinders, eccentric straps, piston rods, valves, valve stems, packing, etc. The other is due to a nut, bolt, or key working loose, a brass working loose in a strap, or undue strain working a frame loose at a joint. An engine is generally designed so as to provide for the kind of wear first named, as it is well known and to be expected, and may go on to a considerable extent for quite a period of time without materially injuring either the engine or its working. But the second cannot be either expected or provided for, but when once discovered, it should be remedied at once. Experience has shown, says the *Safety Valve*, that the engine that runs smoothly, does its work silently and economically, is almost invariably a clean engine; the engine-room is clean, and where you find a clean engine you will generally find a competent engineer. The engine that pounds and groans as it does its work is nearly always dirty, in fact, filthy, is expensive, a nuisance, and is usually to be found in charge of a person whose chief concern is quitting-time and the weekly envelope. The piston of a steam engine is not at first sight a likely part to give way through explosion. But there are cases on record where hollow pistons, on being heated for removal from the rod, have unexpectedly exploded. Such explosions of hollow cast-iron pistons have recently been the subject of special attention in France, the fact appearing that no less than five such explosions have occurred in French workshops during the last 20 years in reheating these pistons. In examining into the interior of a piston that had been in use for 11 years, there was shown the existence of a brown substance containing fatty matter, oxide of iron, peroxide of iron, and carbon. From this it was supposed that a certain quantity of water had been forced into the cavity in service, either through the iron or through the imperfection in the plugs with which the original core-support cavities were filled. This water, in forming oxide of iron, set free its hydrogen, which filled the piston cavity, and as the recombination of this hydrogen with the oxygen at a low red heat would have the effect of producing such an explosion, it is suggested that this result may be prevented by being tapped before reheating.—*Western Machinist.*

FIRING BOILERS.—A correspondent of *Power* writes that paper as follows: "Last year I ran for three months wetting my coal enough to thoroughly dampen it, then threw it on the front of the furnace for a few minutes, broke it up, let it lie a few minutes longer, then shoveled it back and threw a fresh lot on. Then I tried firing one side of the furnace, let it lie a few minutes, then broke it up, and fired on the other side. I found this an advantage. It reduced the amount of smoke and I thought made a better fire. In both these cases I tried the coal both wet and dry, but could perceive no difference. I next tried throwing on a shovelful at a time as the fire needed it, and not breaking it up at all, except when I clean, which is once a day. Now you see very little smoke, and I think some saving in coal. And if my boiler was properly set (it being only about 20 inches from the grate bars) for burning soft coal, I do not think there would be any smoke. I am now running about the same amount of coal I did last year, and doing pretty nearly double the work, so there must be some saving by this mode of firing. And it is certainly a great saving in work, for all engineers know there is not much fun in slicing up and shoveling back a white hot fire."

ALUM IN BOILERS.—In regard to the use of alum in boilers, a correspondent says: "Alum of all kinds is a solvent for iron, dissolving it in appreciable amount. Ammonia alum is probably the most active, but potash alum is quite ready to attack iron. The chance of an accumulation of alum in a boiler is, therefore, very undesirable, and cases are not infrequent where the action is quite marked. In the case of a water containing much organic matter, as slaughter-house refuse or animal sewage, if alum was used in only just the right amount, the advantage might be marked in purifying the water, but the danger is that an excess will be used. Alum is itself a slightly acid salt, but the probability is that in the boiler it decomposes, the sulphuric acid in it removing the scale and eventually attacking the iron."

TRIPLE EXPANSION.—In discussing a paper on triple-expansion marine engines, recently read before an English engineering society, it was pointed out that in two ships alike in every respect except that the one has two-crank and the other three-crank engines, the consumption of coal per indicated horse-power is precisely the same, but that the three-crank engine drives its ship half a knot, or five per cent faster than the two-crank engine. This is a very important point, and one which has not been sufficiently dwelt on by marine engineers, because in discussing the relative merits of the two and three crank engine it has been practically limited to comparing the consumption of coal per indicated horse-power.

BOILER TESTING.—An "engineer" in charge of a boiler in New York, which he was operating without the required license, recently undertook to test his boiler with cold-water pressure from the hydrant. He had been running with 80-pounds pressure, at least that was the story the gauge told, but when he got the 60-pounds hydrant pressure on, he blew the tube sheet out. It was rather suggestive of what might have happened before with steam on; but then he worked cheap.

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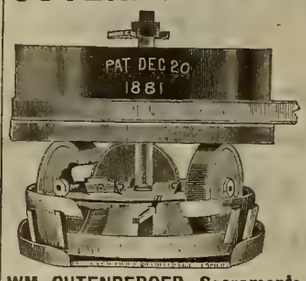

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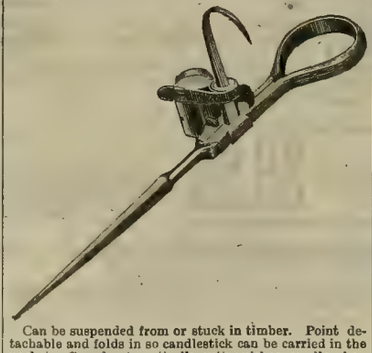

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Lower California Gold Mines.

The Excitement About the Santa Clara Placers.

The Lower California gold excitement still continues, and hundreds of people are now on the road there to add to the numbers already on the ground. The steamers from San Diego are crowded with gold-hunters and the road from Tia Juana is lined with teams loaded with provisions and men on their way to the mines. The trains from Los Angeles southward are crowded and the excitement seems to have been imparted to all classes of people in the southern part of the State.

Although partly placer ground, it is now known that this is not a poor man's camp, as provisions and all necessaries are very high in price. Late news from there warns poor men to keep away. The rich placers will, it is said, last but a few weeks, and though considerable gold has been taken out, many persons agree that the accounts have been much exaggerated.

It would be impossible in the space at our disposal to publish all the statements made concerning the mines. In our Mining Summary, on another page, are given the views of several correspondents; and we print also a map of the district and the routes thereto, with a picture of Ensenada, the Mexican port where the California steamers land.

Judging from the columns of matter published in the San Diego papers, half the population of that section must have left or be about to leave for the mines. It is claimed by some of these papers that the placers and quartz leads are the richest ever found on this coast. During the past few weeks nuggets were searched for on dry ground with some success, several hundred holes having been dug.

The section where the mines are found has long been known to be rich in gold, and has afforded for many years a living for 100 or more Mexicans. The recent rich spots found have caused the excitement which has been increased by the highly-colored published accounts.

Three quartz mines, with good prospects, have been found within six or eight miles of the placers. The Mexicans and Indians are not working with water, but are scraping around in the crevices in the rock. They dig out a large hole to bedrock, then scratch in the dirt with spoons for nuggets. On the other hand, the Americans use a rocker and gold-pan, or, in the absence of a rocker, the pan alone. Water is not plentiful, and before long drywashers will have to be used.

Mr. F. J. Shemler, who visited the camp a week ago, says that the gulches are nothing more than water-courses, which are perfectly dry in the summer, but in the winter are often raging torrents. The beds of these streams are composed of black sand, gravel and bowlders washed down from the mountains. The most successful miners are Mexicans, who simply work among the bowlders, gathering the coarse gold, and the majority are making money. The gold found in the gulches is either float or scale gold, and there is every indication that it has been washed from the mountains at the head of the gulches. A number of quartz claims have been located on either side of the creeks, but the most important ledge has been discovered at the head of American gulch, and located by miners in the employ of a San Francisco mining company. Eight fine specimens show good samples of wire gold, while the remaining ones are fine-milling ore. The veins thus far opened up show good milling ore to a depth of ten feet, the ledge having a pitch of 42½ degrees. The camp is fast filling up with a class of men who have just about money enough to get into camp with, and as they know nothing about mining, they soon become discouraged. In his opinion there are good mines in the new district, but the precious metal will be found in the mountains in gold-bearing rock, which it will take capital to work. The first money spent must be for water, and after this is done stamp-mills will have to be erected. He expects to return to the mines at once, secure a water-right for his company, and then erect a mill and commence work. Mr. Shemler advises all poor men and those not practical miners to remain away, at least for the present, as provisions are scarce and every inch of ground is taken where there is the least prospect of securing gold in the placer diggings.

A party which returned from Ensenada to Los Angeles on the 12th say that the whole excitement has been arranged by colonization and railroad companies. There is no doubt, however, about gold having been found in both placers and quartz. There is little doubt, too, that the richness of the district has been exaggerated. Miners who have returned this week bring discouraging reports and say that in a few days the homeward pilgrimage will commence. A correspondent of one of the San Francisco dailies writes that the majority who are leaving the camp have not given it a fair show. "They came with enthusiasm, and for a few hours worked like beavers, but not turning up gold like a farmer's plow turns up the sod, sat down and declared that the camp was no good and all that was written about it false. There are two long gulches bearing gold from end to end. I have discovered within the past few days that Mexicans were working the mines months before the strike was known to the outside world. Most of them are big paying claims. I know several Mexicans who are taking out on an average $50 a day, while a great many work pretty hard and do not average $5 a day. I think it safe to say that there are 200 men with picks, shovels and pans skirmishing all over the camp who do not make salt. These people are 'coyoters,' who work a claim about half-way to bedrock and then desert it. There are good claims and barren ones adjoining each other, and many hard-working men dig away for days without striking color, while their neighbors are panning out pay dirt right along."

The indications from the gold-fields are that the country is overrun with people, the placer area is too small to warrant a rush and ledge mining too slow for anxious people. The consensus of opinion of those who have returned is that the output is confined to quartz leads, it is not a poor man's camp, and that too many people are there now. Water is getting scarce and the Mexicans are corraling everything. Other reports, which are just as encouraging as before, make it difficult to get at the truth.

Mr. Harry N. Cannon, who is at the mines, writes to the *Examiner* of the 13th that the telegraphic report stating that $400 had been taken out by one man in a day is incorrect, nor, says he, has any man taken out $75 or $80 in a day. There is room for only about 100 men to work in the placers, and they make fair wages while water lasts. But in a few months there will be no water, and then no work can be done.

Judging from all the conflicting reports, it appears that there is placer ground, but not very much; that water is scarce and will be scarcer; that some of the quartz veins found give very good indications; that too many men are there already; that provisions are expensive, and that while the camp may do well enough for men with money, it is no place for poor men to go.

Legislative.

The Assembly bill appropriating $160,000 for additional jute-mill buildings at San Quentin prison, has been indefinitely postponed.

The Governor has vetoed the bill requiring the Prison Directors to close down the sash and door factory on the ground that this had already been done by the directors at the Governor's suggestion, and that the power to regulate such matters is inherent in the directors under the Constitution.

The Governor has signed the bill for a State Reform School for juvenile offenders; also establishing an Insane Asylum in Southern California; also creating Orange county; also making an appropriation for a State mineral cabinet; also for an electric plant to utilize the American river at Folsom; also for a fence around the Marshall monument.

In the Senate, the Assembly concurrent resolution asking our Congressmen to take action to secure the granting of the entire watershed of the Yosemite valley to the State, and the election by the Legislature of a board of three salaried commissioners, has been read and placed on file.

A concurrent resolution has been adopted asking the President to open up to settlement large tracts of agricultural land heretofore claimed as desert land and withdrawn from the market by a former Secretary of the Interior.

A long discussion was had on the Senate amendment increasing the appropriation for the State Mining Bureau to $100,000 from $60,000. The amendment was finally concurred in. The bill appropriates $70,000 for the Geological Survey work in the field, and $30,000 for the support of the Bureau. This is $40,000 more than was voted by the last Legislature.

The Diltz Mine.

Capt. John S. Diltz writes us from Mariposa that his mine now looks better than ever and is evidently of greater value. Although he has had but little water to prospect, a glimpse can now be had of what there is in the mountain. It would be impossible to find out the extent of the deposit without water to wash off the surface and expose the under layers of quartz. The whole paying vein-matter is in porphyry and the quartz stringers in the placers run some 200 feet from the hanging-wall. Little quartz has been milled, though the best that has shown free gold has been pounded out in a hand-mortar. The greater bulk of the vein matter lies under the hanging-wall. Capt. Diltz says if he can sell 1250 feet of his patented ground for a fair price he will go to Pittsburg for iron pipe and bring in water to work the ground. Capt. Diltz has very peculiar mining ground, both quartz and placer combined, but he has not had capital to properly work the deposit. He has owned the ground for many years and occasionally comes across some very rich spots. It would cost about $30,000 to bring water from Snow creek to the Diltz and the Whitlock mines, both of which could then be worked extensively.

SCARCITY of water, either in the Carson river or at the disposal of the water company, will cut no figure in curtailing the bullion yield of the Con. California and Virginia mine, as the management will operate the California mill by steam when the water supply falls short. The ore reserves in the mine are ample to keep the California and Morgan mill stamps in full operation for many months.

A NEW chemical laboratory to cost $68,690 will be built at the State University, Berkeley.

Death of Carlton Newman.

It is with sincere regret that we have to record the sudden death of Carlton Newman, president of the San Francisco Glass Works. Mr. Newman was suddenly stricken down when in apparently good health. He was out on business on the evening of Friday, the 7th inst., and returned home slightly indisposed. He rested well that night, but arose in the morning feeling still more unwell. His trouble appeared to be in his respiratory organs, coupled with weakness and irregularity of pulse. These symptoms grew rapidly worse until about 1 o'clock, when he died from failure of action of the heart.

Mr. Newman arrived in San Francisco in 1862. He had already acquired a thorough knowledge of the glass manufacturing business in Pittsburg, and upon his arrival here saw an opportunity to build up that industry in this city. He started on a small scale at the corner of Rich and Townsend streets, but inside of two years his works were totally destroyed by fire, and he was left penniless. But nothing daunted, he immediately went to work with his friends and soon re-established himself again in the same business. From that time to the time of his death he has prospered, and built up a large and important industry, which now ranks among the most flourishing in the city.

In a short time after his second start he effected a consolidation with the Pacific Glass Works. At the time of his death he was sole proprietor of the extensive works under his charge. He was an inventor early in life, and secured the means of reaching this coast by the sale of two inventions. Mr. Newman was born in Wheeling, West Virginia, June 26, 1829. His life since he reached manhood has been one of busy and successful industry, and he largely enjoyed the respect and confidence of all with whom he came in contact. He was a man of warm and general impulse; manly and outspoken in all things. He fulfilled all the precepts of practical religion. Liberal in all things, there was nothing of narrowness about him either in religion, politics or social life. As an evidence of the estimation in which he was held by his employes, we need but refer to the fact that nearly all were present in a body at the last solemn rites over his remains.

Mr. Newman was an active member of the Manufacturers' Association of this city, and had just been elected a Director of the Mechanics' Institute. He was a Royal Arch Mason and member of Occidental Lodge of this city. He was also an Odd Fellow and member of several beneficiary associations. He leaves a widow, one son and three daughters—all of the latter married. He left two half-brothers, one Wm. H. Murray of the *Journal of Commerce* of this city and the other in business in Chicago. He was buried in accordance with the beautiful and impressive rites of the Masonic ritual. Notwithstanding the stormy character of the day, the large hall of the Masonic Temple was crowded by those who sought to do honor to his memory by their presence at the last sad rites which consigned to the earth all that was mortal of Carlton Newman.

LOS ANGELES MINES.—Messrs. Johnson, Dunham & Crow of Los Angeles have bought about 2000 acres of placer mining land, also Richard Kitchline's interests in three quartz leads 12 miles northwest of Newhall. They leave for San Francisco to purchase necessary machinery to reduce the quartz. Late assays and mill tests show very satisfactory results. These gentlemen seem well satisfied with their purchase.—*Los Angeles Times.* [We are informed that this item refers to the "Cora Belle" mining interests. It may be remembered that the "Cora Belle" was "wrecked" by bad management and bickering among the owners a short time ago. Interest has, however, been revived in the region referred to.—EDS. PRESS.]

ELECTRIC-POWER TRANSMISSION. — The Truckee *Republican* is authority for the statement that 18,000 acres of land have been bonded along the Truckee river for the purpose of erecting mammoth electrical works at a point near Bronco, between 17 and 18 miles distant from the Comstock. These electric works are for the purpose of transmitting on copper wires to the Comstock the water-power of the Truckee river to operate stamp-mills and to hoist ore from the mines.

BARNEY PRICE, who died at Virginia, Nev., last week, was a well-known mining man in Nevada. In the early days he was foreman of the Challenge. He was foreman of a mine at Treasure Hill, White Pine, for the California bank; also for U. S. Senator George Hearst at Belmont, Nye county, where he had charge of the Monitor and Canfield mines. At Candelaria he was superintendent of the Northern Belle.

THE STAR MINING AND REDUCTION CO. held a meeting in Helena, M. T., on March 5th, and elected the following trustees: Henry Klein (Pres.), John M. Shopp, (V. P.), Walter N. Granger (Sec'y), Albert Kleinschmidt (Treas.), J. L. Waggoner (Gen'l Manager), and Adolph Hiberlein (Ass't Manager). They commence work in a few days, bringing out concentrates. Messrs. Klein, Kleinschmidt and Shopp leave shortly for the mine.

WM. IRELAN, JR., has been reappointed State Mineralogist of California by Governor Waterman.

[SPECIAL NOTICE.]

Bakersfield and Kern County Attractions.

A Desert Converted Into Fruitful Farms by Irrigation.

[By R. M. E.]

Many eyes are now turned to Kern county, in the extreme southern portion of the San Joaquin valley, the southern part of Central California, where 1,250,000 acres of fertile land await the settler. For years the development of this splendid county has been checked because the parties holding the land would not sell. Now the fiat has gone forth to put the property on the market, and colonists are rushing in to get the lands before they are all purchased. A fine system of irrigating ditches is supplied from Kern, Buena Vista, Tulare and Goose lakes. In addition to these abundant sources of water supply, artesian water is obtained at a depth of 200 feet or upward. The highest mountain in the United States, Mt. Whitney, 15,056 feet, together with other lofty peaks, sheds its melting snows into the Kern valley, but the waters of the Kern river alone are capable of irrigating all the valley, if properly stored and preserved.

Progress.

About fifteen years ago, outside of Bakersfield, the county seat, there were not a dozen families and the valley was considered barren, but this land was waiting for water. The debris of the mountains contains the elements of tree and plant life, and water transforms it like the touch of a fairy's wand. The mountains in that vicinity are composed of friable granite constantly disintegrating, and the river flows over gypsum beds which are worn away and and deposited on the sands. The total value of all county property last year was $8,990,521, or a gain in one year of $2,649,582.

Products.

Alfalfa is the staple crop. The rich fields of this valuable forage plant yield from eight to ten tons per acre annually, besides furnishing some pasturage. Wheat and barley thrive. The products of this county include cotton and sweet potatoes, melons and delicious fruits of which the grapes in our cut on page 249 of this issue are a fair sample. This is a mammoth variety of the Black Hamburg and is taken from a photograph of a vine in Bakersfield, whose immense clusters give but an imperfect idea of the fertility of this region. Corn, planted in rotation with wheat or barley, and as late as July, yields 60 bushels to the acre, but if planted in April, twice that quantity. Here are grown citrus, nut-bearing and deciduous fruits. When six years old the pecan bears in Kern, which is something remarkable, oranges flourish and it is an Eden for flowers, over 200 varieties of the rose alone being grown there. Chestnuts, prunes, quinces, small fruits, pomegranates, apples, pears, apricots, plums, nectarines, walnuts, butternuts, mulberries, figs, persimmons and olives, together with grain and vegetables, afford a variety of foods to the settler, while an abundance of forest trees provide a cheap fuel. Dairying is an important industry and the county is regarded as one of the best for poultry, the products being rapidly disposed of in San Francisco and Los Angeles. The alluvial soil with a sprinkling of alkali is excellent for beets. Mangel-wurzel on the Lakeside ranch stood 2½ feet above ground and averaged one ton in weight to 100.

The Chief Town

Is Bakersfield with five hotels and three churches, six general stores, ten fraternal societies, with an assurance of a Grange of the P. of H., which will make eleven, four dry-goods stores, four variety, two book stores, etc., etc. One hotel, the Southern, will cost $1,000,000; the Masonic temple cost $30,000; water-works and a first-class fire department make this an attractive residence spot. Sumner, connected by a car line with business center, only one-half mile distant, may be reckoned as virtually the same town. Delano, 32 miles west, on the S. P. R. R., and about the same distance from Tulare, has a good future. Other stations and settlements offer special advantages, but we lack the space to describe them. Suffice it to say there are 39 school districts, and the examinations are so rigorous that only about 20 per cent of the teachers can pass and obtain their certificates. In addition to the abovenamed advantages, this county is notably rich in gold and silver, copper, fire-brick clay, limestone, marble, petroleum, building and lithographic stones, and evidences have been found of the existence of iron, coal and quicksilver.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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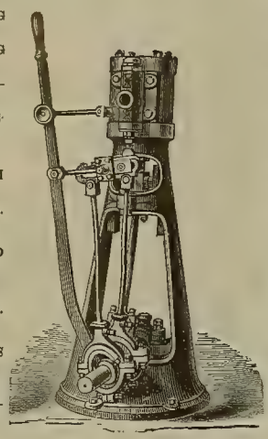

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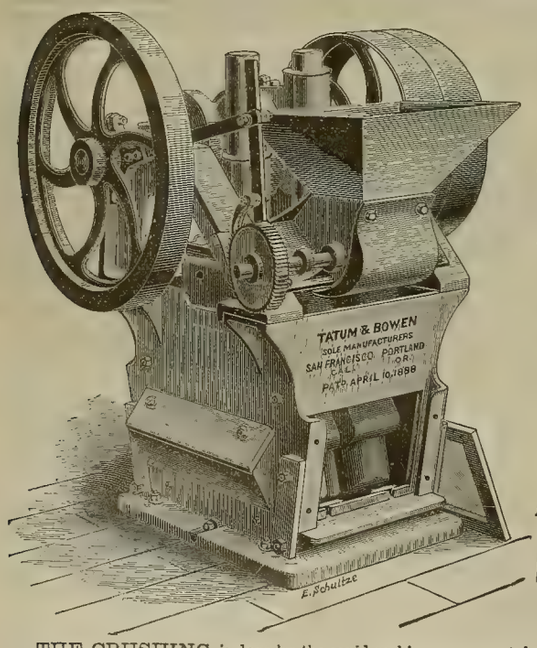

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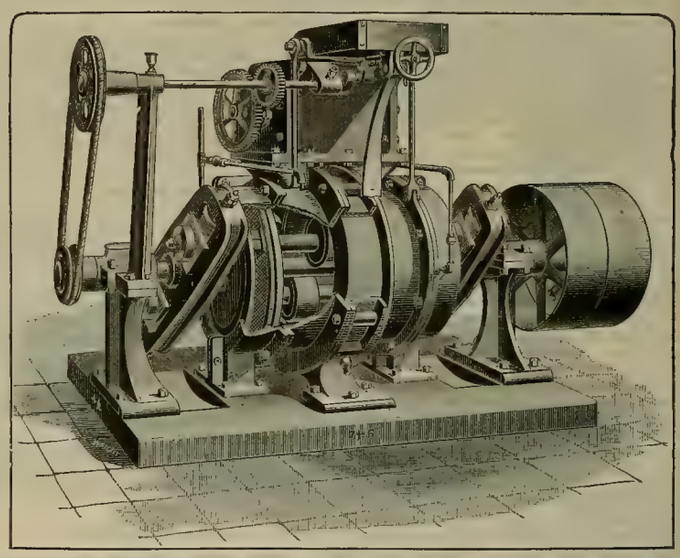

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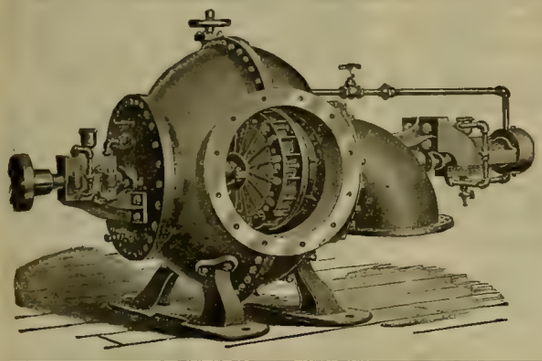

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

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Springfield, Ohio, or 110 Liberty St., New York.

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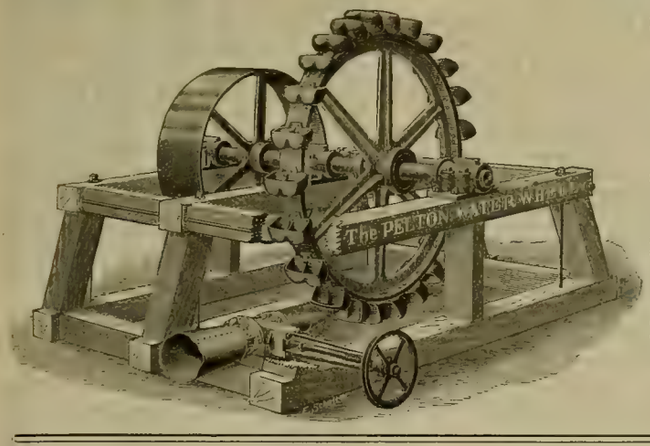

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GIVES THE

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A MARVEL OF ENERGY AND POWER.

Over 600 in use on the Pacific Coast alone, aggregating upwards of 50,000 Horse Power.

It is not only most economical of water, but the most simple and reliable power for Quartz Mills, Compressors, Hoisting, Pumping, or any other purpose where water power can be used.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long distances with small loss, and it is now being extensively used in this way in all parts of the country for producing both light and power.

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For further particulars address

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SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

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GOLD AND SILVER REFINERY And Assay Office.

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We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we fee confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

☞ Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

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Nevada Metallurgical Works.
NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.
C. A. LUCKHARDT, Manager. ESTABLISHED 1869.

Ores worked by any Process.
Ores Sampled.
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Working Tests (practical) Made.
Plans and Specifications furnished for th most suitable Process for Working Ores.
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Ores Sampled and Assayed, and Tests made by my Process.
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BATTERY SCREENS.

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I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

PERFORATED SHEET METAL

For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass Zinc and other metals punched for all uses.

Inventor and Manufacturer of the celebrated Slot Cut burred and Slot Punched Screens.

Mining Screens a specialty, from No. 1 to 15 (fine).

Orders promptly attended to.

San Francisco Pioneer Screen Works,
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JOHN W. QUICK, Proprietor.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dorety, 529 Commercial St., S. F.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, March 14, 1889.

The local money market is working to more general ease. The rains of the week, visiting as they did all sections of the State, give assurance at any rate of good grain crops, and with the usual April rains very large crops are an important factor in creating more ease in the money market by inspiring the more timid capitalists with a greater feeling of confidence, which naturally results in their willingness to place money on term loans to the best advantage, rather than keep it idle. After the storms and a general cleaning up, it is claimed by the well-informed that many contemplated improvements and new ventures will be put into force, which will necessarily have a directly favorable bearing on trade and also on all industries. So far there is very little call for money, either for legitimate or speculative purposes, but a more active demand is looked for in the near future.

In grain futures the dealings on Call the past week partook of a timid character, as if operators were feeling their way. The rains and ships are having a decided bearing on the market.

In local securities, trading the past week was quite active, with Spring Valley Water stock apparently the favorite. There is a feeling among the usually well-informed that the inside manipulators of the stock are trying to break it to still lower figures. It is also thought that the Hawaiian Commercial stock is well out on the public, as is that of two or three other incorporated companies' stock.

The value of foreign imports into this port last month was $4,705,166.

The last steamer leaving for China took Mexican dollars valued at $37,120, gold coin $13,713, gold dust $200, and silver bullion $212,000. Of the latter, $95,000 was for Bombay and $117,000 for Shanghai.

For the week ending March 9th there were loaned in this city on realty $275,272. The lowest rate of interest from banks was 6 per cent per annum and the highest 7 per cent.

Quicksilver is slow at the recent decline. Refined borax is reported to be scarce. Pig lead, after advancing to $3.75, fell back to $3.72½, closing easy. Copper is slow. Holders are unwilling to make further concessions. The market appears to be shaping into a better position. Pig tin is without particular change. The demand is said to be improving.

Capt. Curtis and Col. R. F. Morrow returned the past week from a visit to the Comstock. They are both reported to speak very hopefully of the Gold Hill group of mines. The former person was sent as an expert to report on the Confidence and Challenge mines.

SILVER—The market held fairly steady throughout the past week at from 92⅝@93c, the most of the sales being at the latter figure. The market is reported to be quiet, with the stock gradually increasing. As yet, the output of bullion is no larger, but an increase is looked for in the near future. This opinion is grounded on authentic advices of heavy snowstorms in the mountain ranges, and increasing supplies of water for mill motive-power.

QUICKSILVER—The market is slow. Receipts are light, owing to the bad roads.

COPPER—Contrary to expectations, copper has not receded much. It was generally thought that the price would go down below 14c. The controllers and agents of the American mines are reported to be in New York arranging for future operations. Col. Ranlett of this city is now there in the interests of the mines on this coast that he represents.

COAL—The market shows quite a reduction in West Hartley, Scotch splint and Liverpool steam for prompt shipment. The decline is said to be due to the arrival of a large number of American vessels in Liverpool, and their being attracted to this port by reports of good crop prospects. To get cargoes they offer to take in coal at a less rate of freight. It is very generally claimed that the number of vessels on berth to load Australian coal for this port has increased quite largely, but that information on the subject is kept quiet, probably for freight speculative purposes. It is stated that the low prices ruling for coal has induced the coast collieries to reduce their output on an average fully one-third.

IRON—The market continues heavy. Consumers buy in a hand-to-mouth way. They are induced to enter the market by concessions on asking prices. This refers to spot to arrive and also for shipment. The large supply of available tonnage in England has caused lower freights to be quoted from there to this coast. The English iron market is reported very strong, as are the Eastern markets.

LEAD—The market is without change. The demand continues fair.

TIN—On last Friday the market for coke tinplate jumped up to $6 upon a report of a vessel bound for this port, with large invoices, being compelled to put into a port in one of the Falkland islands. This advance was maintained for a short time only, for it was soon made known that another vessel with large consignments is nearly due, while imports by rail from the East can be made for less money. Pig tin has a firmer, stronger tone. The English market is slightly firmer.

Coal.

TO LOAD.

	Per Ton.		Per Ton
Australian	$ 6 50 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Sydney	$ 9 00
Scotch Splint	9 00	Gilman	7 00
West Hartley	10 00	Seattle	7 00
Greta	9 00	Coos Bay	6 00
Westminster Brymbo	9 00	Cannel	10 00
Nanaimo	9 00		

San Francisco Metal Market.

WHOLESALE.

THURSDAY, March 14, 1889.

ANTIMONY	13 @ 14
BORAX—Refined	7¾@ 7¾
Powdered	7¾@ 7¾
Concentrated	6¾@ 7¾
COPPER—	
Bolt	26 @ 27
Sheathing	26 @ —
Ingot	18 00 @19 00
Fire Box Sheets	— @ 26
IRON—Glengarnock ton	27 @ —
Eglinton, ton	26 @ —
American Soft, No. 1, ton	— @31 00
Oregon Pig, ton	— @30 00
Clay Lane White	— @24 50
Shotts, No. 1	— @28 50
Bar Iron (base price) ₰ lb	2¾@ 3
Chrome iron ore, ₰ ton	00 @10 00
LEAD—Pig	4¾@ —
Bar	5 @ —
Sheet	8 @ —
Pipe	7 @ —
Shot, discount 10% on 500 bags Drop, ₰ bag	1 55 @ —
Buck, ₰ bag	1 75 @ —
Chilled, do	1 95 @ —
STEEL—English, lb	16 @ 20
Canton tool	9¼@ —
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Toe Calk	4¼@ —
TINPLATE—Coke, prompt shipment	4 95 @ 5 00
Coke on spot	5 50 @ 5 75
Charcoal, 14x20	6 50 @ 7 00
do roofing, 14x20	5 37½@ 5 50
Pig tin, ₰ lb	22¾@ 23
QUICKSILVER—By the flask	41 00 @41 50
Flasks, new	1 05 @ —
Flasks, old	85 @ —
COKE—English, ton, spot	20 00 @— —
Do, do, to load	13 50 @13 75

Eastern Metal Markets.

By Telegraph.

NEW YORK, March 14, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42½	92¾	$15 75	$3 72½	$21 40
Friday	42½	92¾	15 40	3 72½	21 50
Saturday	42½	93	15 25	3 75	21 30
Monday	42½	93	15 50	3 75	21 30
Tuesday	42½	93	15 50	3 75	21 30
Wednesday	42½	93	15 50	3 72½	21 30

Mining Share Market.

In mining stock the Tuscaroras have held up fairly well, as if the manipulators are floating all they can on the basis of present prices. The Bodie and Quijotoa stocks are being depressed and kept at low figures, notwithstanding news from the leading mines in the two districts is of a very favorable character. The impression in certain quarters is that some blocks of the stocks are out which insiders are desirous of securing. In the Comstock stocks the movements of the market warrant the belief that inside manipulators are about ready for a short but active campaign. There does not appear to be any doubt but the late and unwarranted depression brought in large lines of stock which have enabled the inside to concentrate on certain stocks so as to enable them to peddle their "goods" out on the public. In this they will be greatly aided by more water in the Carson river, large deposits of snow on the mountain ranges and in several of the mines, work being about ready for stoping out higher-grade ore. More milling facilities, increased bullion production, more dividends and reports of important ore strikes are important factors in allowing the inside to load up the public with cheap stock at high prices. Private and seemingly reliable advices report an important improvement in the Mexican crosscut on the 1465-foot level, that in both the upraise and winze in Ophir on the 1465-foot level, the ore development is proving more valuable than before claimed. In Union, crosscutting is to be started soon. Con. Virginia is said to be richer in mineral ore than at any time since 1886. In Crown Point they are stoping out ore for milling, which assays from $25 to $45 a ton. This will be milled as soon as they are through with low-grade ore now being milled. In this mine they are getting into rich ore on the 600, 700, and 800 levels. They have trebled the number of miners at work in the mine within the past three weeks. Reports of important work in other mines are afloat, but authentic information is hard to get at this writing. The official reports made at the annual meeting of Hale and Norcross and Potosi are of a very encouraging character to stockholders, particularly holders of the former. They confirm advices heretofore published in these columns.

Con. Virginia carried over a surplus of $90,000 from February into the March account.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

UNION PRESSED BRICK AND TERRA COTTA CO., March 12. Capital stock $200,000. Directors—John H. Wise, H. T. Scott, O. E. Moore, Charles H. Frost, T. H. Downing, S. G. Hilborn and W. C. Price.

MISSION HOME AND LOAN ASSOCIATION. Capital stock $1,000,000. Directors—D. Richards, C. W. Taber, J. H. Dawson, A. B. Maguire, H. H. Mayhew, W. T. Barnes, J. H. Grady, S. H. Brown and G. E. McPherson.

MIDAS G. M. CO., March 13. Location, California. Capital stock, $300,000. Directors—S. T. Lawton, A. Halsey, T. Donohue, G. W. Cox, John A. Thomas.

HILLER DRUG CO., March 13. Object, to manufacture and sell medicines. Capital stock, $500,000. Directors—F. Hiller, Geo. T. Marsh, William Gruenhager, A. B. Kinne and George G. Gould.

SAN FRANCISCO COAL AND BITUMINOUS ROCK CO., March 13. Location, Contra Costa Co. Capital stock, $1,000,000. Directors—J. F. Turner, J. W. Brown, P. B. Nagle, R. S. Sterrett and M. S. Knoll.

THE California miner, Squire, who recently called at the Philadelphia Mint for 104 ounces of gold dust he left there in 1855, has finally obtained his money. The ink on the certificate of deposit had faded, which made some difficulty.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS
Baltimore S M Co	Nevada	4	25	Feb 4	Mar 8	Mar 26	A R Grim	402 Montgomery St
Belcher S M Co	Nevada	37	50	Feb 19	Mar 25	Apr 12	J Crockett	327 Pine St
Con Pacific M Co	California	10	15	Feb 5	Mar 11	Apr 3	F E Lutz	330 Pine St
Crocker M Co	Arizonia	6	10	Feb 25	Apr 2	Apr 24	A Waterman	309 Montgomery St
Christy M Co	Utah	1	10	Feb 20	Mar 25	Apr 15	G R Spinney	310 Pine St
Golden Prize Con M Co	Nevada	2	30	Feb 16	Mar 20	Apr 10	C D Bennett	328 Montgomery St
Gray Eagle M Co	California	11	03	Jan 23	Feb 26	Mar 19	O H Bogart	327 Pine St
Julia Con M Co	Nevada	23	10	Jan 30	Mar 7	Mar 28	J Stadfeldt Jr	309 Montgomery St
Lapanter Con M Co	Nevada	1	03	Feb 23	Apr 5	Apr 25	J Stadfeld Jr	309 Montgomery St
Martin White M Co	Nevada	22	25	Jan 19	Mar 6	Mar 26	A B Cooper	325 Montgomery St
Mexican M Co	Nevada	37	25	Mar 5	Apr 10	Apr 30	C E Elliott	309 Montgomery St
Mono M Co	California	27	50	Feb 28	May 8	B L Burling		309 Montgomery St
North Peer G & S M Co	Arizona	5	05	Feb 25	Apr 1	Apr 24	H Deas	309 Montgomery St
New Coso M Co	California	22	30	Feb 5	Mar 14	Apr 1	J L Hunt	303 Montgomery St
Oak Con M Co	California	1	03	Feb 25	Apr 8	Apr 23	E J Ryan	230 Montgomery St
Peer M Co	Arizona	7	10	Jan 28	Mar 5	Mar 28	A Waterman	309 Montgomery St
Piedmont M Co	Nevada	1	05	Jan 28	Mar 6	Mar 27	J J Scoville	309 Montgomery St
St Louis M Co	Nevada	2	05	Jan 14	Feb 18	Mar 16	W E Dean	309 Montgomery St
Scott Bar M & M Co	California	2	10	Jan 23	Feb 28	Mar 19	H Pink	318 Pine St
Sierra Nevada M Co	Nevada	94	25	Mar 5	Apr 9	Apr 29	E L Parker	309 Montgomery St
Utah Con M Co	Nevada	6	25	Mar 5	Apr 10	Apr 29	A H Fish	309 Montgomery St
Western Belle M Co	Nevada	1	20	Jan 24	Mar 1	Mar 21	J H Sayre	328 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Chollar M Co	Nevada	C E Elliott	309 Montgomery St	Annual	Mar 20
Hale & Norcross S M Co	Nevada	E B Holmes	309 Montgomery St	Annual	Mar 13

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	Mar 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Mar 1
Idaho M Co	California		Grass Valley	7.50	Mar 6
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents in DEWEY & CO.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING MARCH 5, 1889.

398,936.—GRINDING PAN—M. P. Boss, S. F.

398,937.—ROTARY HARROW — A. C. Brown, Eugene City, Ogn.

398,942.—SAWMILL SET WORKS—F. W. Cook, S. F.

398,967.—MAIL-BAG FASTENING—Jos. Jacobs, S. F.

399,065.—COIN ADJUSTER—Geo. McLoughlin, Carson, Nev.

399,209.—ELECTRIC AMALGAMATOR—J. H. Rae, S. F.

398,989.—WRENCH—J. Tomlinson, Folsom, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SAWMILL SET WORKS.—Frederick W. Cook, S. F. No. 398,942. Dated March 5, 1889. This is an improvement in those set works by which the knees or standards are properly controlled and adjusted. The invention consists in novel constructions and combinations.

MAIL-BAG FASTENING.—Joseph Jacobs, S. F. No. 398,967. Dated March 5, 1889. The object of this invention is to provide a simple and effective fastening for mail bags which can be rapidly operated and is not liable to get out of order. The tag or destination-card can be readily inserted in place and is held securely by the same operation which completes the main fastening of the bag. The tag is in the most convenient place for reference at all times, whether the bag be full or whether the flap be turned inside the mouth of the bag when ready to receive mail matter.

ORE-GRINDING PAN.—M. P. Boss, S. F. No. 398,936. Dated March 5, 1889. This is a pan for grinding ore in which a muller rotates within the pan and crushes the ore between its shoes and the dies of the pan. The pulp is fed into the center of the muller and is confined therein. It thence passes down and is directed by inclined grooves to and between the shoe and die, and thence, being ground, passes directly out of the pan through an opening in the base of the pan-rim, no plug being used as in ordinary pans. This is the only course open for the pulp. It can pass out in no other way but between the shoe and die, and therefore every bit of it is once subjected to the grinding action, and once only. In many of the ordinary pans the pulp is fed into and fills the pan itself, and some portions may pass between the shoes and dies many times before other portions are subjected to the grinding action at all; but in this pan the shape of the muller so confines and directs the pulp that every bit of it is ground successively in its passage to the discharge.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Savage, March 9, $16,837; Peerless, 9, $7170; Cons. California and Virginia, 9, $96,146; Hale and Norcross (for February), $68,500; Savage (for February), $27,878; Hanauer, 6, $2100, 7 $2200, 8 $2100; Hale and Norcross, 13, $19,361; Navajo, 13, $8000.

SOME of the sulphurets from Nicolia, B. C., have been treated in San Francisco, and averaged $150 per ton. Some rich ore is now coming out of the Tubal Cain mine of the Nicolia Mining Co.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 21.		WEEK ENDING Feb. 28.		WEEK ENDING Mar. 7.		WEEK ENDING Mar. 14.	
Alpha	1.55	2.10	2.05	2.30	1.90	2.3	1.75	1 90
Alta	1.95	2.20	2.15	2.50	1.90	2.10	1.80	1.90
Andes	.80	.95	.90	1.00	.90	1.00	.85	.90
Argenta	....	....	....	.10	....	....	....	....
Belcher	2.65	3.15	3.05	3.50	3.10	3.65	1.75	3.00
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	4.25	4.90	4.70	5.25	4.35	5¼	4.05	4.35
Bullion	.80	1.05	1.00	1.10	.90	1.00	.85	.90
Baltimore	....	.20	.20	.30	.20	.30	.20	.40
Belle Isle	....	.35	....	....	....	....	....	....
Bodie Con	1.50	1.60	1.50	1.65	1.35	1.65	1.25	1.30
Benton	....	....	....	....	3.00	3.50	....	3.50
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.45	.50	....	.50	.40	.50	.30	35
Con. Va. & Cal	7.50	7⅞	8.00	8.50	7⅞	7.50	7.50	7.75
Challenge	3.80	4.10	4.50	5⅜	4.60	6¼	4.15	4.55
Champion	....	....	....	....	....	....	....	....
Chollar	2.35	2.80	2 05	3.10	2.55	3.15	2.40	2 65
Confidence	13	14	14	16¼	11	16	13¼	13⅜
Con. Imperial	.60	.70	.70	.80	.70	.80	.65	.85
Caledonia	.35	.40	....	.40	....	.40	....	.35
Con. Pacific	....	....	....	....	....	....	....	.20
Crown Point	3.80	4.90	5.00	6¾	5.25	6¼	4 35	5¼
Crocker	.50	.75	.60	.75	.55	.60	.35	.55
Central	....	....	....	....	....	....	....	....
Dudley	....	.15	....	....	....	....	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	....	....	....	....	2.00	....	2.10
Exchequer	.80	1.00	1.00	1.15	.95	1.05	.80	.95
Grand Prize	1.20	1.30	1.05	1.10	1.00	1.10	.80	1.00
Gould & Curry	2.55	2.8	2.80	3.20	2 65	3.10	2.45	2.60
Hale & Norcross	3.75	4.10	3.85	4.25	3.85	4.40	3.70	3.90
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	....	.25	.25	.30	....	.25	....	....
Justice	1.50	1.75	1.60	1.85	1.60	1.75	1.45	1 60
Kentuck	1.90	2.10	2.25	2.35	2.15	2.30	1.85	2.00
Lady Wash	.35	.40	.40	.45	.35	.40	.30	.35
Martin White	....	....	....	....	....	....	....	....
Mono	....	1.00	....	1 05	....	.85	.55	.60
Mexican	2.80	3.60	3.20	4.20	3.50	4.10	3.35	3 65
Mt. Diablo	....	....	....	....	....	....	....	....
Northern Belle	....	....	....	....	....	....	....	....
Navajo	....	1.45	1.40	1.50	1.40	1.45	1.00	1.25
North Belle Isle	2.00	2.75	2.55	2.65	2.55	2.65	2.55	2.70
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.80	2.95	2.75	2.80	2.90	3.00	2.95	3.10
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.50	1.65	1.55	1.70	1.50	1.70	1.35	1.50
Ophir	4.30	5.50	5¼	6.50	5.25	6.00	5¼	5.50
Overman	1.00	1.45	1.35	1.55	1.40	1.50	1 30	1.40
Potosi	2.00	2.40	2.20	2.60	2.30	2.70	2.15	2.25
Peerless	.65	.85	.60	.75	.65	.80	.45	.65
Pecr	.25	.30	....	.25	....	.35	.25	.35
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.75	3.15	3.05	3.45	2.90	3.30	2.75	3.00
S. B. & M	2.65	3.20	3.00	3 30	3.05	3 20	2.70	2.95
Sierra Nevada	2 80	3.25	3.10	3.80	3.15	3.65	2.85	3.10
Silver Hill	.65	.70	.70	.75	.65	.75	.65	.70
Silver King	....	....	....	....	....	....	....	.90
Scorpion	.50	.55	.55	.65	.55	.60	.50	.55
Syndicate	....	.10	....	....	....	....	....	....
Union Con	2.80	3.15	3.15	4.10	3.60	4.05	3.50	3.70
Utah	1.15	1.30	1.30	1.50	1.30	1.45	1.20	1 25
Yellow Jacket	3.50	3.90	4.00	4.60	4.40	4.90	3.75	4.25
	....	....	....	....	....	....	....	....

Sales at San Francisco Stock Exchange.

THURSDAY, Mar. 14.

200	Alta	2.10	
300	Andes	.35c	
110	Alpha	1.95	
210	Belcher	3.20	
70	B. & Belcher	4.55	
500	Bullion	.95c	
100	Buiwer	.35c	
100	Baltimore	.40c	
150	Caledonia	.43c	
50	Chollar	2.80	
110	Con Va & Cal	.83	
300	Con. Imperial	.75c	
140	Crown Point	4.90	
100	Challenge	4.75	
40	Confidence	14.25	
200	Crocker	.50c	
110	Exchequer	.90c	
100	Eureka Con	2.00	
200	Grand Prize	.80c	
190	Gould & Curry	2.57	
70	Hale & Nor	3.90	
100	Kentuck	2.00	
100	Lady Wash	.40c	
160	Mexican	3.60	
50	Navajo	1.00	
450	New York	.20c	
160	Nev. Queen	3.05	
100	N. Belle Is	2.70	
50	Ophir	5.87½	
225	Overman	1.45	
220	Occidental Con	1.35	
150	Potosi	2.35	
500	Peerless	.60c	
50	Savage	2.95	
150	Sierra Nevada	3.20	
150	S. B. & M	3.05	
100	Scorpion	.55c	
200	Utah	1.30	
700	Union	3.80	
500	W Comstock	.30c	
100	Yellow Jacket	4.10	

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R. G. HUSTON—Montana.
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THE artesian well being sunk in San Luis valley, below Alamosa, Col., will turn out to be a mine rather than a well. Gold was found by the drill at 40 feet, and, after getting through some hard volcanic rock, at a depth of 70 feet, rich silver ore has been found.

The Mechanics' Institute.

At the annual meeting of the Mechanics' Institute it was reported that the gain was 400; the increase in fees and dues $2302.50, and the outside circulation 100,500 volumes. During the year, also, 1112 subscribers have joined, and 13 life members, making a total of 1125; withdrawn and dropped, 728; gain, 397; and in good standing at the present time, 3557. There have been received and entered in the accessions catalogue 3713 bound volumes, also 887 unbound volumes and pamphlets, making a total of 4600. The number of volumes at last report was 45,051; this year the number is 47,656.

The report of Treasurer J. A. Bauer was equally satisfactory. The following is a synopsis of his report: Receipts—March 1, 1888, to February 28, 1889, $32,556.04; disbursements—same time, $30,872.58; balance, $1,683 46.

Pavilion fund—Receipts, $40.134 50; disbursements, $34,813 71; balance, $5320 79.

Sinking fund—Receipts, $3981.02; disbursements, $3556.51; balance, $424.51.

Folsom-street lot—Receipts, $7444.33; disbursements, $7444.33.

The assets of the Institute consist of land fronting on Hayes and Larkin streets, which, with the improvements, is not worth less than $1,000,000; Post-street lot and library building, $175,000; Sixteenth-street property, $125,000; books, furniture, etc., $80 000; cash in treasury, $7558.66; total, $1,387,558.66. Against this there is a mortgage indebtedness to the Hibernia bank of $120,000; to the State University, $45,000; leaving a net balance of $1,212,558 66.

A communication was received from the president, P. B. Cornwall, tendering his resignation, on account of pressing business affairs needing his close attention. On motion of Wilson, seconded by A. S. Hallidie, a resolution was adopted expressing sincere regret at the resignation of Mr. Cornwall, the resolution being ordered spread upon the minutes.

A. S. Hallidie then moved that a committee of three be appointed to draft a suitable resolution on the death of Carlton Newman. The following gentlemen were appointed: A. S. Hallidie, George Spaulding and I. C. Stump.

At a meeting of the Trustees held later, the following officers were appointed: David Kerr, President; J. C. Stump, Vice-President; J. A. Bauer, Treasurer; A. W. Starbird, Secretary; and S. J. Hendy, Corresponding Secretary. George S. Ames was also elected to the position of Trustee, rendered vacant by the resignation of P. B. Cornwall.

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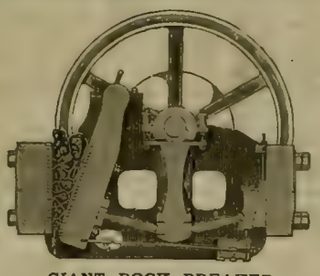

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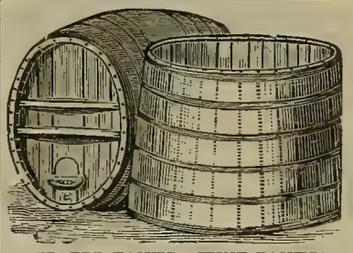

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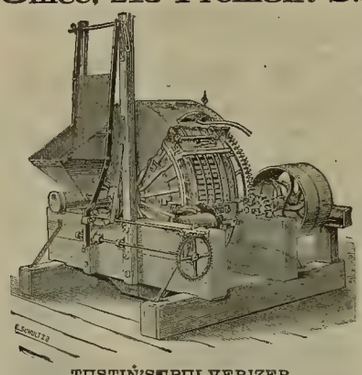
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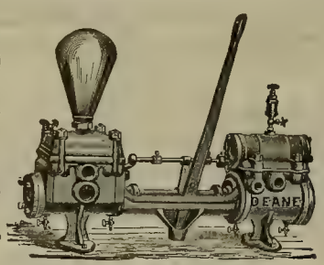

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FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.
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Zinc, Copper or Brass Screens for all purposes. California Perforating Screen Co., 145 & 147 Beale St., S. F.

COAL MINES OF THE WESTERN COAST.
A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for $2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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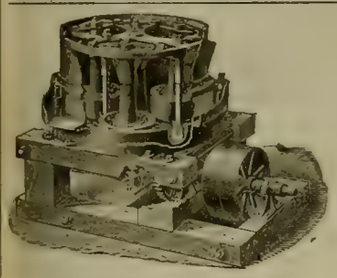

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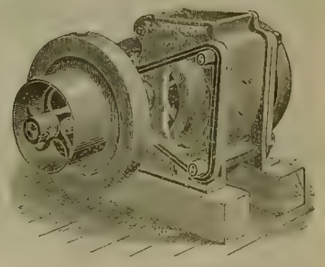

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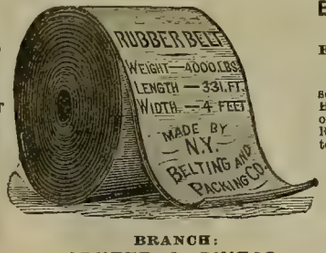

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For Removing or Preventing Scale, Corrosion and Pitting in Steam Boilers. Send for references.

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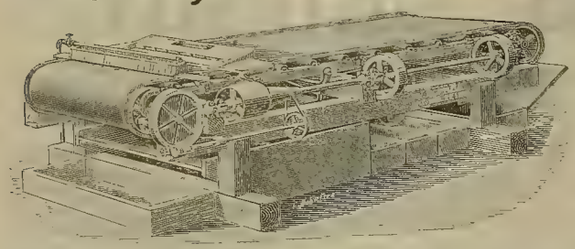

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DEAR SIRS:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

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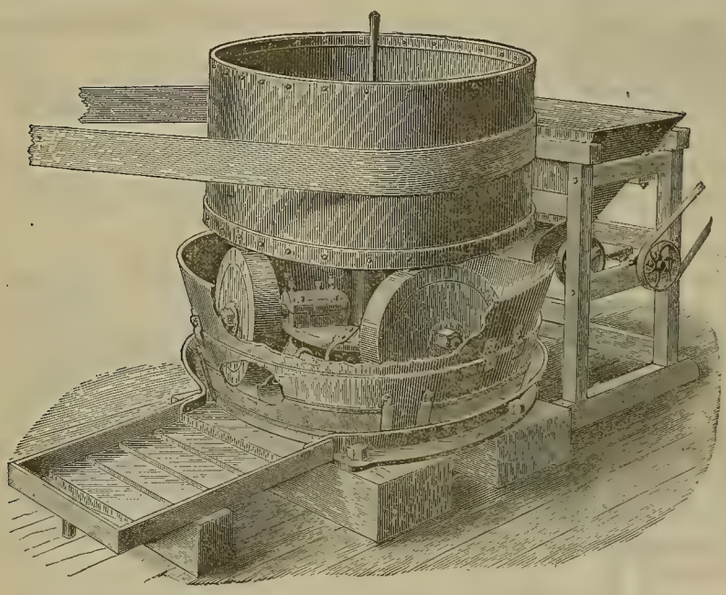

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The most perfect Roller Mill made, for the following reasons:

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6. It is portable, requires no frame-work, and is ready for the foundation as it leaves the shop.

Full Descriptive Circulars of any of the above sent on application.

OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO., SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

Risdon Iron Works, San Francisco—GENTLEMEN: Our Company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60-mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screen 12 tons in twenty-four hours; through 50-mesh, 15 tons; and through 40-mesh, 18 tons. This proportion has been continuous. One set of Dies will crush from 1500 to 1600 tons. One set of Tyres will crush 1500 tons. One ring plate will crush from 2200 to 2300. The mills require very little attention. At our mill an ordinary "peon" earning one dollar per day has complete charge. In regard to sliming, in comparison with stamps by reason of the discharge surface and the continuous agitation by the scrapers, a MUCH less amount of slimes is created. A three years' experience teaches me that, in every respect, the mills are a complete success and of material benefit to the mining world. They can be set up and running in 48 hours, and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator, it is unequaled by any mill now in existence.

Yours truly, D. M. BURNS, Superintendent.

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NATIONAL AIR COMPRESSORS.

SINGLE OR DUPLEX, STEAM OR BELT POWER.

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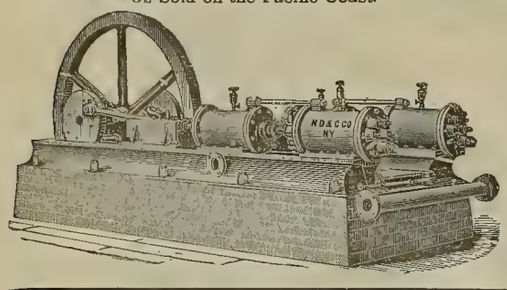

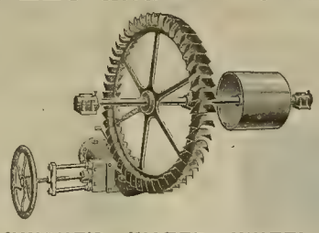

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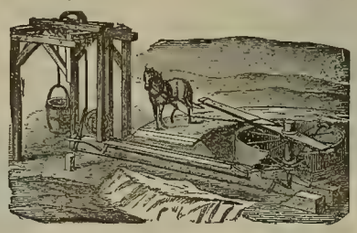
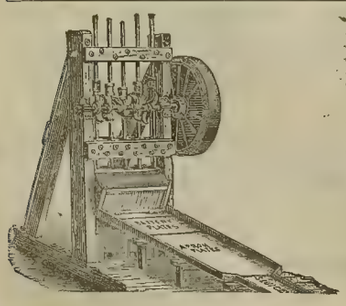


MINERS' HORSE WHIM.

All wrought iron. No gears, no breakage. One horse will easily handle rock or water to a depth of 350 feet, giving entire satisfaction to the prospector. Price, complete, $200. 150 sold on this Coast.

NATIONAL ROCK DRILL.

200 Sold on this Coast. Has less repairs than any other Drill.



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SILVER-PLATED AMALGAM PLATES for SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

PRICES GREATLY REDUCED.

Only Refined Silver and Best Copper used. Over 3000 Orders filled. Fifteen Medals Awarded. Old Mining Plates can be Replated. Old Plates Bought, or Gold Separated.

These Plates can also be purchased of JOHN TAYLOR & CO., Corner First and Mission Sts.

San Francisco Gold, Silver and Nickel Plating Works, 653 & 655 Mission St., San Francisco, Cal., E. G. Denniston, Prop'r.

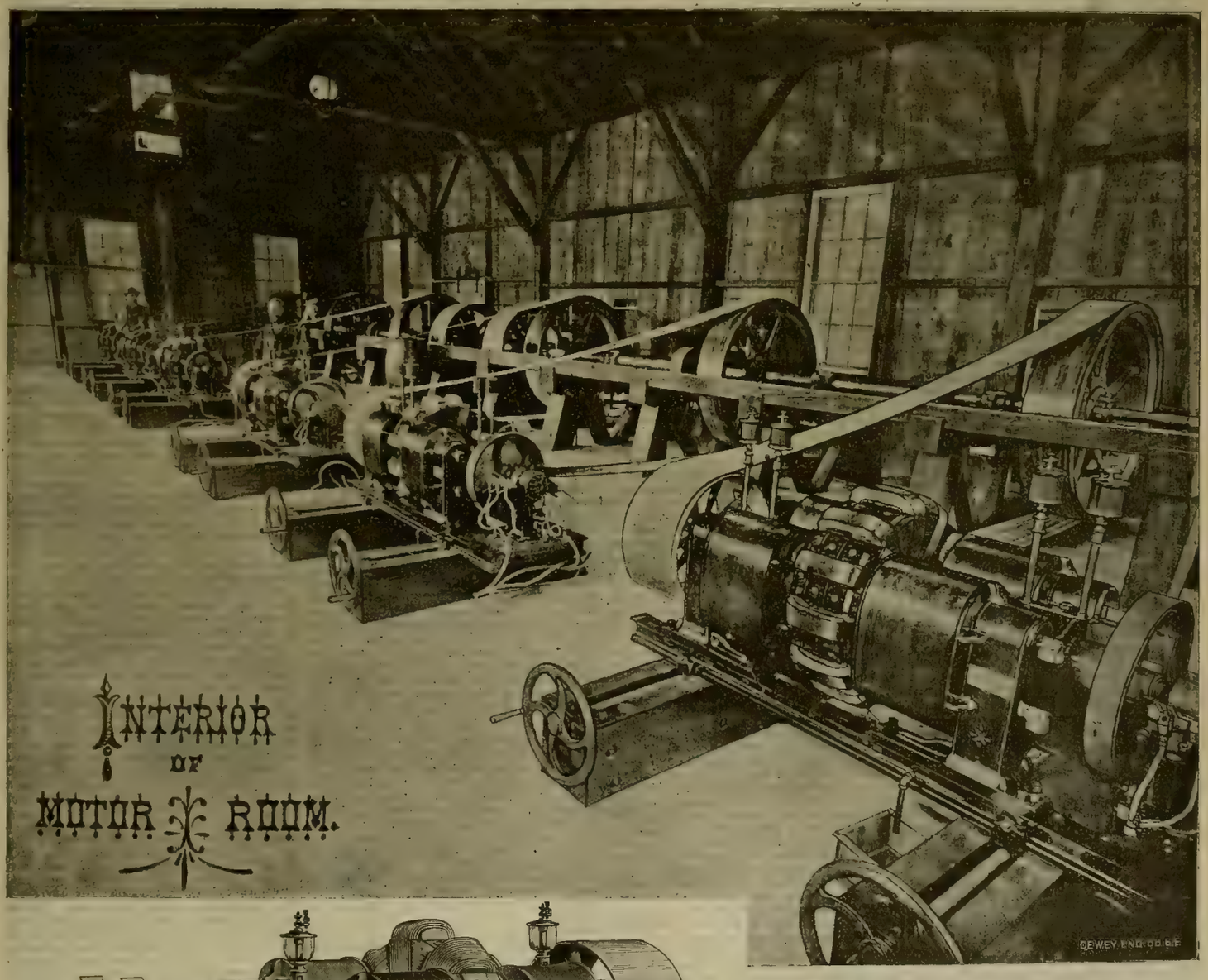
Our Plates have proved the best in weight of Silver and durability. SEND FOR CIRCULAR.

MINING AND SCIENTIFIC PRESS.

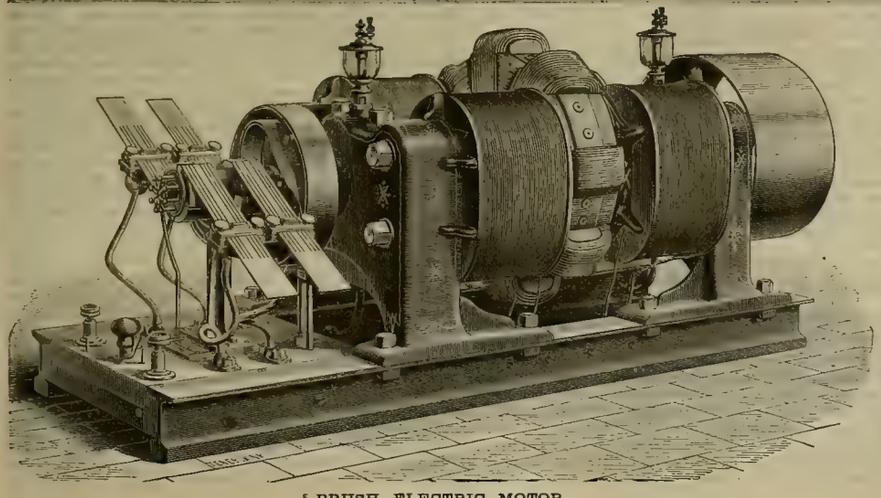
An Illustrated Journal of Mining, Popular Science and General News.

ELECTRIC-POWER EDITION—TWENTY PAGES.

BY DEWEY & CO. Publishers. SAN FRANCISCO, SATURDAY, MARCH 23, 1889. VOLUME LVIII. Number 12.



INTERIOR OF MOTOR ROOM.



BRUSH ELECTRIC MOTOR.

Electric-Power for Mining Work.

We have on numerous occasions within the past two years called the attention of the mining community to the great advantage of electric-power for running mills, pumps, hoists, and all machinery at mill and mine, under proper conditions. In this number of the PRESS we give a detailed description, with engravings, of the great electric plant on the Comstock, which is now doing satisfactory work. This marks a very important step in the progress of both mining and electricity, and before long we may expect to see many other electric plants connected with mining works.

Within any reasonable distance the electricians can convey the power to be utilized in any desirable way. The loss of power increases with the distance, but for 12 to 15 miles the system is entirely practicable. With progress in this branch of science no doubt much larger distances will become possible; in fact, they are so now under conditions of perfect insulation against high electro-motive force.

There are hundreds of places on this coast where water-power can

(*Continued on page 208.*)

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Mines of Angels, Calaveras County.

EDITORS PRESS:—The mines of Angels embrace those of Robinson's Ferry, Carson Hill, Albany Flat and Altaville, located on the different branches of the mother lode, and are but a few miles distant, all drawing their supplies from Angels. Their claim for recognition is not of a late day, nor are the mines a recent discovery, but rather the result of present development on well-known quartz veins. Prof. Whitney, in writing of this section, states: "The breadth of the belt of metamorphic rocks which inclose the gold-bearing quartz veins is 24 miles in Calaveras county. Starting from the west, or at the bottom of the Sierra, the first rock encountered is horizontally stratified and undisturbed tertiary sandstone. To this succeeds the belt of Mesozoic metamorphics in nearly vertical strata. The lower edge is composed of talcose and chloritic slates, weathering irregularly. Next comes a wide belt of dark-grayish green, somewhat porphyritic material which shows a sheeted structure known as 'porphyritic green slate.' This belt incloses another of argillaceous slate, with which is associated the 'mother lode,' or the 'great quartz vein.'"

The most remarkable primary metalliferous deposit of California is the mother lode referred to. Many of the great mines of the State are upon it. It extends from a point a few miles southeast of Merced river, in Mariposa county, through Tuolumne and Calaveras, to near the center of Amador, a distance of 80 miles. This powerful lode is made up of irregular parallel plates of white compact quartz and crystalline dolomite or magnesite, more or less mixed with green talc, and these plates, which somewhat resemble the "combs" of ordinary lodes, are either in contact or separated from each other by intercalated layers of talcose slate. The quartz is chiefly developed in the central portion of the vein and from its color and resistance to decomposition, it gives rise to a very conspicuous outcrop forming the crest of the hills, so that it can be readily seen for a distance of several miles. The mother lode divides into three branches in Calaveras county. At the intersection of the east and middle branch on Carson Hill, $2 800,000 was extracted by the Morgan Mining Co. Here, at the outcrop, the famous and unequaled nugget of 195 pounds, troy weight, of $43,534 value, exceeding the renowned Welcome nugget of Australia by $2000, was discovered. Numerous nuggets, weighing from 5 to 26 pounds, were found in this same vicinity.

Among companies at present in operation on the different branches of the mother lode is the Calaveras Con. G. M. Co., Limited. This property extends from the Stanislaus river at Robinson's Ferry to Albany Flat, a distance of 1½ miles. At present they are confining themselves to development and have driven a tunnel 543 feet long, crosscutting the mother lode at a depth of 200 feet and disclosing a vein 70 feet in width running from $6 to $8 to the ton. The working force consists of 25 men. Another season will see the mines equipped with a mill of 60 to 100 stamps. Parallel with this company's mines is the famous Morgan mine, now in litigation between Messrs. Fair and Irvin, which, with its neighbor, the Melones, are idle. Joining the Calaveras C. G. M. Co.'s properties on the northeast is the McCreight mine, now the property of Messrs. Hayward, Hobart & Hardy. The vein here shows an average width of five feet, the rock milling from $5 to $200 a ton. The mine is operated by a shaft now 300 feet deep, nine men supplying the 10-stamp mill with quartz. Further on is the Mattison mine of Tullock & Lanes, which is being prospected by a tunnel now in 210 feet and cutting the 30-foot ledge 100 feet deep. Six men keep the 5-stamp-mill pounding away merrily on ore running from $1.50 to $8 a ton.

Adjoining is the Gold Cliff mine, the property of Chas. J. Nickerson and Nathan Niels, which is opened by a cut 275 feet long, cutting the vein 160 feet deep and showing a vein 30 feet in width, averaging $4 to the ton. The mill is of 20 stamps. Following this mine, on the central lode, is the property of the Suffolk G. M. Co., Chas. D. Smythe, superintendent. The 110-foot shaft shows a four-foot vein averaging $5 a ton by free-milling process, but by a recent process of Mr. Smythe's going $60 to $80 to the ton. In consequence the five-stamp mill is hung up until Mr. S. can get his process in operation. Ten men are employed. Parallel with the Suffolk, on the southwest, is the Evening Star mine, the property of Mr. J. T. Curtis, where a tunnel 80 feet long will strike the 10-foot vein at a depth of 100 feet. This property is in the prospecting stage. Adjoining it is the Osborne, a 10-foot ledge with an average of $10 per ton. A tunnel cuts the vein 58 feet deep. Four men keep the Kendall rocker-mill busy crushing its 10 tons in 24 hours. All this property requires is capital.

In the town of Angels, on the east branch of the mother lode, is the Nevills mine, with a "west ledge" 20 feet in width and the "east ledge" 15 feet, developed by a 400-foot shaft. The reported average value of the rock is $7 a ton. The mine has a fine mill of 20 stamps and employs 30 men. Adjoining is the Utica, the property of Messrs. Hayward, Hobart & Lane. Mr. Hayward has brought his knowledge of the mother lode—acquired in operating the Plymouth Con. at Plymouth, Amador county—to bear on this property, and with their resources, have shown just how to work the large bodies of low-grade ore of this great lode to the greatest profit. Their first work was the sinking of three shafts of 370 and 435 feet, to prove the size and value of the ore bodies. This showed up a vein of an average width of 18 feet. As the vein carried a large amount of low-grade ore, reducing the average to $4 a ton, a mill of 60 stamps with 24 Frue concentrators was next erected. The mill is automatic in its operation, and is not excelled in any detail or requisite for the rapid, economical and successful working of the ores, by the famous mills of Dakota. To further reduce the cost of milling, a ditch four miles long was constructed, and from its terminus a stretch of pipe 1½ miles long was laid. This power will soon be applied by Pelton wheels, and thus by displacing the steam-power and attending expense, the cost of mining and milling, now about $2.25 a ton, will be still further reduced. Thus far, the work has been largely of a developing character; now, however, the mine is in shape to work, and the Utica will be heard from as a steady bullion-producer. The working force at this mine is about 80 men.

Adjoining the Utica are the mines of the Angels Quartz Mining Company, owned and operated by J. V. Coleman. The properties were formerly known as the Potter and Doc Hill mines. The mines are opened by two shafts of 200 feet depth each, one of 300 feet and the old Potter shaft 600 feet deep. The latter is now being cleaned out and will be put into shape for working. Mr. G. H. Fox, the superintendent, has been carrying on an extensive system of development which will be still further extended. It was originally supposed that the two veins on these properties were distinct, but development would indicate that they were one, the smaller vein being a spur of the larger. The intervening space is mineralized as well as the vein matter, and the coming summer will see a mill erected of sufficient capacity to handle the 200 feet in width of vein matter to a good profit, as all of the ore is of a fair grade. At present, the ores extracted in prospecting are crushed in the company's mill by three Low cannon-ball mills of a combined capacity of 30 tons in 24 hours. The company has its own construction and repair shops, and everything in and about the works gives evidence of a practical man in charge. The present working force is 30 men.

The ores of this section carry a large amount of sulphurets which are treated by the Angels Chlorination Works of Messrs. Hayward & Hobart, at a charge of $20 a ton. The works have a capacity of four tons in 24 hours, are complete in every detail, and leave nothing more to be desired for the successful working of the ores of this section. Many who resided in Angels five years ago, claim that Angels is at its zenith, but an inspection of the mines operating will show that at the present time the work being done is almost entirely of a developing character, and it is only necessary to recollect that the mines on the three branches of the mother lode extend over a stretch of country 6 miles in length by 1½ in width, which would give an aggregate length of 18 miles of veins, running from 2 to 200 feet in width. That Angels is but awakening and her ore reserves unequaled in extent by any mining town in the State is a mere matter of computation. Angels is distant from the terminus of the S. & C. R. R. and V. S. R. R. 30 miles, communication being by daily stage. The population of the town is now about 1000. The Angels hotel offers every accommodation to travelers. Numerous stores carrying extensive stocks of goods supply the wants of the people. Many fine residences grace the streets, prominent among which is the mansion of Messrs. Hayward, Hobart & Lane, so ably and affably presided over by Mrs. Lane. In the adjoining town of Altaville Mr. D. D. Demorest's foundry, machine-shops and agricultural implement warehouses are an appreciated convenience in operating the mines of this section.

The Union Water Co.'s system of ditches surround the section, furnishing water for milling at 8 cents an inch. Mining timbers sell for 18 cents a running foot; lumber $20 per M.; while miners' wages are $2 50 a day.

The *Mountain Echo* and *County Record* are both published in Angels, and unite to spread the fame of the camp. To the *Echo* is reserved the honor of being the pioneer in the field, and to it belongs the credit of first attracting capital to the mines of this section. The papers should receive the praise and support of every Angelite.

The mildness of the climate makes it possible to operate the mines every day in the year. Good schools, churches, stores, homes and intelligent society make mining life in Angels exceptionally pleasant, and leave nothing to be desired. E. H. SCHAEFFLE.

Angels, March 14, 1889.

Saving Gold and Sulphurets.

Milling Ores on the Mariposa Grant.

EDITORS PRESS:—It was in the fall of 1863 I applied through your Patent Department for a patent copper pan and boiler amalgamator, together with a method of treating sulphurets with salt and extracting the gold. My copper pan was from 4 to 6 feet in diameter, bottom one-fourth inch thick and galvanized with quicksilver. This was set in a furnace. The sulphureted pulp, after being treated to a salt bath and exposed to the air, was sprinkled with mercury and frequently turned over. It was then put into the pan and covered with many times its bulk in salt water and brought to a boil while being stirred with a muller. Mercury will not evaporate at a heat of 212° if well covered with water. The salt causes the whole charge to turn as black as ink and the gold is freed from its coating and settles and sticks to the bottom. After boiling slowly for one hour the pan is filled with clear water. It is then drawn off into a concentrator or run over a burlap incline table, which will save a portion which is not yet decomposed. That which is decomposed flows away in coloring matter, and that which is left on the table is again thrown into the salt-vat and an arastra or a grinding-pan is kept constantly at work grinding on more sands and sulphurets to be placed under the salt treatment in the vats.

While T. W. Park managed the Fremont mines, I worked at the Mt. Ophir mill. I was arastra-man, attending to four large arastras charged with blanket sand. At that time I made what I named a gravity concentrator. It was simply a box or a small barrel set below the mill. The flow of water and sands from the mill was conveyed to the bottom, where it discharged. The light and worthless matter flowed over the top and all the best was left in the bottom. By placing two of those side by side, the flow from the mill could be shifted from one while the other was being cleaned out.

When the Pine Tree and Josephine mines were being worked and the Benton mills on the Merced river were in full blast, I went below the mills and got a panful of the tailings, and took home and panned it down to the clear sulphurets, which I put through my salt treatment. The result was 33 cents per pound. I afterward went there and got some of their tailings, and had nearly the same results. The millmen were jealous, and did not like to have it said that they lost gold. The short of it is: The Josephine and Pine Tree ores are of the most rebellious character, and they did not want to see me make my apparatus pay. In the summer of 1867 that Brummagem was working the Princeton mine and mill, I asked him what chance he would give me in the sands of his tailings, and I proposed to give him $1 a ton more on their quartz if they would give me all the tailings. I set my two gravity machines, and while they milled 300 tons, I concentrated and piled in one heap 45 tons, which was still a large percentage quartz. In the meantime I separated 1000 pounds of sulphurets from the same, and I set up my pan amalgamator.

The 1000 pounds I put under the salt treatment and amalgamated in the copper pan yielded $275, or, say $550 per ton for the sulphurets. The quartz sands separated and ground in arastra paid $30 per ton. Now come my figures for their milling 300 tons, which they said paid $10 per ton, or $3000. Next come my figures for my 45 tons of concentrated sands, $30 per ton for the quartz, $1350; and for the 1000 pounds of sulphurets, $275. This altogether made $1625. I sent a man up to the Hite mine to put up two arastras and vats and boiler for my salt treatment of sulphurets, and I went there and staid several days and instructed him where he could concentrate their sands before they got into the river. As soon as they found out he was making something they bought him out and got him away, and the tailings got away. On the whole I am of the candid opinion that one-third of the gold from the Hite mine was lost; nearly one-half from the Princeton, and two-thirds from the Pine Tree and Josephine.

Mariposa, March 11th. JOHN S. DILTZ.

HALE AND NORCROSS MINE.—At the annual meeting of the Hale and Norcross M. Co., the old directors were re-elected, consisting of H. M. Levy, A. K. P. Harmon, C. P. Eagan, Jos. Marks, M. Hoeflich, C. S. Wheeler, and E. B. Holmes. At a subsequent meeting H. M. Levy was appointed president, A. K. P. Harmon, vice-president; A. B. Thompson, secretary; R. P. Keating, superintendent; and Nevada bank, treasurer. The secretary's financial report shows that the bullion receipts during the year were valued by assay at $986,311.75, and that $224,000 was disbursed in dividends. There was a cash balance on hand March 1st of $12,447.62, with further shipments of bullion to arrive. Superintendent Keating's annual report shows that there are large reserves of ore in the mine between the 500 and 1300 levels, and concludes as follows: During the past year we hoisted 46,525 tons of ore and 31,091 tons of waste rock. The gross bullion yield of all the ore worked during the year was $997,669 93. Besides the extraction of the ore above mentioned, 4441 feet of drifts have been run.

AN ELECTRIC SHOCK.—A lady who with others descended the Chollar shaft on the Comstock to see the dynamos at work, touched a small temporary wire which supplied the current to one of the incandescent lamps, and received a very severe shock. The shock, though not dangerous, threw her down into the giraffe, and her screams brought others of the party to the rescue. Her hands were found to be badly burned and her nervous system received a severe shock.

THE Viola French Copper Co. in Beaver county, Utah, has been attached by the miners for wages due.

Quicksilver Here and Abroad.

J. B. Randol, manager of the New Almaden mine, has contributed an interesting article on quicksilver in California and Europe to the *Engineering and Mining Journal* of New York. Mr. Randol evidently takes a deep interest in this subject, and follows up all lines of information with the closest attention. He makes the point that no new discoveries are being made in California, while mines heretofore worked are becoming exhausted, and this too in the face of improved prices. The further point is made that the foreign production of this article is double that of the home product, that the largest two foreign mines are worked by the Government at lower prices than it is possible to duplicate in this country; that one of these mines has reserves that will last at the present rate of production 70 years and the other has reserves that will last 100 years, while the American mines never have reserves for only a few months ahead, and are obliged to spend large sums of money in unwearied prospecting, often with the most barren results.

The product of the New Almaden mine in 1888 was 18,000 flasks, or 2000 flasks less than in 1887. This mine still retains the lead, producing last year 54 per cent of the total American product. Napa Consolidated was the next largest producer last year, its total being 4065 flasks, a gain of 1185 flasks. The Bradford is one of the latest claims that shows the greatest promise. It only began producing in 1887, when its yield was 1543 flasks, while last year it produced 3848 flasks, a gain of 2305 flasks, or 150 per cent. This mine now occupies third rank, but bids fair in 1889 to take second place. It is in Lake county. The ore thus far taken out has been near the surface, and of course has paid well. Not so with some other mines with deeper workings, which have only been kept open by assessments on stockholders. A notable example of this kind is the Great Western, also in Lake county, which produced 6442 flasks in 1880, and paid dividends, while last year the yield was only 625 flasks, and an assessment was necessary to defray expenses. The Sulphur Bank produced 11,152 flasks in 1881, and only 890 flasks in 1884, followed by assessments. It has since done better, and was last year credited with 2164 flasks.

The yield for the Ætna has fallen off from 3478 flasks in 1886 to 959 in 1888. Some years ago the most noted mines in this State were the Guadalupe and Redington. Each of these was considered a fortune to the owners. The Redington did not pay a large amount in dividends. Both properties are now in the sere and yellow leaf. The Guadalupe has been dropped altogether since 1885, when it returned only 35 flasks. The Redington appears to be fast falling in its wake, the yield last year being only 121 flasks. Mr. Randol shows that the product for the five years ending December 31, 1883, was 293,918 flasks, valued at $8,545,000, or an average of $29 07 per flask. For the past five years the yield was 132,941 flasks, valued at $5,845,000, an average of $36 61 per flask. It is quite evident from this exhibit that if there were much profit in the business, the higher average prices for the past five years would have resulted in an increased product instead of the large decreased yield, which the figures show. That certainly is a logical conclusion, whatever may be its inspiration.

In the face of these facts the Ways and Means Committee in Congress last year had the hardihood to recommend the repeal of the 10 per cent ad valorem duty on this article and place it on the free list. The committee may have thought that a protection of 10 per cent ad valorem was practically no protection, and so remanded the article to the free list. At the average price of quicksilver in this country last year the duty was about 5½ cents per pound. Fortunately the House Tariff bill of Mills & Co. was defeated in the Senate, and so this blow at a specific California industry of much moment has been averted. There was not a shadow of an excuse for the removal of this tax. Though thus far the product is confined to California, and is limited, there is still a surplus for export. The Senate proposed as an amendment a specific duty of six cents in lieu of an ad valorem duty of 10 per cent. But as the Senate amendments to the House bill were not ratified, the whole tariff legislation of the last Congress, about which so many speeches were made in that body and in the late presidential canvass, and about which so many business men had so much worry and anxiety, has gone by the board. California quicksilver-producers hope the next Congress will either let them entirely alone or put a specific tax of 10 cents per pound upon the article in the place of 10 per cent ad valorem tax.

The product of the European mines for 1888 is not at hand, but for the previous five years it was as follows:

	Almaden, Spain.	Idria, Austria.	Italian mines.
1883, flasks	46,143	13,152	6,065
1884	43,099	13,967	7,850
1885	46,739	13,503	6,965
1886	51,199	14,496	7,375
1887	53,276	14,676	7,500
Total	240,456	69,794	35,755
Annual average	48,090	13,960	7,150

The movement to and from England for the past two years was as follows:

	1887.	1888.
Imports, flasks	61,114	73,768
Exports	62,606	47,133

The exports from England last year embraced 10,267 flasks to China, 334 flasks to

Japan, 1744 flasks to Australia and New Zealand, 3076 flasks to the East Indies, 9967 flasks to Mexico, 5038 flasks to Central and South America and Brazil, and 4652 flasks to the United States and Canada. Most of this trade legitimately belongs to California, and would come here but for the fact that Spain and Austria, with their cheap labor and richer deposits, can undersell us. With the duty at 10 cents per pound, and a guarantee that it would be kept there for ten years, capital might be induced to make a vigorous search for deposits of quicksilver in California, and possibly such search might be rewarded with discoveries that would place the industry on a better footing than ever.

MINING PREMIUMS AT THE STATE FAIR.—While the State Agricultural Society has been liberal in the matter of racing purses and agricultural premiums, the mining communities have felt that their special industry has been neglected, and no encouragement has been given to make displays of valuable ores, minerals, etc., which have done so much to enhance the wealth and prosperity of the State, and which will continue to engage large investments of capital and employ a considerable percentage of intelligent and well-paid labor. In consequence of this oversight or neglect the mining counties have not manifested that interest in the State Fairs that they otherwise might, and have found more of value to them in the annual expositions of the Mechanics' Institute at San Francisco than at the exhibits at the State capital. The subject has been called to the attention of the present officers of the State Agricultural Society, and they have expressed a willingness to make recognition of the mineral interests of the State, and will, in their premium list for the next annual fair, offer premiums and medals for displays of gold, silver and copper ores, and other minerals and woods. If these premiums are on a liberal scale, there is no reason to doubt that the mineral display will be one of the most valuable and attractive features of the fair, and with the agricultural, horticultural and vinous exhibits will form a grand combination that will most favorably impress not only Californians but visitors from distant States who may attend.—*Grass Valley Union.*

WATER-JACKET FURNACE. — A Williams water-jacket furnace was brought in on yesterday's train and was visited by many of our local mining men. This is a new patent, designed by J. J. Williams, superintendent of Copper basin, who will erect it at that point. It weighs in the neighborhood of 5000 pounds and costs about $1000; has a capacity of five tons of lead or copper ore every ten hours. Jack Boyd, an old machinist and one fully conversant with this class of machinery, says it is the most complete arrangement of its cost and capacity he ever saw. It is designed to work copper and lead ores, and its completeness, cheapness and its comparative lightness will enable owners of copper and lead properties in isolated districts to procure them, do their own smelting and ship their matte and bullion out on the backs of pack animals. Owners of copper and lead properties, and there are many of them in this vicinity, are anxiously awaiting the first run of this late invention, and if it proves to be the success it promises to be, orders will immediately be forwarded for more of the same make.—*Prescott Courier.*

THE Truckee *Republican* says: It begins to look as though there would be but little railroad wood cut in this vicinity this year. The railroad company has not made any contracts, only one of importance being with the Boca Mill Co. In this case the latter company has been attempting to sublet their contract, but have failed to find any one to take a contract to cut any wood. At the present price of railroad wood contractors find it impossible to furnish wood unless they can secure the very best class of laborers, who will work faithfully for the interest of their employers, and these cannot be secured except at the very highest wages. The railroad company claim that they cannot pay a higher price for wood without increasing its cost for fuel above that of coal. The wood industry was one of the most important in this vicinity, but unless something occurs so that the price of wood will be advanced, the industry will become dormant.

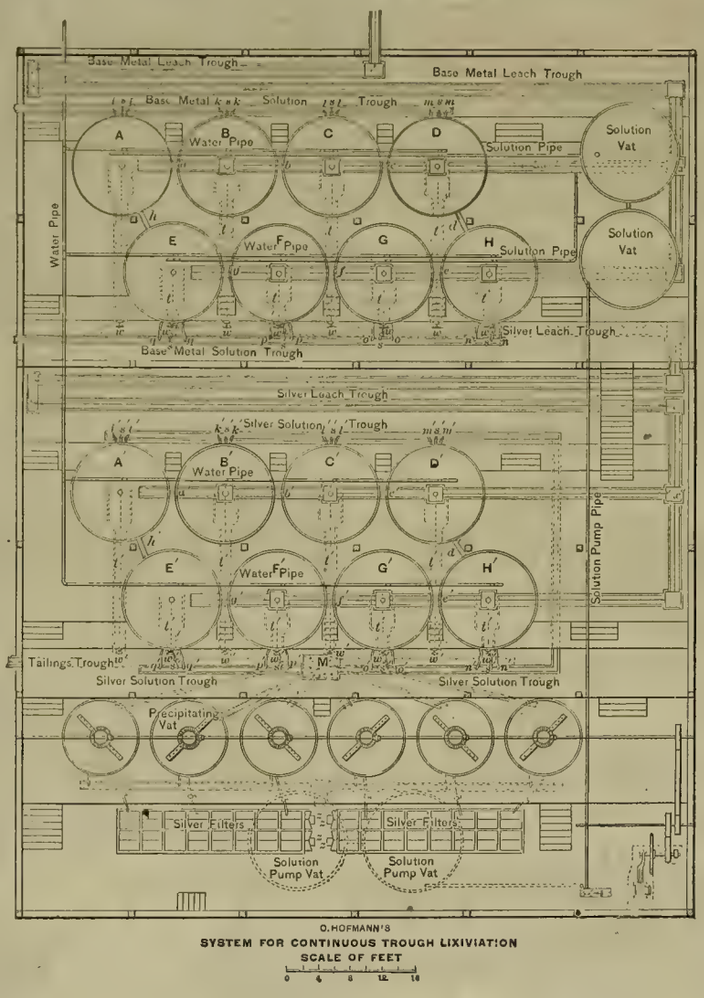
GEN. MILES, U. S. A., has ordered an examination of the harbors of San Francisco, San Diego, San Pedro and Santa Barbara. The examination will be made by artillerists, under command of Major W. L. Haskin, U. S. A. There are already charts of these harbors, topographical maps, plans of defenses, etc., but it is considered that, owing to changes in shoals and channels, a survey is necessary at this time. The examination will also include a detailed reconnoissance of all ground for possible defenses at forts and islands, and submarine topography as well, with a view to suitable locations of torpedoes for harbor defense.

COMO DISTRICT, NEVADA.—The following charitable suggestion is made by the Virginia *Enterprise:* It would be a good plan to send a party up to Como to see if the miners there are still alive. They went into winter quarters upon their mountain with a good supply of grub, but it has been so long since they have been heard from that no one knows but they may all have been devoured by wild beasts.

Trough Lixiviation.

Mr. Ottokar Hoffmann of Alameda, Cal., has read before the American Institute of Mining Engineers a paper on "Trough Lixiviation," in which he describes a system where he has found that, if chloridized ore is brought into rapid contact with a proper volume of moving sodium hyposulphite solution, the silver chloride contained in the ore dissolves almost instantly, and that it is rather the volume of the solvent than its concentrated state which produces this effect.

Such favorable conditions cannot be attained in tanks. The rapidity with which a certain volume of the solvent can be brought into contact with the ore particles is limited by the speed with which the solution descends through the ore, and thus the leaching-time in tanks cannot be shortened beyond the limit set by the filtering capacity of the ore. In a trough, however, these favorable conditions can be attained by gradually introducing the ore into the moving stream of the solvent. The ore can thus be brought into rapid contact with any desired quantity of the solvent, and moves in and with the stream. The effect is astonishing. Ore charged at the upper end of a trough of moderate length will leave the trough at the lower end desilverized, as tailings, while all the silver chloride will be dissolved in the solution.



O. HOFMANN'S
SYSTEM FOR CONTINUOUS TROUGH LIXIVIATION
SCALE OF FEET
0 4 8 12 16

Solution is performed outside the tanks in troughs, while the ore is moving in and with the stream of solvent, and the tanks are used only to separate the solids from the liquid. The system is a continuous one; but as the lixiviation process requires two solvents, first, water for the removal of the base-metal chlorides, and then a solution of a hyposulphite salt for the extraction of the silver, it has to be divided into two departments: the base-metal and the silver department. Fig. 1 shows a complete arrangement. The upper series of tanks represent the base-metal, the lower series the silver department. The tanks in each department are placed on the same level and close together. They are connected by pipes, *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, in such a way as to form a perfect circuit. These connecting pipes are placed a few inches below the rim of the tanks, and also on a level. The diameter of these pipes depends on the daily capacity of the works and the proportion of solvent and ore to be used. Each tank is provided with outlets, *i*, *k*, *l*, *m*, *n*, *o*, *p*, *q*, which are on a level with the connecting pipes. They lead to the base-metal solution trough, which is placed below the bottom-level of the tanks.

Into this trough leads also the outlet *s*, from under the filter bottom. Each tank is also provided in the center of the bottom with a discharge hole, through which the ore is sluiced into the silver-leach trough. The pulp (roasted ore and water) is conveyed from the furnace-house to the base-metal department in a triangular trough, which enters the building near the roof, descends in zigzag, and branches off in two troughs which pass over the two rows of tanks. Over each tank the trough is intersected by a square box, the bottom of which contains one or more plug-holes, in order to permit the charging of any desired tank. By means of slide-gates the stream can be directed to flow in either of the two branches. The sluice-troughs *t*, beneath the bottom of the tanks, all discharge into the silver-leach trough, which leads to the silver department. Here, the tanks are constructed and arranged in exactly the same manner as those in the base-metal department. The solution storage-vats are placed in the base metal building.

Base-Metal Leaching.

The pulp of water and ore, after passing a grinding-machine, in which the lumps are mashed, enters the triangular base-metal leach-trough, and is thus conveyed automatically to the base-metal tanks. The first tank to be charged is *D;* but before commencing operations, the following preparations have to be made. The slide-gate *x* is closed, to direct the stream into the first branch trough, and the plug-hole of the square box above *D* is opened. The connecting-pipe *d*, between tanks *D* and *H*, is closed by a plug from the inside of *D*. The outlets of all the tanks are closed except the outlets *n* of tank *H*. Likewise all outlets from under the filters are closed. This done, the pulp is admitted to flow into tank D. When the solution reaches the level of the connecting-pipes, it will flow through *c* into tank *C*, and when *C* is filled, into tank *B*, and so on until the last tank *H* is filled, when the solution will leave the tank through outlet *n*, *n*. As soon as tank *D* is filled with ore, the pulp is made to flow into tank *C*. The connecting-pipe *c* is closed, and thus tank *D* is disconnected from the circuit. The outlet *s*, below the filter of tank *D*, is opened, and the solution is allowed to drain into the base-metal solution trough. When the solution disappears below the surface of the ore, water is admitted to press out the solution absorbed by the ore. When this is done, sodium hyposulphite solution is applied to press out the water.

As soon as the liquid flowing out through a filter outlet *S*, shows indications of silver, the outlet *s* is closed, and the charge is ready to be sluiced for silver leaching. While tank charge *D* is under the described treatment, which does not take much time, tank *C* is gradually filling with ore. When filled, the pulp is made to enter tank *B*, and tank *C* is disconnected from the circuit and its charge is treated in the same way as that of *D*. Charge *D* being sluiced out with solution, the filter outlet *s* is turned from the base-metal trough in the silver-leach trough, the hose clamp is opened and the solution contained under the filter is allowed to flow out. This accomplished, outlet hose *s* is closed and returned to the base-metal solution trough. Then the plug of connecting pipe *d* is removed and tank *D* is restored again to the circuit. *D* being empty, the flow in the base-metal solution trough will cease until the tank is filled again with base metal solution.

Electric-Light Poles.

At a meeting of the Supervisors' Committee on Streets and Highways, held last week, A. J. Bowie and others, representing the Electric Improvement Co., asked permission to erect poles or masts in the streets for the use of the company's wires. Attorney Van Ness claimed that the company had the constitutional right to erect poles, under the supervision of the Superintendent of Streets, but preferred to obtain permission of the supervisors. The company proposes to extend its wires to the outskirts of the city, and furnish the largest quantity of light for the smallest amount of money. The object of applying to the board for the privilege is to avoid litigation, which might be instigated by rival companies.

In reply to a question by Mr. Barry, Mr. Bowie stated that the company already had a contract with the Harbor Commissioners to light the entire city-front. His company had a capital of $2,500,000, and they intended extending their circuits throughout the city as rapidly as possible, particularly in the residence sections, where they contemplated supplying incandescent lights for household use.

George H. Roe, secretary of the California Electric-Light Co., opposed the granting of the privileges asked for, as in the near future all wires must be operated under ground. He believed there were already too many poles in the streets. Those applying for privileges to place wires along the streets should be compelled to put them underground. The California Co. had already invested $100,000 in running wires above ground which would be sacrificed to replace the wires underground. If their work was begun now, the wires would be placed below the surface of the street.

Mr. Bowie replied that no method yet devised for working wires under ground had proved to be a success. Experiments in Detroit, New York, Philadelphia, Washington, and other cities, of working light wires under ground, had proved failures. The tremendous induction from high currents prevents the working of light wires under ground. Out of 30,000 miles of wire in New York not 6000 are under ground.

Mr. Pilster moved to lay the matter over for four weeks. So ordered.

POTOSI M. CO.—At the annual meeting of the Potosi Mining Co. the old directors and officers were re-elected, consisting of A. K. P. Harmon (President), W. E. Sell (Vice-President), A. W. Rose, Jr., C. T. Bridges and Joseph Marks. Charles E. Elliot was reappointed Secretary, A. C. Hamilton, Superintendent, and Nevada Bank Treasurer. The company was overdrawn at the bank $34,524 on March 1st, but considerable bullion has yet to come in before a balance will be struck. The superintendent's annual report shows that considerable ore has been developed in the mine, and concludes as follows: "It is hoped that the power generated by the electric motor at the Nevada mill may be so far reduced in cost as to afford the mine greater margin on the ore extracted."

UNDERGROUND WIRES.—The entire subject of placing electric-light wires underground was discussed at the meeting of the National Electric-Light Convention on Feb. 21st last. The report of the committee appointed last year was considered, and Geo. H. Roe of the California Electric-Light Company offered the following resolution: "That, while the appliances and devices for operating electric-light wires underground are being continually improved, and promise ultimately to render practical the operating of all electric-light wires underground, they have not yet reached such a degree of perfection as would justify this convention in declaring itself in favor of underground wires for central station arc lighting.'—*Western Electrician, Feb. 23d.*

THE COPPER SYNDICATE.—George F. Coppins, vice-president of the Brass Manufacturers' Association, says: "The present high price of copper affects us very greatly, and we hope for the failure of the great copper syndicate. From $18,000,000 to $20,000,000 worth of copper is now being carried by the syndicate, and it is said that they have too great a load to safely carry. They have established a bank at Paris which is backed by the Rothschilds. If the trust should break it would please all the brass manufacturers only too well."

SMELTER IN OREGON.—A dispatch from Portland, Oregon, states that the Chicago company which intended to erect smelting works at Tacoma have changed their minds and will put it up at Portland instead. A site has been secured where they will have the use of three overland railroads. It is expected to have the smelter in operation this summer. Major Delashmutt and other large mine-owners at Cœur d'Alene have offered to contract to deliver 400 tons of ore at the smelter per day.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. *Ledger*, March 16: There is jubilation over the bountiful rains which have fallen the past week. Instructions have been received from the managers of the Wildman M. Co. in the East to add 10 more stamps to the mill as soon as possible. The last sinking of 100 feet is completed, and a drift has already been started at the 700-foot level. The mine continues to look more encouraging as they get deeper. The material for the additional stamps to the mill will be delivered just as soon as the weather will permit. S. D. R. Stewart is making preparations for sinking a shaft near the old Lincoln mine, and is having the hoisting works moved from the McAdams claim to the new shaft. Good rock has been discovered in that location.

NEW MINING CO.—*Ledger*, March 16: The South Eureka M. Co., comprising Dr. J. L. Mayon, J. F. Parks, Jackson Dennis, U. J. Hussey and I. N. Templeton, has been organized to work the well-known mining property known as Tanner's hill and extending 2000 feet along the mother lode, from the Summit to the Oneida mine. The Plymouth Con. is running 35 stamps of their mill. The contractors of the Alpi have struck water in superabundance, causing two of the contractors to throw up the job.

COSMOPOLITAN.—*Dispatch*, March 16: At the 500 level the east crosscut is out 260 feet; west crosscut, 110 feet; both the crosscuts have been suspended and are running levels north and south on the ledge; north drift in 40 feet; south drift in 30 feet; north drift on 300-foot level in 80 feet.

EMMA.—This prospect is situated near the Mokelumne river in the Clinton mining district, and about eight miles from Jackson. It is owned by J. L. Madden and Wm. Daugherty, and is being worked by them on a limited scale. They have a tunnel in about 70 feet, and expect to tap the ledge about 100 feet further on. They are now sinking a shaft on the ledge which is about three feet wide at a depth of 50 feet.

DRYTOWN CON.—This mine is going along in a smooth way. The shaft is now ready for the machinery, the pipe is being laid as fast as possible and will be finished next week. The directors expect to have the hoisting machinery ready by April 1st so as to hoist out the water.

GIN MINE.—A party of miners have leased this mine for a short time. They have run a tunnel into the hill about 50 feet, and have struck some very good ore, enough to pay them wages for all the dead-work that has been done.

GOVER.—The Gover mill is running on some very fine ore taken from level 2. They make about one ton of sulphurets per day that will work $180 to $200 per ton. The Gover has many setbacks, but masters them all.

OVERPLUS.—At Quartz Mountain are running their Huntington mill on the same quality of good ore. It nets the owners about $1000 per month.

NORTH CALIFORNIA.—Are running on much better ore this month, taken from near the shaft in the North tunnel.

Butte.

FROM CHANNEL POSTOFFICE.—Cor. Oroville *Register*, March 9: Times are very dull, as some of the best paying mines in the vicinity are shut down; but it is an old adage "It's an ill wind that blows no one any good," so it is with mines shutting down. It has thrown many miners out of employment, and consequently they have gone to prospecting, and that branch of the mining industry is very lively. A few fine prospects have been struck, but nothing worthy of note of late but what has been reported to the Oroville papers. Some of the old prospecting enterprises are pushing ahead with their work in a vigorous manner, among which is the Alki mine of which Geo. Parry is the superintendent and principal owner. They have driven several hundred feet of incline and added some valuable improvements to their pumping and hoisting machinery, which leaves no room to doubt that they are in earnest, and that they are going to reach the bottom of the Old Pliocene, or, as it is called here, the "Big Channel," of which so many ineffectual attempts have been made to find the bottom. When once the bottom of this is reached, there is no doubt but what they will have one of the richest mines in the State. The Miocene, owned by Sparks, Henderson & Morris, situated some distance above the Alki, is having a tunnel driven upon it, and the indications for rich pay are very good. The owners of the Calamity mine are also driving a tunnel with a very good showing at present. The Hidden Treasure Co. are at present prospecting their quartz ledge near Toad Town, and I think it will prove one of the best in this county in a short time. This company will resume work on their gravel mine, situated three miles east of Old Lovelock and adjoining the Alki and Calamity mines. The Oro Fino, owned partly and managed by Mr. T. Smith, is making a fine showing. I saw one nugget a short time ago taken from that mine that weighed a few cents less than $400. This and several hundred dollars in fine gold was all taken out in one or two weeks, which shows what can be done on Magalia Ridge with energy and capital to back our efforts. The Wiley Bros. have organized a company in Stockton and started up on Middle Butte to tap the Big Channel. May their efforts be crowned with success is my wish. Messrs. Matlock and Gable, the owners of the Boomerang, have been doing some valuable work on their property in the way of building and also in driving their tunnel ahead. They have concluded to put on hoisting machinery as soon as possible.

Calaveras.

MILL.—Amador *Ledger*, March 16: Donnelly & Howard of Sutter Creek are building a six-stamp mill to go to the Riverside mine, Calaveras county. C. O. Mitchell is making about 1000 feet of 11-inch pipe, which in addition to the 1000 feet the company has on hand at present, will be laid across the Mokelumne river by the canal company for the purpose of running the mill.

El Dorado.

EQUATOR MINE.—Placerville *Observer*, March 13: This mine is situated in Diamond Springs mining district, about five miles south of this city, directly on the mother lode. There are three parallel veins running through the ground belonging to this company. They have several locations. They have two tunnels, one in over 350 feet, and one nearly 600 feet long, besides several inclines run down on the angle of the vein which dips to the east at an angle of 60 degrees. They have recently run into a gold-bearing ore body nearly 20 feet wide. Supt. Burdick, who is not over-enthusiastic without reason, expresses himself as highly encouraged with the general outlook. This property is favorably located for economical working, and its future is looked forward to with much interest.

STILLWAGON MINE.—Supt. S. A. Lane, of the Stillwagon mine, was in town last week. Machinery is now being placed on the ground for the erection of a new mill at that mine. Good ore is reported in the face of the tunnel and a full force of men is now at work.

CRYSTAL MINE.—The tunnel at the Crystal mine is being driven with full force, and it is thought that the ledge will be reached before long, as the rock is changing in character, showing more the nature of wall rock.

BIG TUNNEL.—The Big Tunnel is now in 520 feet. They have just run through a vein of very fine slate 56 feet wide, and are now in ledge matter.

MOUNT PLEASANT.—Capt. Smith set a few men to work on the Mount Pleasant mine at Grizzly Flat on Thursday of last week.

PACIFIC MINE.—The water is lowering rapidly in the Pacific shaft. We expect to see ore coming out before long.

GRAVEL.—Georgetown *Gazette*, March 16: Robert Murdock was down from the gravel mine worked by himself and Denver Craig, near Volcanoville. They report the mine looking up, and are highly elated over the fact that the gravel they are now working is getting richer as they penetrate.

SLIGER.—The Sliger mine, situated near Spanish Dry Diggings, known as the Simpers claim, has been taken hold of by a S. F. company who are constructing a roadway from Spanish Dry Diggings. In a few weeks they intend to put a force of men on and make this one among many of our North Side mines.

Inyo.

MINING NOTES.—*Register*, March 16: At the Lucky Jim, Darwin McKenzie has just started a new steam hoister. He is employing six or eight miners, and making movements for an all-summer work. At Cerro Gordo a few chloriders are working. Boland & Gorman's new venture is essentially a dry concentrating process of fine dust, which is shipped to Melrose. The quantity is immense. Lower freight rates help this new scheme along very materially. Lookout is beginning the season's work in splendid style. Water mains are being relaid all over the hill. At the Minnietta, particularly, Frank Fitzgerald is beginning on the production of two tons daily of concentrates. He wants good miners and some active teams, too, and such can depend upon finding employment.

Mariposa.

A RICH STRIKE.—*Gazette*, March 16: Charles Myers and C. A. Schlageter have struck a rich vein on Bear creek, about four miles north of J. H. Malone's, and not far from the Feleciana mine. The ledge averages from 20 inches to six feet wide, and it all prospects well. Competent judges have tested the rock and declare it a good mine. We are always glad to hear of new veins being discovered and we hope the lucky ones of this may prove it to be a veritable bonanza. The plant was stocked with provisions and a working force this week, and we presume that the next few weeks will determine the definite character of the ledge.

Monterey.

CROOKSHANK MINES.—San Jose *Mercury*, March 12: F. T. Childs, a miner, has returned from the Crookshank mines, 60 miles south of Monterey, and says he thinks that region remarkably rich. Over a hundred claims have been located since January, and five new ledges opened up. The mines are located 40 miles west of Kings City and are three miles from the coast. At present a three-stamp mill and an arastra are doing all the reducing work, but a San Jose firm is going to put in a custom mill for the benefit of those miners who cannot afford to erect a mill. The fact that all goods have to be carried 30 miles from Kings City and then packed the rest of the distance is the reason the place has not been much heard of. The county is to put a road in soon, however, which will facilitate ingress and egress. Mr. Childs says the Crookshank ore assays from $2000 down to $30 or $40.

Napa.

SHIPMENT OF BULLION.—*Independent Calistogian*, March 13: On Monday last, five bars of gold and silver bullion were shipped by the owners of the Palisade mine near Calistoga, to San Francisco, Wells, Fargo & Co. of course having charge of the metal. The weight was 512 pounds. We could not ascertain the value, but it was of course several thousand dollars. The bars attracted a great deal of attention when brought to the express office, as is usually the case here when it is known that bullion is shipped.

Plumas.

SPANISH RANCH.—Cor. Plumas *National*, March 9: Bedrock cleaning on Gopher Hill is in full blast. Messrs. Patten, Duncan & Co. are up from the lower country, and will likely start work on Ohio Point quartz mine. They are also taking a look at the McGowan ledge. Mr. Cameron of Oakland, the new superintendent, is pushing work on the French Ravine ledge, which is showing up finely. The Hallsted Bros. are taking out quartz on the Rich Gulch ledge, and will start the mill in a short time. This will be a good year to prospect, and no doubt much of it will be done.

Shasta.

HYDRAULIC MINES STOPPED.—Shasta *Courier*, March 16: The closing down of the hydraulic mines of Western Shasta is a most infernal outrage on the part of the Government officials. The amount of debris that reaches the Sacramento river from these mines is very trifling and immaterial, and the water in the river flows discolored below the mouth of the streams on which the enjoined mines are located. All of these mines are on clearly mineral land, and some of them on land bought as mineral from the Government. What did the owners of such land purchase them for except to mine upon them—to extract the gold by practical appliances? If the Government goes back on these purchasers, who have been at great expense in fitting their mining property for proper working in addition to having paid for their land, then we say that the Government is guilty of obtaining money under false pretenses, is a fraud and practically a thief.

RICH.—The Sierra Buttes Mining Co. is pushing its tunnels on the Uncle Sam mine on Squaw creek. A new tunnel has tapped a nine-foot ledge of free-milling ore, very rich. This company knew what it was about when it paid Jack Conant $150,000 for the mine.

Sierra.

WATER SUPPLY.—*Mountain Messenger*, March 16: The recent heavy showers have given an abundant supply of water for our miners, enabling the Young America and Sierra Buttes Co.'s to continue work, and the Buffalo and others to resume operations. The Salinas and Mercer is also reported as having sufficient water to run, and also the Keystone.

Siskiyou.

RIVER MINING.—Yreka *Journal*, March 16: The mines are being opened up again in the Salmon River section for spring and summer work. Mr. Ball, of the old Klamath mine, now known as the Golden Ball quartz mine, has struck a rich find. Mr. James, whose claim has been frozen up during the past winter, has again resumed operations. His drifts have been very productive in the past and it is hoped will turn out this year very satisfactory. Messrs. John Doherty and John Barry are also working a rich vein in the Only Chance claim. Messrs. Schroeder & Werner will commence work again for the spring and summer at their quartz mines on Deadwood, this week, and in a short time will add new and additional machinery, to increase the crushing capacity of their mill. They need about 20 hands and have secured several already. The amount of quartz in sight is sufficient to keep a ten-stamp mill in operation for the next 20 years, all of it paying very satisfactory. The placer miners on Humbug creek are not doing much at present, waiting for storms to furnish water, but the quartz miners are busy taking out quartz. There will be more extensive operations in quartz on this stream, during the coming spring and summer season, than for many years past. The river miners on the Klamath are all making active preparations to commence building wingdams, by getting out the necessary timbers, besides having lumber hauled from the sawmills. A number of mines bonded in this county are to be worked on an extensive scale during the coming summer, by the addition of new machinery and plenty of help.

San Diego.

MINE SOLD.—Los Angeles *Mirror*, March 16: C. E. Whelpley, of the firm of Whelpley & Southworth, has just returned from the Julian mining district, San Diego county, whither he was accompanied by D. C. Kling, a mining expert of St. Louis, Mo. Mr. Kling, who is himself an extensive mine-owner in Nevada, purchased from Mr. Whelpley, for a St. Louis syndicate, the Kentuck mine at Banner, five miles below Julian and 65 miles from San Diego, the price being $25 000. The Kentuck is a gold-quartz mine and was worked years ago by a man named McEwing. It has lain idle 10 years. There is one shaft down 160 feet and several others 100 feet, with dozens of drifts and crosscuts. The ledge, which is well defined, is eight feet wide at the bottom, and samples of ore show free gold. The syndicate proposes to begin work as soon as possible.

Trinity.

RUSH CREEK. — Trinity *Journal*, March 16: Messrs. Ehrman & Hancock, as soon as weather permits, will run in a tunnel on the ledge discovered on Rush creek some time ago by Henry Ehrman. The vein is from 6 to 7 feet in width and carries free gold; the ore is not high grade, going from $8 to $10 a ton. The ledge is about one-quarter of a mile from Paulsen's store. There are a number of small ledges in that vicinity, all of which carry gold, but nothing permanent has been discovered yet. The chances of ultimately developing in them something of value are very good. John Anderlina and J. W. Hancock have invented a stamp quartz-mill. The model is simple and looks as though it would work well. They will apply for a patent.

Tulare.

GARNETS.—Visalia *Delta*, March 14: A discovery of the genuine garnet of the pyrope variety has been made lately by Mr. O. D. Barton on Rattlesnake creek in Drum valley, this county. The specimens left in the *Delta* office are small, but we have no doubt that a ledge exists in the same locality, where a species of this precious stone is found in larger sizes. A more common variety is found in large ledges in the vicinity of Three Rivers, this county.

Tuolumne.

PROVING RICH.—Tuolumne *Independent*, March 16: The Mandich Bros.' claim, between Volcano and Sutter Creek, gives promise of proving a bonanza. The shaft is down 45 feet, the vein varying from four to nine feet, and growing larger and increasing in prospects as depth is attained, showing considerable free gold in the rock. They have their tunnel in 120 feet, all on the pay shoot, and with a 400-foot tunnel can tap the vein 300 feet from the surface. There is plenty of timber and free water. On the extension claim, which has been prospected, the show is as good as on the original location. John Paul Dart of Sonora is a partner in the extension.

NEVADA.

Washoe District.

BEST & BELCHER.—Virginia *Enterprise*, March 16: Quartz that carries some metal is being found on the 350 level.

CON. CAL. & VA.—The usual quantity and grade of ore is being extracted from the various openings on the 1400, 1435, 1500, 1600, 1650 and 1950 levels. The stopes on the 1650 continue to look well and are yielding a large amount of ore. The usual quantity of ore is being shipped to the river mills, and the average of the battery assays will be about the same as last week. Both river mills can now be run to their full capacity.

CONFIDENCE.—The west crosscut on the 1300 level is in vein material of a promising appearance. A good deal of prospecting is being done in various parts of the mine. The ground has a fertile appearance and all indications are good for finding paying deposits of ore. The ore shipped to the Brunswick mill averages about $27 a ton. The first bullion shipment sent below on March account amounted to $16,466.05.

HALE & NORCROSS. — The continuation upward of the 500 level ore body, where found on the 400 level, is showing well. Good ore is being found in the upraise from the 500 level. The connections between the 500 and 600 levels give a good circulation of air in the ore stopes. The shipment of $34,673 55 brought the total for the month of February up to $78,097.77.

CHALLENGE.—The top of the joint Confidence raise above the 1100 level continues in clay and quartz of a promising appearance. The joint west crosscut on the 300 level is in vein material of a favorable appearance. The ore is being shipped to the Brunswick mill, and averages $27 a ton.

CROWN POINT.—The raise from the 800 level crosscut is in ore that shows some high assays, but it only averages a low milling grade. A great deal of ore is found on the 400 and 600 levels. On the latter some very rich ore is being found. Are shipping weekly nearly 900 tons of ore.

SAVAGE.—Are shipping over 500 tons of ore a week to the Rock Point mill. The battery assays average nearly $20 a ton. Have shipped bullion of the value of $10,531.20, making the bullion product of the mine $29,066.16 for the month of February.

CHOLLAR.—The usual amount of ore is being extracted, and a great deal of prospecting is being done at various points. The Nevada mill is now doing good work. Now that water is abundant they will be able to start up the whole 60 stamps.

BELCHER.—The east crosscut on the 200 level is passing into material that carries some promising streaks of low-grade quartz. Some prospecting is being done on the 1300 level.

OCCIDENTAL.—Ore is being obtained on the 300, 350 and 450 levels. Some favorable quartz is being obtained on the 650 level. Good progress is making in the grading of the site for the new 20-stamp mill.

OVERMAN.—The stopes are yielding the usual amount of ore, which is being worked at the Vivian mill. On the 6th inst., bullion to the value of $9171.16 was sent below.

YELLOW JACKET.—A good deal of prospecting is being done, and the material encountered promises well. On the 300 level some good ore is showing.

BALTIMORE. — Are still finding a considerable amount of ore of a good quality on the 300 level west, all of which is being saved for reduction.

NORTH OCCIDENTAL.—Work is being done on the 250, 350, 400 and 450 levels. On the 250 level some ore of low grade is being found.

SIERRA NEVADA.—A considerable amount of prospecting is being done and some ore of low grade is now being encountered.

UTAH.—The incline winze below the 600 level is in a formation of quartz and porphyry that shows metal.

ALTA. — The ore producing sections of the mine are yielding all the ore that the mill is capable of working.

SILVER HILL.—The shaft is being put in order preparatory to resuming work in the old lower levels.

POTO I.—The ore-producing sections are looking well, and a good deal of prospecting is being done.

GOULD & CURRY.—On the 450 level the south drift is in a quartz formation that gives low assays.

SEG. BELCHER.—Good progress is being made in the new west crosscut on the 1300 level.

JUSTICE.—The ore stopes are looking well and the mill is kept going to its full capacity.

UNION CON.—The north lateral drift is in a mixture of quartz, clay and porphyry.

CON. IMPERIAL.—The work now being done is principally in the way of repairs.

MEXICAN.—The west crosscut is in vein material that carries some metal.

OPHIR.—The raise above the 1465 level is still showing some metal.

BULLION.—Explorations are still continued on the 500 and 600 levels.

ANDES.—Are extending the drifts on the 175 and 350 levels.

SCORPION.—Are still pushing the crosscut on the 300 level.

Eureka District.

MAY START UP.—Eureka *Sentinel* March 16: The Eureka Con. Co. will soon receive some 700 tons of coke, several carloads of which arrives by every train. This indicates that their furnaces will start up in the near future.

Palmetto District

ACTIVE.—Cor. Esmeralda *News*, March 16: Palmetto is still active, 15 men being employed at the mine. Five stamps will be added to the mill, also concentrators, when Palmetto will become one of the prominent bullion-producing camps of the county.

Silver Peak District.

CLOSED DOWN.—Cor. Esmeralda *News*, March 16: The Silver Peak mines, owing to some unforeseen reason, are shut down once more. Mr. Brunton, the representative of the owners, had just arrived from London, where all arrangements had been made for the sale of the property to the English company. According to mining experts, the gold mines at Silver Peak are the largest on the coast, although the ore is of low grade. To make up that deficiency, there are mountains of the precious metal. It is estimated that if the property should be sold, together with the erection of a mill and supplying the same with water-power, the cost involved would amount to about $1,500,000.

Sunrise District.

PROSPECTORS.—Virginia *Chronicle*, March 13: A party of four prospectors left Sunrise district to develop a mining location made there last year. There is a shaft 250 feet in depth on the property. The shaft is timbered with cedar cut in the vicinity and put in place without squaring it or even removing the bark. Although the timber was placed there 25 years ago, it shows no signs of decay. The shaft is caved some distance above the bottom and will be cleaned out to ascertain the size of the vein, ore

from which assaying above $90 per ton is scattered about the dump near the shaft's mouth.

Tuscarora District.

BELLE ISLE.—*Times-Review*, March 16: West crosscut, 250-foot level, extended 20 feet. Rock in the face somewhat harder, with spar seams coming in.

COMMONWEALTH.—225-foot level: Drift from No. 1 winze has been extended 8 feet, all in ore. Stull timbers are being put in already for stoping. No. 1 upraise has been carried up 9 feet, and will connect with No. 2 east lateral winze within a day or two. South drift from No. 1 west crosscut has been extended 16 feet. 300-foot level: No 1 west crosscut has been extended 15 feet. South drift from No. 1 west crosscut has been advanced 16 feet, cutting seams of high-grade ore.

NEVADA QUEEN.—The stopes have changed but little since last report. Average assay of concentrating ore hoisted during the week has been $18 per ton. The concentrating works are doing well and run steadily. The ore chutes and tracks at the mill are being put up as fast as possible, and the mill will start up on or about April 1st.

NAVAJO.—No. 5 upraise, 350 level, has been carried up 10 feet, and a drift run therefrom 10 feet on the vein, showing a good width of high-grade ore. The usual quantity of ore has been sent to the mill. The various stopes are looking well.

COMBINATION SHAFT.—The Combination shaft has been sunk and timbered 15 feet. The rock is growing harder and shows faces of ore. The north drift from the Commonwealth line, 150-foot level, extended 18 feet.

GRAND PRIZE.—400-foot level: Face of south drift advanced 13 feet and shows 2 feet of good concentrating ore. East crosscut from south drift extended 14 feet.

FOUND TREASURE.—The pump has been run every second day. There has been some decrease in the water during the last two weeks.

NORTH BELLE ISLE.—North drift, 500-foot level, extended 15 feet. The stopes above the 300-foot level show some first-class ore.

ARIZONA.

REPORTED STRIKE.—Tombstone *Epitaph*, March 16: Another reported strike in this district, this time being nearly two feet of between $600 and $700 ore in the Nicholas mine. Well, it is said that many rumors will make a war, and perhaps many rumors will make a genuine strike in Tombstone after awhile.

COLORADO.

THE CARBONATE CAMP.—Denver *Republican*, March 16: The Leadville district is in better condition at present than at any time in the past history of that wonderful mining camp. Unless a reaction should set in, which is not probable, Lake county will produce more silver and lead this year than during any 12 months since carbonates were first discovered there. The daily output now, for six days in the week, is placed at 1600 tons a day, over two-thirds of which is fine silver-bearing ore. This vast production is destined to show immense values for the mines at the close of the year, and instill renewed confidence in the district. The mining operations of Lake county are also upon a more substantial and satisfactory basis, insuring a steady increase in mining and greater stability to the industry. There is a great deal of money behind the leading mining enterprises of the district at present, as well as experience and determination, the three constituting a combination that cannot fail to prove successful. Nearly all the mining and prospecting companies working in the county are well provided with funds, and a great deal of new exploration work is in progress, much of which will be continued to a successful conclusion. Considerable leasing is still being carried on in the district, but this character of mining has passed into more reliable and competent hands. The majority of lessees now working are intelligent, practical miners of business experience and mean to carry their ventures through. The failures and business stagnation of Leadville 60 to 90 days ago were unquestionably due to a general abuse of the tribute system. For a time leases were let by mining companies to miners indiscriminately, and irrespective of their financial means or business ability. As a consequence merchants and professional men were called upon and induced to advance capital and maintain these incompetent leasers. Other tribute works used the fact that they were working under lease to secure heavy and extended credits. Failure necessarily followed incompetent work, and the merchants all lost heavily, and a dozen or so of the smaller dealers failed. The lesson was an expensive one for Leadville people, but it will not be forgotten. The experience shows that the average practical miner is invaluable in his place, but the simple knowledge of how to wield a pick or hammer is not sufficient to find ore or operate a mine economically.

DAKOTA.

BALD MOUNTAIN. — Deadwood *Pioneer*, March 16: Dick Richards, down from Bald Mountain yesterday, is enthusiastic over an ore strike in the Eclipse. Work was resumed a few days ago in an old tunnel on the property, and had progressed only five feet when the ore was first struck. Dick, who is interested in the Ruby Bell and other well-known properties in Ruby, states the Eclipse is the best mine in the camp. The most favorable reports are heard from the Diamond Queen. The company has just completed a 100-foot tunnel, which has crosscut two distinct ore ledges, one five, the other 15 feet wide. One of the directors, who visited the property Tuesday, states that were reduction works operating, his company alone could supply all the ore required to run them.

IDAHO.

CLAYTON.—Cor. Idaho *Messenger*, March 12: Clayton is located in the heart of a rich mining region, and is about 30 miles from Challis, the county seat of Custer county. It is walled in on either side by mountains and traversed by the Salmon river the entire length. The Ella mine is looking well, and it is expected daily that the big ledge will be struck in the lower tunnel. The Silver Rule, on Slate creek, 12 miles above Clayton, is working about 50 men, its showing is good, and promises to be one of the best, if not the best mining propositions in the Territory. The Cinnabar, on Slate creek, will start up in the spring with a large force of men. This is the mine that was formerly owned by the Kirk Bros., and was stocked by Eastern parties, a few months ago, for the sum of $2,000,000. The smelter will start much earlier this spring than usual, as the roads are in good condition for heavy freighting at the present time. The present encouraging outlook for Clayton indicates a "big boom" there next summer.

LOWER CALIFORNIA.

CONFLICTING REPORTS.—National City *Record*, March 14: During the last few days several of those who recently left for the new gold-fields in the Santa Clara valley, Lower California, have returned, but it is hardly possible to come to any definite conclusion as to the outlook at present or the possibilities for the future, from what these people report, on account of the wide diversity of their respective stories. Some of the disappointed ones tell very discouraging tales and come back richer in experience only, but poorer in pocket, while others confirm the news of last week, and state that the mines are all they have been claimed to be, backing their statement with the announcement of their immediate return to the camp. It is just possible that the grumblers are not the right kind of people to be successful in a mining camp, and have not given the placers a sufficient trial, but nevertheless their woeful tales and the sincerity with which they are given should serve as a warning to all who had exaggerated ideas of the ease with which fortunes are made by inexperienced men in the mines. It is apparent that the canyons in the Santa Clara valley are gold bearing, and it is established beyond a doubt that rich finds have been made there, but only to the patient worker comes the reward, and even he is often unfortunate and cannot strike "color" during months of hard labor. The report of three well-known citizens of National, who returned from the camp on Monday and leave again for there to-day, follows. It bears the stamp of truth and is reliable. It is not published to induce any one to start for Lower California or to advertise the mines, but simply as the best and most authentic report so far received from the new camp by the *Record*. On Monday afternoon J. C. Crenshaw, Capt. Sam McHenry and John E. Clouse arrived here after a 52-hour trip direct from the new mining camp in the Santa Clara valley. Their arrival created much excitement, owing to the fact that they were the first party of nationalities who returned from the diggings with reliable information. Their report, while conservative and not at all sensational, is a highly satisfactory one, and proves beyond any possibility of doubt that the prevailing excitement is founded on bonafide facts, and that the new El Dorado is indeed destined to become a great mining camp. Mr. Crenshaw, to whom the *Record* is principally indebted for the following information, is most positive in his assurances of the richness of the mines, and he, as well as those who came with him, will at once return to the camp. It is learned that the roads to the camp proper are in a very good condition and that contrary to prevailing impressions, wagons can easily travel all the way through. The weather is not nearly as cold as reported, the days being mild and only the nights being considerably colder than here. There is no snow in or near the camp. The placers are located in four gulches, which join into each other and are called Mexican gulch, where the first discovery was made, the American gulch, the Indian gulch and the Alamo gulch. The Judges' tent and the Mexican soldiers are located in the American gulch. These ravines are many miles long and afford ample room for thousands of prospectors and miners. On Saturday afternoon last about 1000 people were in the mines, about one-half of them being actual workers with located or denounced claims. Since then people have departed for there at a rate of about 200 per day. All who work persistently make more or less money and rich finds are daily occurrences, but there are many people there who work only a few hours, expecting to find a pocket at once, and of these, the gambling, dissatisfied element is composed. Many of that class will probably shortly return and give the place a black eye by denouncing it as no good. The camp is a very orderly one, although liquor is sold there, and the best of feeling exists between Mexicans and Americans. The Mexican judge is impartial and just and the soldiers act as police, keeping everybody and everything straight. Provisions are plentiful, although, with the exception of fresh beef, which is 12½ cents per pound, they are high priced. Flour was quoted at $12 per 100 pounds last week. Firearms must be left in the camp, and individuals are not allowed to carry them around.

MONTANA.

A SMELTER FOR CASTLE.—*Mining Review*, March 16: Mr. I. N. Knight, a prominent mining man of the Castle Mountain district, has been in the city during the past week on business looking toward the future prosperity of his particular section of the country. Mr. Knight is very anxious to establish a custom smelting plant in Castle, and claims that a 60-ton smelter would experience no difficulty whatever in securing ores to keep it constantly employed.

UTAH.

REVIEW.—Salt Lake *Tribune*, March 15: The week has been a quiet one in mining circles; no special event marks it, but the general outlook is very fair. The receipts in this city for the week ending March 13th, inclusive, were to the total value of $110,159.33, of which $44,635.33 was in ore, and $65,524 was in bullion. For the previous week the receipts were $113,458, of which $62,658 was in bullion and $50,800 was in ore. The product for the Ontario for this week was of bullion, 22,715 68 fine ounces; from ore sales, $24,581.21; an approximate total of $47,296.89. The Daly output during the week was from ore sales, two lots, $15,899.87; no bullion. The Horn silver prospects are growing better; its ore product is fair, and the prospects in the new shaft are encouraging. Fine bar receipts in this city for the week were to the value of $23,815; base bullion, $20,459. The Hanauer smelter produced during the week bullion valued at $21,250. Ore receipts here for the week were $16,835.33 in value by Wells, Fargo & Co.; $27,800 by McCornick & Co.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, March 21, 1889.

General trade was quiet up to to-day, when more activity is noted in all lines, due to clear skies and a more hopeful feeling regarding the future. Houses having salesmen on the road report stocks generally held by interior merchants to be light, which will necessitate early replenishing. Among iron-workers business continues light, but they are buoyed up by the confirmed reports that with more settled weather many orders for work will be placed. The outlook favors the belief that when business does open with them, it will prove very active.

The local money market continues to shape itself to easier terms for borrowers. The commercial and savings banks report, as a rule, deposits increasing and only a fair call for funds. There is a more general disposition to draw funds from the East for use in this city. It is claimed that there is a lessened call for funds from the country, which, it is affirmed, goes to show that interior local capitalists are more disposed to loan money on realty than when the weather pointed to a dry season. The call for money for speculative purposes continues light, as the light trading in futures on Call and in local and mining securities indicate. It is claimed that soon after more settled weather is had, there will be quite a revival in the speculative markets, and consequently a freer demand for funds.

The lumber trust has advanced prices, which will probably tend to delay many contemplated improvements. On the 14th instant the pine men made a general advance of $2 per thousand. On the 15th inst. the retailers made an advance of $3 per thousand. The redwood men are inclined toward an advance. Manufacturers are talking higher prices.

The steamship Belgic sailed to-day for Japan and China, taking out the following treasure: Mexican dollars, 216,744; gold coin, $11,101; and silver bullion, $150,000. Total, $377,845.

SILVER—The market does not show as much firmness in comparison with prices ruling up to two weeks ago. This is due to a decline in exchange on New York. For shipment by the last steamer sailing for China there was only one buyer, and in consequence the prices paid are said to have been about one-eighth of a cent below New York prices. The output of the mines on this coast is still light.

MEXICAN DOLLARS—There was more doing the past week, owing to a fair demand for shipment to China. Prices paid ranged from 73 to 73¼c, although sales in a small way were made by dealers at a slight advance.

QUICKSILVER—Another shading in prices is reported. The demand is still slow, although the outlook is favorable for a large increased consumption in the near future. In last month there was over 216,000 lbs. sent overland from this city.

LEAD—The market continues fairly active, with Alaska and Sacramento canners the chief buyers of pig. Values remain unchanged, although a slight shading is said to be obtainable by a large buyer.

TIN—The imports of tinplate the past week aggregated 1003 boxes from New York by "rail." The market is steady at full prices for both spot and prompt loading. The call is quite good, chiefly from Alaska and Columbia river canners. Advices from England report a syndicate forming on the part of American buyers to control the production of tinplate in South Wales.

BORAX—Receipts the past week aggregated 182,000 lbs. The Charmer for New York took out 788,744 lbs. The market is steady.

IRON—Imports the past week aggregated 300 tons of pig from Puget Sound. The market is dull but steady. The stock of foreign here and to arrive is ample to meet all requirements for several months to come, unless the consumption should enlarge. The output of the Oregon Iron Co. and of the Puget Sound Iron Co. is chiefly under contract. The bulk of the former is used in Oregon, while that of the latter is taken here.

COAL—Imports the past week aggregate as follows: Japan, 1340 tons; overland, 283; Wellington, 4700; Australia, 2744; and Nanaimo, 4073. Total, 10,440 tons. The market is weak and in buyers' favor, which makes it difficult to give exact quotations. The South Pacific Railroad Co. will have, in connection with their sailing vessels from the Sound, two steam colliers in service between this port and their mine in British Columbia. By this means they can not only supply their own wants, but have a small surplus to sell to their employes at cost prices. The yards in this city are full, while large consumers have supplies to meet their wants for several weeks to come. Mail advices from Newcastle, N. S. W., report that the tonnage in port and listed to arrive for this port was comparatively small, but cable advices report that improved wheat crop prospects in this State will send more vessels here.

COPPER—The market the past week did not show any material change. To sell, low prices had to be accepted, but from 15 to 16c had to be paid in New York. Many large consumers at the East have contracted at 16½c up to June next, while others have good stocks on hand.

Eastern Metal Markets.

By Telegraph.

NEW YORK, March 21, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42½	93	$15 50	$3 72½	$21 40
Friday	42½	93	15 50	3 75	21 45
Saturday	42½	93	15 60	3 72½	21 30
Monday	42½	93	15 25	3 70	21 00
Tuesday	42 9-16	93½	15 00	3 72½	21 05
Wednesday	42⅝	93⅝	14 75	3 70	21 20

NEW YORK, March 21.—The past week has been very quiet in copper, owing to the uncertainty regarding the future. The prevailing opinion among the better informed is that from the ruins of the French syndicate, a new one will be formed, which will be stronger in every respect than that one gone to the wall. Holders of copper have not forced sales, but express considerable confidence in the future. Tin has fluctuated some, closing easier. Lead has moved to a fair extent. Large consumers buy sparingly.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, March 21, 1889.

ANTIMONY	13 @ 14
BORAX Refined	7½@ 7¾
Powdered	7½@ 7¾
Concentrated	6½@ 7¼
COPPER—	
Bolt	26 @ 27
Sheathing	26 @ —
Ingot	18 00 @19 00
Fire Box Sheets	— @ 26
IRON—Glengarnock ton	27 @ —
Eglinton, ton	26 @ —
American Soft, No. 1, ton	— @31 00
Oregon Pig, ton	— @30 00
Clay Lane White	— @24 50
Shotts, No. 1	— @28 50
Bar Iron (base price) ₱ lb	2½@ 3
Chrome iron ore, ₱ ton	00 @10 00
LEAD—Pig	4½@ —
Bar	5 @ —
Sheet	8 @ —
Pipe	7 @ —
Shot, discount 10% on 500 bags Drop, ₱ bag	1 55 @ —
Buck, ₱ bag	1 75 @ —
Chilled, do	1 95 @ —
STEEL—English, lb	16 @ 20
Canton tool	9½@ —
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Tool Calk	4½@ —
TINPLATE—Coke, prompt shipment	4 95 @ 5 00
Coke on spot	5 50 @ 5 75
Charcoal, 14x20	6 50 @ 7 00
do roofing, 14x20	5 37½@ 5 50
Pig tin, ₱ lb	22½@ 23
QUICKSILVER—By the flask	40 50 @41 00
Flasks, new	1 05 @ —
Flasks, old	85 @ —
COKE—English, ton, spot	20 00 @— —
Do, do, to load	13 50 @13 75

Coal.

TO LOAD.

	Per Ton		Per Ton
Australian	$ 6 50 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Sydney	$ 9 00
Scotch Splint	9 00	Gilman	7 00
West Hartley	10 00	Seattle	7 00
Greta	9 00	Coos Bay	6 00
Westminster Brymbo	9 00	Cannel	10 00
Nanaimo	9 00		

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY CO.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING MARCH 12, 1889,

399,374. — ARTIFICIAL SLATE — Calvin Brown, S. F.

399,515.—BRAKE—John Fulton, Biggs, Ogn.

399,524.—COMPOUND CABINET ENGINE—E. W. Hamlin, S. F.

399,328.—DYNAMO ARMATURE — J. A. Hayes, S. F.

399,615.—ROLLER BEARING—R. W. Hent, S. F.

399,497.—SHIPPING RECEIPT COVER—D. K. Howe, Portland, Ogn.

399 412.—FENCE MACHINE — G. W. Johnson, Dallas, Ogn.

399,337.—WEED-CUTTER — F. E. Lux, Walla Walla, W. T.

399,345.—CAMERA ADJUSTER—H. E. Pohlman, S. F.

399 284.—WALL FOR HOUSES—W. R. Ray, Los Angeles, Cal.

399,444.—FOOTBOARD FOR WOOD-CHOPPERS—A. L. Stevens, Little Falls, W. T.

399,451.—HASP LOCK — W. Tiffany, Creswell, Ogn.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

COMPOUND CABINET ENGINE.—E. W. Hamlin, S. F., assignor to G. G. Wickson. No. 399 524. Dated March 12, 1889. This invention relates to that class of compound engines which employ one steam cylinder and the trunk form of piston head, the working parts being inclosed for automatic lubrication. The object to be attained by this invention is a high grade of economy and proficiency when applied to smaller sizes of compound engines, and especially under a high rate of speed. These engines may be constructed either as upright or horizontal, the results being the same in either case.

CAMERA ADJUSTER.—Henry E. Poehlman, S. F. No. 399,345. Dated March 12, 1889. This invention relates to a means for adjusting and regulating the position of the camera on the tripod; and it consists in the combination of a plate secured on the top of the tripod, a plate secured to the base of the camera and connections between said plates whereby the latter may have an axial movement, a movement forward and back and a movement from side to side. The object is to provide a means for attaching the camera to the tripod of such character that the camera may turn axially and may be adjusted to any inclination up or down, or to any inclination laterally, so that, notwithstanding the position of the tripod, the camera may be properly adjusted.

THERE is some excitement about mining discoveries in the Black Knob mountains, below Sacramento canyon, Nevada.

MECHANICAL PROGRESS.

Steel Castings.

In a paper read before the American Society of Mechanical Engineers, Mr. R. T. Morgan, Sr., said:

All of the conditions specified for castings of iron must be duplicated in the manufacture of steel castings, but on higher and more exacting planes. In the manufacture of iron castings, most of the practice of the world has been carried on (governed in the many conditions necessarily specified here as to the use of mixtures of material) by grades bought from leading producers according to the standards fixed by the breaking and eye test, using cupolas or air-furnaces with coke and coal to do the melting. All the operations depend on the crude tests last specified, and the reliability of the supply of the best materials from reputable manufacturers of coal, coke and iron. A great many responsible, reputable founders, having experienced, practical men employed in their foundries under such conditions, have turned out some of the most varied, complicated and best castings made for years. Some few of the modern and best have had their chemical laboratories, and as far as material is concerned, have gone beyond the general practice of iron founders and are certainly entitled to the best results. But while these show by comparison the possibility of getting the best iron castings, just as wrought iron has been manufactured in rolling-mills under similar crude practical conditions, the manufacture of the many grades of steel required for the best steel castings of varying sizes and kinds has made necessary all the higher conditions of chemical and practical knowledge combined. Steel castings, by whatever method the steel is melted—whether open-hearth, Bessemer, crucible, or some other—require each a different treatment to produce similar results in two different kinds and sizes of castings, following with keener practical care every operation specified for iron castings. After this, practical machine and other testing records should be made, so that every known practical chemical operation shall have been recorded for future use, with a careful watch also upon the practical use of castings made. All this takes time, just as has been necessary for the steel-rail men to find out its necessary good qualities. Steel castings require higher-class conditions than iron, depending more on the chemical than practical, but requiring both to a higher degree for steel than iron. The manufacturer having the best general conditions, and who will have the desire and determination to take none but the best stock, will certainly make the best steel castings. To enable him to do so it will be necessary for him to get the best encouragement possible from the purchaser of steel castings at lowest competing price, but will be willing to pay more for the best castings made under careful and costly conditions than for castings not so good made under inferior conditions. This latter enters into the question as much as either and all of the others.

Steel castings made and annealed well have an average of at least four times the tensile and wearing qualities of best cast iron. With the many conditions specified here carefully attended to, the splendid results attained by leading manufacturers of iron castings in the leading countries of the world are possible, and I have not the least doubt that their success will be fully equaled in time in steel castings. Of this we have many satisfactory evidences already from some leading manufacturers of steel castings, who have turned out complicated examples both large and small.

Does Machinery Run Better at Night?

In an article from the pen of R. James Abernathy, the following is taken relative to the inquiry whether machinery runs better at night:

Very few persons most emphatically declare that there is no difference as between the day and night time operations of machinery, notwithstanding that the preponderance of the evidence, based on actual experience and observation, is against them, and in favor of the oft-repeated declaration that machinery does run stronger by night than by day. At first glance, I would, as a rule, have been as quick to denounce the declaration as a purely visionary deduction of a distorted imagination; but long experience has taught me that all statements or positions, well supported by evidence, will bear careful investigation, and therefore instead of rejecting the question as simply theoretical, I have busied my brain in the discovery of a probable cause for such results, and long since became convinced that the changes in nature, and especially in atmospheric conditions, that are constantly taking place, afford a very reasonable explanation of the proposition. The changed conditions favoring the stronger movement of machinery do not necessarily and always occur at night, but more frequently at night than at any other time; and hence the reason why, by actual observation, machinery is credited with running stronger at night than by day. The favoring conditions do not always occur at night, and sometimes occur during the daytime; but, owing to the numerous duties and activities in which men are engaged during the day, the changes are not noticed so readily as at night, when there is naught to do but watch the operations of the mill.

As viewed by the writer, the causes of the changes in the operation of machinery are largely due to the changes in the weight and density of the atmosphere. Where machinery is propelled by water, there are the most logical reasons for believing that it will run stronger when the atmosphere is what we call "light" than when it is heavy, because as the air grows lighter, water relatively increases in weight, which permits a given quantity of it to do more work in a given time.

We all know that a body will fall in a vacuum with much greater force than it will in open air. A feather will accompany a more solid body in its descent in vacuum, while in the open air it will float off or descend very slowly. So, at least, we have all been taught in elementary philosophy. If that proposition be accepted as a fact, it then becomes evident that as the density of the atmosphere is lessened, the effectiveness of falling bodies is increased in that proportion. Water can perform no work except by falling through space. It seems clear enough that with a minimum hindrance in the way of atmospheric resistance, a maximum amount of work can be performed. Also, machinery can be moved more freely and with less power with decreased atmospheric resistance. With the water relatively heavier and resistance less, why should not the machinery run stronger?—*Western Machinist.*

A ROLLING-MILL FOR ALUMINUM.—As an evidence of the growing importance of aluminum in the arts, it is noted that a new plant of considerable capacity and dimensions has just been laid down at the works of the Oldbury Aluminum Company, Oldbury, England, for the production of rolled sheet, strip, and wire in aluminum, for use by steelmakers, engineers, ironfounders, cycle manufacturers, and others. For sheathing purposes it has recently been found particularly useful. The new plant includes two large rolling-mills, one of which will be set apart for rolling rods and sheets both in aluminum and bronze alloys. An engine of about 100-horse power has been constructed in this mill with a complete set of rolls similar to those used in ordinary forges. A number of annealing furnaces have also been built. It is estimated that this mill, when running full time, will turn out ten tons of finished metal per week. The wire-mill will, it is thought, produce about five tons per week of aluminium or bronze wire. This will have also a separate engine and complete set of wire-drawing appliances. The aluminium wire will be drawn cold, in the same way as brass wire. The sheets of metal will be also rolled cold like sheets of brass and then annealed. A foundry is also provided for supplying these mills with strips and other castings for manufacturing into rods and sheets. The foundry has six furnaces, which will turn out sufficient material to keep both the mills running.

NAILS OF TINNED SHEET IRON.—Scraps of tinned iron have long been a waste product, whose application, for any purpose worthy of the intrinsic value of the metals contained in them, has been an unsolved problem. It is true that scraps of this kind have been cast, but the hardness and granular structure render the metal fit only for use as weights. Also, to a slight extent, the tin has been removed by electrolytic processes. But there has not been any definite use of this product as a material manufacture until its recent use for nails. Scraps of tin are cut by dies into rectangular bits, with a length of about three times their width. These scraps are then fed from an automatic hopper between dies, when they are squeezed first to square form, like a nail, and then headed. Nails of this kind are well fitted for many purposes, being free from tendency to rust, also light, very rigid, and capable of being driven into the hardest wood without buckling.

WHY NOT COMPOUND LOCOMOTIVES?—The Pennsylvania has recently imported from England a compound locomotive, of the design used on the London & Northwestern and other English railroads, where it is meeting with success as to cost of running. No modern steamship is now built without having compound, triple, or quadruple compound engines, which have resulted in an enormous saving of fuel. There should be no reason why the same principle applied to our locomotives should not produce the same results. Evidently this is the entering wedge for compound locomotives on the Pennsylvania system if the results obtained from the "Webb" prove satisfactory. A cotemporary suggests that our American mechanics give this question careful consideration, for, unless we do, our railroads will be going to England for their locomotives.

A NEW PROCESS has been brought out in Vienna for the manufacture of copper-coated steel wire for electrical purposes. The old method was galvanic, while according to the one now proposed, the steel wire will be coated by spirally winding around it very thin copper bands. The object in all such wires is to combine the great conducting-power of the copper with the tenacity of the steel.

THE breaking strain of iron and steel does not (as hitherto assumed) indicate the quality. A high breaking strain may be due to extreme softness. The contraction of area at the fracture forms an essential element in estimating the quality.

SCIENTIFIC PROGRESS.

New Relations Between Light and Electricity.

On repeating the well-known experiments in the perforation of insulating plates by the electric spark with plates of various minerals, Prof. Marangoni has obtained certain curious results. Particularly, with plates of Iceland spar, obtained through a cleavage parallel with the rhombohedron, the following results are obtained: (1) the hole made in Iceland spar by the electric discharge is in a straight line, while in glass it is zigzag; (2) the discharge, instead of following the direction of the planes of cleavage, as might be expected, follows that of the principal axis of the rhombohedron, that is to say, the optical axis; (3) along the aperture there are observed two slits situated in two planes at right angles with each other, and which are intersected by the hole itself, say the optical axis. One of these slits is found in the principal section.

As a general thing, the first spark pierces the plate. Prof. Marangoni experimented with various minerals, such as fluorspar, selenite, muscovite and topaz; but, as the specimens were defective, the results were of no account. A beautiful specimen of rock salt, on the contrary, gave excellent results. With plates parallel with the plane of the cube and varying from 5 to 10 mm. the electric discharge perforated them at right angles with their faces and produced two slits at right angles with each other, and consequently with the faces of the cube, and several other small slits at right angles with each other and bisecting the angles of the first. The smallest slits were therefore in planes parallel with the faces of the dodecahedron.

The facts thus made known have led the professor to conclude on the following relations between the propagation of electricity and that of light:

1. Light and electricity in a medium of regular molecular structure, are propagated in a straight line.

2. Light and electricity, in a minimum of time, that is to say, with the least resistance, take certain directions which are those of the axes of elasticity, or certain directions having determinate ratios to such axes.

3. Light is a transverse vibratory motion, and, in non-isotropic bodies, is decomposed into two rays, so that the plane of the vibrations of one of the rays is at right angles with the plane of the vibrations of the other.

The electric discharge produces slits at right angles with its own direction, and these slits are not, as a general thing, produced according to the planes of cleavage. This would countenance the supposition that electricity also admits of transverse vibrations like light, and might likewise be polarized according to two planes at right angles.

Light, in an amorphous medium, such as glass, changes direction at the least accident, and the trajectory of the luminous vibrations is then very complicated.

So, too, the slit produced by the electric discharge through a plate of glass does not allow of any normal direction.

The facts observed on the electric discharge through crystals are in perfect accordance with Fresnel's theory that the vibrations of ether take place more easily in directions parallel with the layers of the molecules, and that, consequently, every oblique vibration upon one of the axes of elasticity is decomposed into two vibrations, one of which is parallel with such axis and the other at right angles with it.

Prof. Marangoni regards this analogy of effects as a new proof of the hypothesis that attributes light as well as electricity to a vibratory state of ether.—*La Lumiere Electrique.*

IMPORTANT EXPERIMENTS WITH SALT.—N. N. Beketov of Charkof has recently communicated to one of the scientific societies of St. Petersburg the results of his experiments on the electrolysis of common salt. *Engineering* says: All the sodium products are at present obtained by the Leblanc or ammonium process, and several manufacturers have, it appears, applied to Mr. Beketov for an opinion as to the comparative advantages of these processes. Being of the opinion that neither the Leblanc nor the ammonia process was as perfect as it ought to be, Mr. Beketov determined to try electrolysis, though he had already experimented successfully in this direction some years before. This last set of experiments have, it is stated, been more promising, though they have not yet been tried on a commercial scale. The inventor sends a current through a mass of fused salt, the temperature of which is about 500° C. In this condition it is a fair conductor, and is rapidly decomposed by the current. With an electro-motive force of five volts and a current of one ampere, 36 pounds of salt can be completely decomposed in 24 hours. From this the author argues that considerable economy can be effected by the adoption of the new process.

ALIMENT PREFERRED BY PLANTS.—M. Ville, after years of careful experiment and close observation, was led to believe that the aliment preferred by cereals is nitrogen; by leguminous plants, potassa; by roots, the phosphates. Understand these are the preferred elements, but not the exclusive, for these three substances in various proportions are necessary to each and all, and even lime, which humus renders assimilable, must be added. While nitrogen may be preferred by cereals for the formation of the grain, phosphates are necessary. We only give the above points to indicate the preference and a partial necessity.

AN IMPORTANT INVENTION.—London *Iron*, under the head of "Oolite Marble," refers as follows to what is apparently a very important scientific invention: Oolite marble reads like a contradiction, but it is not one; it only denotes a further development of science, by means of which the softest oolitic stone is transformed into the hardest marble. The process by which this is effected consists in treating the stone with a chemical solution in which a powerful acid plays an important part. The solution acts upon the stone to a depth of about half an inch, and becomes incorporated with and forms part of the stone itself, closing up the pores, and giving to the surface a marble-like character and rendering it impervious to damp. It imparts great additional strength to the stone, and produces a face so hard that it can be polished to a surface equal to marble or granite, as we have seen. Some stone prepared by this process was used in building a church five years ago—before the process was perfected—but it is stated that not the slightest sign of deterioration is visible. The process is being introduced by the Oolite Marble Company of 352 Strand, London, and a satisfactory demonstration of its effectiveness took place on Feb. 15. Apart from its application to building stones, the process enlarges the scope for ornamentation and decoration in many important directions in connection with architecture. It is stated that the application of the hardening process does not add 5 per cent to the cost of the stone.

ELECTRICALLY ILLUMINATING STEAM.—In Wiedemann's Annalen, Herr R. Von Helmholtz describes a pretty and singular experiment. A jet of steam escaping from a hole one or two millimeters in diameter is lighted obliquely and observed upon a dark background. The jet is then invisible at the base and whitish at the top. But if a pointed wire connected with a static induction machine be brought near, the jet immediately assumes a brilliant tint, whose color depends upon the potential of the point. The same effect is produced without the aid of electricity by merely holding a heated body near the jet. The phenomenon is due, no doubt, to a modification of the size of the particles of aqueous vapor, and in the hands of Prof. Helmholtz we may expect the experiment to throw new light on some of the most difficult problems of molecular physics. To this the London *Electrician* adds: A. E. Mayor, who at one time held the appointment of chief electrician in the Chilian navy, has frequently observed the effect described when a beam of electric light has been thrown upon a cloud of steam. For naval purposes this plan of blowing off steam and projecting the beam upon the cloud forms a most efficient method of signaling, and in action it is much better than any device involving the suspension of lamps from the yard-arm, since it does not reveal the exact position of the ship to the enemy.

ELECTRICITY UNDERGROUND.—Incandescent lights now light up the underground workings of the Anaconda mine, Montana. They started off with 500 lamps, but more are constantly being added, and soon 1000 lights will be in use. Candles are a thing of the past in that mine. Electric lights will also be used in the hoisting works, blacksmith shops and all shops and buildings about the mine. Supt. Carroll says the electric lamps are better, cheaper and safer than candles. Should a lamp be broken, the moment the air strikes the carbon it crumbles and the light goes out. The whole plant, engines and all, cost but $20,000.

LUNAR INFLUENCE ON THE MAGNETIC NEEDLE. According to M. Ligner, the Austrian meteorologist, as ascertained by careful investigation, the moon has an influence on a magnetic needle varying with its phases and its declination. The phenomenon is said to be more prominently noticeable when the moon is near the earth, and to be very marked at those periods when she is passing from the full to her first and second quarter. It also appears that the disturbances in question are at their maximum at the time when the moon is in the plane of the equator, and greater also during the southern than it is during the northern declination.

TO PREVENT WRINKLES.—A well-known doctor advised a lady who was just beginning to show those odious wrinkles about the eyes to wash her face every night in boiling-hot water, just as hot as she could bear it, in which is a little bicarbonate of soda. She must bathe her face in this thoroughly and hold her face in the steam for some time. After drying the skin it should be well rubbed with olive oil. This prescription, faithfully followed every night, will, he says, not only prevent wrinkles, but will send away those that have already come.

A YALE PROFESSOR'S DISCOVERY.—Prof. Chas. S. Hastings of Yale has discovered a new combination of glasses for the telescope object glass which eliminates secondary chromatic aberration. It is expected to revolutionize astronomy. The professor declines to give the details of his discovery now, but says it is a definitive solution of the problem which occupied the minds of scientists for a century.

USEFUL INFORMATION.

Playing Cards.

The game of cards is of very ancient origin, and is supposed to have originated in Asia. The Chinese have 30 cards in a pack—three suits of nine cards each, and those independent cards which are superior to all others. They retain this style and game to the present day. The European cards and game probably came from Hindostan. The cards were called *tschu har-tas*, a word signifying four crowns or four kings. Cards were also used by the Arabs, when the game was connected with religious, necromantic or scientific associations.

Cards were introduced into Europe previous to the 13th century, probably by the Saracens. As first introduced, they were quite different from those in use at present. In shape they were square, and instead of suits of spades, clubs, hearts, and diamonds, their marks were rabbits, pinks, roses and flowers of columbine. The figured cards were very prettily devised, a queen riding on horseback with a rabbit beside her marked the queen of rabbits or of clubs. A rustic-looking man, grotesquely dressed, and standing in a strange attitude, with a pink beside him, signified the knave of pinks or diamonds.

Their first appearance in Europe seems to have been at Venice, where for a long time they were *painted*. In 1441, as the municipal records of that city show, the art of *painting* cards, which appears to have become quite an industry in Vienna, was seriously interfered with by the appearance of cards which were evidently *printed* from wooden blocks. This was probably the first work of the kind ever done outside of China.

The printing of cards was soon followed by similar devices on cloth for altar-pieces and images of various kinds. Printing from movable metallic types and the entire art of printing soon followed.

Soon after cards came into general use throughout Europe, so much time was spent with them and they led so universally to gambling that several of the European Governments prohibited their use. But the prohibition had no effect and their use became more and more popular, especially among the noblemen and in royal circles. It was probably about that time that the characters began to be changed. In the change the characters are supposed to have been intended for the four different classes of society. The hearts represented the clergy; spades (Italian *spada*, a sword), the nobility; diamonds, the citizens; and clubs, the serfs.

FISHING BY ELECTRICITY.—The idea of utilizing electric lights in fishing has now got beyond the experimental stage, not only in Europe, but in our own country, for we read that there are fishermen on the coast of Maine who are now fishing by electric lights. This is not a new departure, said a fisherman recently, but new ways of utilizing the lights have been discovered. The old way was to plunge an incandescent lamp into the water, the connection being made with some source of electricity on board the fishing vessel. When this was used in deep-sea fishing, it was found that the mains to the lamp often got foul of the fishing tackle or the cable of the vessel, thereby destroying its usefulness. A Frenchman has surmounted the difficulty by adopting a lamp worked by a primary battery, the whole of which can be thrown overboard and regained when the trip is ended. The battery consists of six Bunsen cells, in which, however, chromic acid is placed instead of nitric acid, formerly used. The cells are connected with a 12-volt Edison lamp. The success of the recent experiments presages the general adoption, by our coast fishermen, of this new discovery.

ARTIFICIAL COFFEE.—Of late artificial coffee-beans have been found in the European (German) market. They are made from roasted grain flour, with an addition of dextrine or some such body. There are two such establishments at Koln which furnish the necessary outfit, with formula, etc., for the manufacture of the beans. According to an original letter from one of these establishments in the possession of Dr. A. Stutzer, in Bonn, from 1000 to 1200 pounds of beans may be made in one day with the outfit, which the firm offers at a high price. The letter further predicts a golden future for the article, but advises that it be used for the adulteration of genuine coffee only in such countries where the laws are not very stringent, etc. These prospects must be very enticing to sophisticators, especially as the imitation is so perfect that only a very critical examination will serve to detect the adulteration. The artificial bean distinguishes itself from the genuine in being perfectly symmetrical and of the same size, and that the epidermal membrane is entirely wanting.—*Ex.*

THE FIRST USE OF WOOD FOR PAPER.—The discovery of the value of wood in paper-making is credited to Dr. H. H. Hill of this city. About 40 years ago the doctor visited the paper-mill at Vassalboro, and after looking over the machinery, suggested the feasibility of using wood, and asked why the manufacturers did not get a few bales of excelsior from Augusta, where it was made, and try the experiment of making paper from wood. "It can't be done," said the manufacturers, "Have not you as much gumption as the hornets, whose nests are made of wood paper?" asked the doctor. The result of the conversation was a letter, some time later, from the firm's wholesale agents in Boston asking what they were putting in their paper to make it so much better than it had been. It was the wood, then first used in this way.—*Kennebec (Me.) Journal.*

THE BROOKLYN BRIDGE.—Food often stimulates rather than satisfies the appetite. There can be no question that inventive genius continually suggests new wants. A New York contemporary says that a second Brooklyn bridge should be begun at once, and thinks it highly probable that as soon as it is completed a third bridge will be a necessity. The mayor of Brooklyn shares in the desire for additional means of communication with New York, nor is the wish unnatural if Brooklyn's rapid growth be taken into account. Since the beginning of the present bridge her population has doubled, and it is predicted that early in the next century it will equal the present population of New York. With three bridges connecting the two cities, the talk of consolidation would not appear visionary.

SOUND GRAINS OF SENSE.—It is rather singular how many persons there are who feel obliged to make noise while at work. Some of the noises are alleged singing, whistling—"for want of thought"—shuffling with the feet, and downright hurrahing. We have never observed that earnest, thoughtful men were great whistlers while at work or that they danced jigs. In an office we know of, several men work at drawing, and a perpetual blast of whistling, shouting, halloos, and uproar of various sorts issues from the fanlight during the day. It must be a pleasant place to work for those not riotously inclined. It sounds like a menagerie.—*Engineer.*

IMPROVEMENT IN PLASTERING.—An Eastern man has invented two kinds of plastering composition. That to be used for the first coat consists of sand, sawdust, plaster of Paris, slaked lime, sugar and carbonate of soda, while that for a second coat is made of cream tartar, pumice-stone, sugar, lime and plaster of Paris, each composition being compounded and applied in proportions and after a manner described. Both compositions have been patented.

A NEW EXPLOSIVE FROM MOLASSES.—A German patent has been granted to A. Doutrelpont for a process of preparing a new explosive, "petragit," from molasses. It is an oily nitro product, and is said to have three times the power of nitro-glycerine.

CIRCULAR APERTURES are most effective for discharging water, since they have less frictional surface for the same area.

GOOD HEALTH.

Health of the State.

The monthly circular of the State Board of Health for February has been received. From it we learn that mortality reports have been received from 67 localities with an estimated population of 665,700. The total number of deaths reported were 859, which gives an annual death rate of 15.48, which is an unusually small percentage for the season of the year, and indicates the absence of any epidemic disease upon the coast. Among diseases which have caused the greatest number of deaths are consumption, which is credited with 165; pneumonia, 92; heart diseases, 61; various diseases of the stomach, 38; diphtheria, 32; while cancer, the fourth on the list, is credited with 26. The large death rate from this disease is no doubt largely due to the persistent use of the knife instead of constitutional treatment. Bronchitis was fatal in 22 instances. All the deaths from this malady, with but one exception, occurred in the coast counties.

But four deaths are noted from cholera infantum; but as spring advances, a large increase from this disease is expected. It is very properly stated that when mothers become more familiar with household hygiene, we may hope to see this affection disappear from our list of prevailing diseases.

In cases of diphtheria the importance of thorough isolation is strongly urged. It should be borne in mind that this disease is almost as contagious as smallpox and twice or three times as fatal. Too much care cannot be taken in confining cases within as narrow a limit as possible.

TREATMENT OF DIPHTHERIA.—Much care and promptness is necessary in the treatment of diphtheria. A writer in *Science News* says: The local treatment of diphtheria by spray of solution of sulphuret of calcium is recommended by Dr. George E. Hubbard, New York. The solution is prepared as follows: Take of lime, 1 part; sulphur, 2 parts; water, 20 parts. Slake the lime with some of the water, then add the remainder and the sulphur. Boil to 12 parts and filter. Under the use of this solution, in spray, even sparingly applied, the diphtheretic patches undergo a change in a few hours. The temperature soon subsides, and a general improvement in the condition soon follows. In some cases the patches disappear entirely in a day. If the false membrane has developed rapidly before the physician has seen the patient, this spray will even then be effectual in arresting systemic poisoning, and soon the tough membrane will become detached. Do not, by any means, allow the patient to swallow any portion of the false membrane. By gentle manipulations it can be removed without causing any irritation. In cases of very young children it may be best to add a little water to the solution, at first, until we are satisfied that it does not irritate the tender mucus membrane. The doctor also thoroughly fumigates the apartments with sulphur, and administers such medicine as may be indicated. The principal thing to do is to destroy the disease germs as early as possible, and he believes the solution under consideration does much toward preventing constitutional infection as it is taken into the patient's stomach. Its stimulative, laxative, and somewhat diuretic action are quite marked.

ARTIFICIAL LUNGS TO RESTORE LIFE.—An object of great curiosity in Bridgeport, Conn., is a rabbit which Prof. George Poe, a relative of the late Edgar Allan Poe, has drowned 11 times and then brought back to life. The professor has invented an artificial pair of lungs, which he uses to restore life by drowning or asphyxiating. To demonstrate its usefulness he submerges his rabbit in water in the presence of witnesses, and holds it there for ten minutes. The rabbit has also been smothered with the fumes of burning charcoal, until all signs of life have been extinct. A mirror held at the mouth and nose showed no vapor, neither was there any heart action. Prof. Poe then attached his patent bellows covering over the mouth and forced oxygen into the lungs. The returning suction of the pumps drew out the deadly gases, and thus an artificial respiration produced a muscular expansion and contraction of the lungs of the subject until life was restored. Prof. Poe claims that he can drown and restore human beings as well as rabbits. He will not divulge the secret of compounding or the quantities of gases used. He thinks his artificial lungs will become generally adopted by fire departments and hospitals through the country. The rabbit after having gone through with these ordeals eight or ten times in the presence of witnesses, was quite well a few days since, according to the New York *World*, and jumping around the dooryard in a very lively manner.

THAT ACHE IN THE BACK.—An Albany physician, says a cotemporary, declares that Americans suffer more generally from Bright's disease and nervous disease than any other people, and he says that the reason is that Americans sit down so persistently at their work. He says: "Americans are the greatest sitters I ever knew. While Englishmen, Germans and Frenchmen walk and exercise, an American business man will go to his office, take his seat in his chair and sit there all day without giving any relief to the tension of the muscles of the back. The result is that these muscles surrounding the kidneys become soft and flabby. They lose their vitality. The kidneys themselves soon become weak and debilitated. If Americans would exercise more, if they would stand at their desks rather than sit, we would hear less of Bright's disease. I knew of a New York man who had suffered for some years from nervous prostration until it was recommended to him that he have a desk at which he could stand to do his work. Within a year he was one of the healthiest men you ever saw. His dyspepsia and kidney trouble had disappeared, and he had an appetite like a paver."

HOW TO HANDLE WASPS AND BEES WITHOUT HARM.—W. L. Wilder, in *Science*, says: "It is a fact not generally known that if one holds his breath, wasps, bees and hornets can be handled with impunity. The skin becomes stingproof, and, holding the insect by the feet, and giving her full liberty of action, you can see her drive her weapon against the impenetrable surface with a force that lifts her body with every stroke, but let the smallest quantity of air escape from the lungs and the sting will penetrate at once. I have never seen an exception to this in 25 years' observation. I have taught young ladies with very delicate hands to astonish their friends by the performance of this feat, and I saw one so severely stung as to require the services of a physician through laughing at a witty remark of her sister, forgetting that laughing required breath. For a theory in explanation I am led to believe that holding the breath partially closes the pores of the skin. My experiments in that direction have not been exact enough to be of any scientific value, but I am satisfied that it very sensibly affects the amount of insensible perspiration."

A NEW REMEDY FOR SKIN DISEASES, says the *Hospital*, is a continual bath, the patient eating, drinking and sleeping there until cured. One patient has been kept in such a bath for 385 days. He is tied up always at night to prevent him from slipping so as to drown. The palms and soles become much shriveled, but the rest of the skin is unchanged. The water is kept at 98 degrees.

THE DOCTORS DISAGREE.—It is reported that a New York physician, feeling "out of sorts," consulted five of his medical brethren in turn to learn what ailed him. Each one gave a different opinion of his case and recommended different modes of treatment. He believes they were all wrong.

ENGINEERING NOTES.

A NEW MODE FOR PROJECTILES.—A correspondent of the *Manufacturer and Builder* proposes to supplement the force of powder in discharging projectiles by the centrifugal action of the gun. He says: Allow me to suggest that by means of both forces (*i. e.*, explosive and centrifugal) combined, double the distance that either can obtain separately may be obtained. To do this with accuracy of fire, I would suggest that there should be attached to the trigger of the gun a long coil of wire of just exactly such a length that, when the gun, after being loaded, should be made to revolve on its trunnions by means of steam power, until such centrifugal force had been obtained of itself to carry the projectile five miles, the coil of wire having been unwound, would pull the trigger, and the projectile would leave the mouth of the cannon with a double momentum that would carry it double the distance—say five miles for each. Of course the length of the wire would have to be accurately gauged to insure accuracy of fire, or else the consequences might be prejudicial.

THE MANCHESTER SHIP CANAL.—The progress which has been made in the construction of this canal since the reorganization early in 1887, following the futile attempt to raise the necessary capital through the house of Rothschild, is highly satisfactory to the friends of the enterprise. The entire contract is let to Mr. Walker, who has already completed over one-quarter of the entire excavation called for, besides which a good deal of the retaining wall separating the canal from the estuary of the Mersey is in a forward state and some of the locks are started. One of the most serious engineering works to be overcome is the carrying of the Bindley canal over the ship canal. The crossing section of the canal will be carried in a large iron trunk, which can be swung out of the way when vessels are passing below in the ship canal. This will be quite a novel piece of engineering, and it is made necessary in consequence of the lack of water to lock up and down the smaller canal.

MEXICO will, the *Mexican Financier* holds, profit much by the construction of the Nicaragua ship canal, as it will enable vessels to sail all the way from Matamoras to Guaymas. While the canal can be used for purposes of naval defense, our contemporary does not think that this should alarm Mexico, "for the dangers of armed conflict with her northern neighbors grow less and less every day." The Nicaragua route is praised as being cheaper and healthier than the Panama. Good winds can at all seasons of the year be relied on by vessels bound for Brito, at the Pacific terminus of the Panama route, while owing to the calms, there are many months during which Panama can only be reached by steamers.

TURNING A LARGE RIVER FROM ITS COURSE.—A company has been formed in France, headed by a well-known Alsatian manufacturer, for the purpose of diverting the Guiers river to St. Christophe, where a fall of 200 meters would be thus obtained, representing a force of 4000-horse power, which would be utilized in developing electricity for the production of aluminium by a new process from the clay found in the district. It is asserted that by means of the process in question, aluminium, which is at present so costly, can be produced at a price that will very little exceed that of the cheapest metals.

FLOWING OF WATER IN PIPES.—A cylindrical pipe, flowing full, discharges less than the same pipe when only filled through a segment whose arc is 281 deg. 30 min. by 2.5 per cent, while the velocity is less by 9.5 per cent, the hydraulic inclination being the same. The full section discharges less, and also with less velocity, in other forms of pipes as well as in cylindrical. The scouring power of circular pipes flowing full is therefore less by nearly 10 per cent than that of the same pipes filled through an arc of 281 deg. 30 min.—a new element to be considered in the arguments for and against circular pipe sewers.

WHAT BECAME OF THE MONEY?—It is estimated that of the sixty millions sterling sunk in the Panama canal bubble, ten per cent has gone to French bankers, five per cent has been paid in bribes to the French press, ten per cent has gone to the inner members of the canal ring, who have had the giving out of the contracts, and most of the balance has gone to enrich the contractors. It is estimated that less than one-half of the work has even now been done.

ELEVATOR INSPECTOR.—Supervisor Bush has introduced an order providing for the appointment of an inspector of elevators in this city and county and the periodical inspection of elevators. It was passed to print and referred to the Building Committee.

THE TEHUANTEPEC SHIP RAILWAY.—A recent cable dispatch says that a party of English engineers are about to begin the location of the route, and that the financial arrangements are completed.

LONG RAILROAD TUNNELS.—The Mont St. Gothard tunnel is 9½ miles long; the Mont Cenis tunnel, 7½; and the Hoosac tunnel 4¾ miles in length.

MINING AND SCIENTIFIC PRESS

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TABLE OF CONTENTS.

EDITORIALS.—Electric Power for Mining Work, 201. The Copper Syndicate; Shasta County Mines; Steam Launch Building, 208. Electrical-Power on the Comstock, 209.

ILLUSTRATIONS.—Interior of Motor Room; Brush Electric Motor, 201. Brush Dynamo Electric Generator for Constant Current, 213. The Underground Station; The Pelton Water Wheel, 209. The Nevada Quartz Mill, 210.

CORRESPONDENCE—Mines of Angels, Calaveras County; Saving Gold and Sulphurets, 202.

MISCELLANEOUS.—Hale and Norcross Mine; An Electric Shock; Quicksilver Here and Abroad, 203. Mining Premiums at the State Fair; Water-Jacket Furnace; Como District, Nevada; Trough Lixiviation; Electric-Light Poles; Potosi M. Co.; Underground Wires; The Copper Syndicate; Smelter in Oregon, 203.

MECHANICAL PROGRESS.—Steel Castings; Does Machinery Run Better at Night; A Rolling-Mill for Aluminum; Nails of Tinned Sheet Iron; Why Not Compound Locomotives, 206.

SCIENTIFIC PROGRESS.—New Relations Between Light and Electricity; Important Experiments with Salt; Aliment Preferred by Plants; An Important Invention; Electrically Illuminating Steam; Electricity Underground; Lunar Influence on the Magnetic Needle; To Prevent Wrinkles; A Yale Professor's Discovery, 206.

USEFUL INFORMATION.—Playing Cards; Fishing by Electricity; Artificial Coffee; The First Use of Wood for Paper; The Brooklyn Bridge; Sound Grains of Sense; Improvement in Plastering; A New Explosive from Molasses, 207.

GOOD HEALTH.—Health of the State; Treatment of Diphtheria; Artifical Lungs to Restore Life; That Ache in the Back; How to Handle Wasps and Bees Without Harm; The Doctors Disagree, 207.

ENGINEERING NOTES.—A New Mode of Projectiles; The Manchester Ship Canal; Turning a Large River from its Course; Flowing of Water in Pipes; The Tehuantepec Ship Railway; Elevator Inspector; Long Railroad Tunnels, 207.

MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 204-5.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 216.

Business Announcements.

[NEW THIS ISSUE.]

California Electric Light Co.
Electric Power—N. S. Keith.
Machinery—Parke & Lacy Co.
Belting—French & Linforth
Assessment Notice—Gray Eagle M. Co.
Chemical Preparation—Prof. J. Herman.
☞ *See Advertising Columns.*

Passing Events.

The burning of the lower smelter of the Anaconda works, Montana, is a very serious affair, throwing out of employment as it does so many men and involving so large a pecuniary loss directly. The new works handled about half the output of the mines.

The shipment of silver bars from Napa county, this State, noted in our "Mining Summary," shows that silver mines are possible in our Coast Range. The gold mines at Los Burros, Monterey county, prove also that this range contains that metal in paying quantities.

Judging from recent news from Leadville, the leasing system has not worked well in all cases, and will be restricted in the future. Irresponsible parties have done injury to mining properties working under this system.

The returning miners from the Lower California gold mines do not bring back very flattering accounts of the new fields. There is gold there, but not in so wide a region as was hoped for. The Mexicans seem to make money, but Americans do not do so well.

The hydraulic miners have issued a circular to owners of gravel mines, which we publish elsewhere in this number of the PRESS.

The news from Paris respecting the copper syndicate is of great interest to copper miners in this country. While this syndicate has worked hardships to consumers all over the world, it has benefited the owners of copper mines by furnishing a steady market at good prices. A fall in the price of copper to the old rates will close down a number of mines on the Pacific Coast and elsewhere.

The Copper Situation.

The event the past week in the copper market has been the failure of the Societe des Metaux of Paris and the incorporation of a new Comptoir d'Escompte with a capital of 40,000,000 francs, one-half of the shares being reserved for shareholders in the old company, which will be wound up. This movement, no doubt, will lead, if it has not already done so, to the formation of a copper syndicate, based on the proposition made by the old syndicate, which, if it becomes an accomplished fact, will put the copper industry upon a more substantial footing, and, at the same time, keep prices down to such figures as not to restrict the consumption, but rather to its encouragement.

The proposition, as we understand it, made by the old syndicate to the American copper-mining companies was to extend the existing or three years' contracts 12 years, making them to run 14 years from last October. It is asserted that with this extension granted, English capitalists could be drawn into the enterprise, which would make it impregnable so far as finances would be concerned. The American companies hung back from entering into such long-termed contracts, but were rather inclined to the formation of a bank in which they would be represented by four directors, the full Board of Directors having the power, from time to time, to regulate prices for copper and also the amount of production. Pending negotiations to settle amicably all differences, the load of copper became unmanageable for the syndicate and its backer, the Comptoir d'Escompte. The situation was made still more trying by the Russian Government withdrawing its deposit of 25,000,000 francs from the Comptoir d'Escompte, followed by the suicide of a leading director of the bank, which precipitated a run on the institution. Events in Paris followed in quick succession, but no serious panic was produced, owing to the Bank of France and a number of leading bankers coming to the assistance of the Comptoir d'Escompte, enabling it to withstand a run, and allowing time to right the affairs of the bank, the syndicate and all in interest.

As we understand it, the American copper companies received letters of credit on such banking institutions as the Seligmans, Belmont & Co., Kidder, Peabody & Co., Brown Bros., Ladenburg, Thalmann & Co., Muller, Schall & Co., and others, for sums equivalent to the purchase price for the output of the guaranteed figure. Some of these guarantees were for only one year's product, while others, again, were for the full length of time, three years. A leading authority states that the American mining companies delivered the copper to the agents of the syndicate in this country, but drew only against their credits to the extent of those amounts of copper which were not sold to consumers in the United States and Canada. The result has been that many of the companies have drawn only a small part of the sums secured to them by credits.

The question as to the immediate future of the metal is being raised, which in the light of the above and also owing to the fact that the stock of the speculators is hypothecated to strong parties, is altogether unnecessary. It is not at all likely that the institutions and private capitalists having money advanced on copper will throw their securities on the market, but rather they will hold so as to work it off to the best possible advantage, even if the syndicate now reported to be forming does not take it off their hands.

In connection with the above, it may be of interest to state that Henry R. Merten & Co. make the stock of copper in England and France, and afloat thereto from Chili and Australia, as follows: February 28, 1889, 218,140 tons; January 31, 1889, 109,528 tons; December 31, 1888, 101,105 tons; February 29, 1888, 52,593 tons; February 28, 1887, 59,546 tons; January 1, 1888, the visible supply in England, France and the United States was 54,098 tons, and on December 31, 1888, 151,995 tons.

Shasta County Mines.

Mr. George Johnson, from the Little Nellie mine, near Iron Mountain, Shasta county, favored us with a call a few days since. The mine is owned by B. N. Bugbee of Sacramento, and arrangements are now being made to put a mill upon it. They are running a tunnel to cut the ledge about 350 feet from the surface. The tunnel is run in about 350 feet, and will go 400 feet further to cut the pay shoot. The old, or upper tunnel, is 200 feet above the new one. There is rock enough above the upper tunnel to keep a mill running a year or two, and there are 250 tons of auriferous ore on the dump. The best of the ore has already been selected and shipped to Selby & Co.

About three weeks ago another and parallel ledge was struck, known as the Adeline; so far as they have gone it shows a pay shoot of about 350 feet. A prospecting tunnel 70 feet long has been run, and an eight-inch ledge of rich ore is the result. Some of the rock runs as high as $400 in gold per ton.

There are three other ledges connected with the mine—the Little Nellie No. 2, the Double E and the Julia. A fine water-power is obtained from Boulder creek, which empties into Spring creek, this in turn emptying into the Sacramento river.

Mr. Johnson states that the Iron Mountain mine is now doing very well under the superintendency of James Sallee, one of the owners. They are running 20 stamps, with pans and settlers, and although the ore is considered rebellious, they claim to work it up to 90 and 95 per cent. They are delivering the ore in the mill for 37½ cents per ton. The ledge or deposit is about 300 feet wide. The sulphurets are plentiful, and they are now moving the furnace to a higher level, 60 or 70 feet above the creek, so as to handle them more readily. They have on hand now about 500 tons of sulphurets, and as soon as the furnaces are moved will roast and work them.

The work is paying better than it ever did before. Drifts and tunnels have been run to prospect the vein, but it is being worked at present like a quarry, so large is the deposit. The cave last fall blocked operations, but the mill has been running since February 15th.

Steam-Launch Building.

Of late quite a number of steam launches have been built in this city for use in this bay and the rivers and harbors of Alaska. The launch Ida, recently built for the Kodiak Packing Co., Alaska, by the Atlas Iron Works, has some peculiar features. Her dimensions are: Length, 36 feet; beam, 9 feet; depth, 5 feet. She is fitted with compound engines, with cylinders 6x10½ inches, with an 8-inch stroke. Her propeller is 3 feet in diameter, with a 5-foot pitch.

The peculiarity about the Ida is that a brass pipe projects from the port side of the vessel, abaft amidships, and extending along the side is connected with a series of 32 small metal tubes, each three feet in length, arranged vertically under the launch's counter, and looking like a gridiron. This acts as and takes the place of the condenser, usually used on a steamer. The steam from the boiler goes through the pipe to the tubes, is there condensed and the water flows back to the vessel's hold, where it is again pumped into the boiler. J. B. Jardine is the inventor of the system, and he says while a vessel of that size usually carries five tons of water and a condenser weighing about a ton, the Ida only carries half a ton of water, which is used over and over again. He says that a voyage could be made to China with two tons of water. Purser Smith of the Mariposa, who is a natural-born mechanic, made a critical examination of the "gridiron," and says that it is a most valuable invention, and would prove of great benefit to the numerous steam yachts in use down in Australia.

A vessel a size larger called the Frances M. Cutting, and on this same plan, will shortly be illustrated and described in detail in the PRESS. This is one of six now in course of construction at the Atlas Iron Works.

COL. GEO. H. MENDELL of the U. S. Corps of Engineers leaves this week for Europe, for the purpose of studying the methods of river and harbor improvement there, with a view to applying the information obtained for the benefit of the Columbia river.

Electric-Power for Mining Work.

(*Continued from page 201.*)

be utilized for operating the dynamos, but where such power is at a greater or less distance from mine or mill. Sometimes water-power is available on the other side of a mountain or hill, or further down the canyon or gulch. In such cases water-wheels may be connected with the dynamos, and the power thus generated be transmitted to the motors at the desired point.

In many instances of this kind the water-power itself would cost nothing, and the plant alone is necessary to utilize it. If the water-power is scarce, large wires must be used to save loss; but if there is a surplus of original power, smaller wires may be used at less than first cost.

There is nothing mysterious or doubtful about this power or its mode of application. A water-wheel or steam engine is connected to an electric dynamo, which on being revolved generates an electric current which passes over the wire to the electric motor at a distance, this motor in turn being revolved. This is connected by belt to the shafting of any machinery. There is a certain loss of power between the dynamo and motor, depending on the distance, size of wire, etc. There are governors on the water-wheel and the dynamo and motors, and the rate of speed can be regulated by ordinary appliances. Starting and stopping are done at will precisely as with an engine or other power.

The modern electric motors are, in most essential particulars, like dynamos; only they have opposite functions. A dynamo is an instrument to which power is applied to rotate its armature, and that power, which is mechanical energy, is thereby converted into electrical energy (electricity). An electric motor is a dynamo to which we apply electrical energy. Its armature rotates, and through a pulley attached thereto, power (mechanical energy) is obtained. These properties of dynamos and motors properly associated make them valuable as means of transmitting power in large or small quantities from places where produced to places where used, be the distance over which transmitted a few hundred feet or many miles.

The California Electric-Light Company, which put in the electric plant on the Comstock, have in this city both a lighting and power system on an extensive scale. They furnish power in different parts of the city and have no difficulty of any kind. They have recently sold a large plant to go to Oregon City, where there is a fine water-power, and this power will be utilized for both power and lighting in Portland, Oregon, 12 miles distant. In the latter city the power and light will be distributed in all directions wherever wanted.

The Pacific Power Company, in this city, which furnishes the Keith electric motors for running the presses and elevator pump in the MINING AND SCIENTIFIC PRESS offices, distributes its power to various industrial establishments within a limited area at present, but distributes 160-horse power to 31 different stations, in quantities of from one to 25-horse power. They are recovering up to 75 per cent of the steam-power delivered to the dynamos.

OUR ILLUSTRATIONS.—The illustrations of the underground electric station in the Chollar shaft, the Nevada mill, and the motor-room in this number of the PRESS were made direct from photographs without redrawing, being perfect photo-facsimiles. The only exception is in the case of the buckets on the Pelton-wheel in the cut of the underground station, which were exaggerated unduly in order to bring out the relation of wheel to the dynamo. The cuts will give a very good idea of the general arrangement of this wonderful plant, while the description gives all the details of interest.

OMINOUS.—It looks rather ominous for the new Lower California gold-fields when there is serious talk among the prospectors about lynching a correspondent of certain papers on the ground that they were induced to go to the mines by reason of his false reports as to the richness of the placers. It is stated that the correspondent in question had to take refuge with the Mexican soldiery.

GOLD DISCOVERIES within a few miles of Holbrook, A. T., have caused great excitement at that place. The mines are placers, and many people are going to the new fields.

Electrical Power on the Comstock.

Combination of Water-Wheel and Dynamo.

All difficulties seem now to have been overcome, and the electrical transmission of power at the Nevada mill is in successful operation. In no other place in the world are dynamos run and electrical energy generated at so great a depth beneath the earth's surface, 1630 feet.

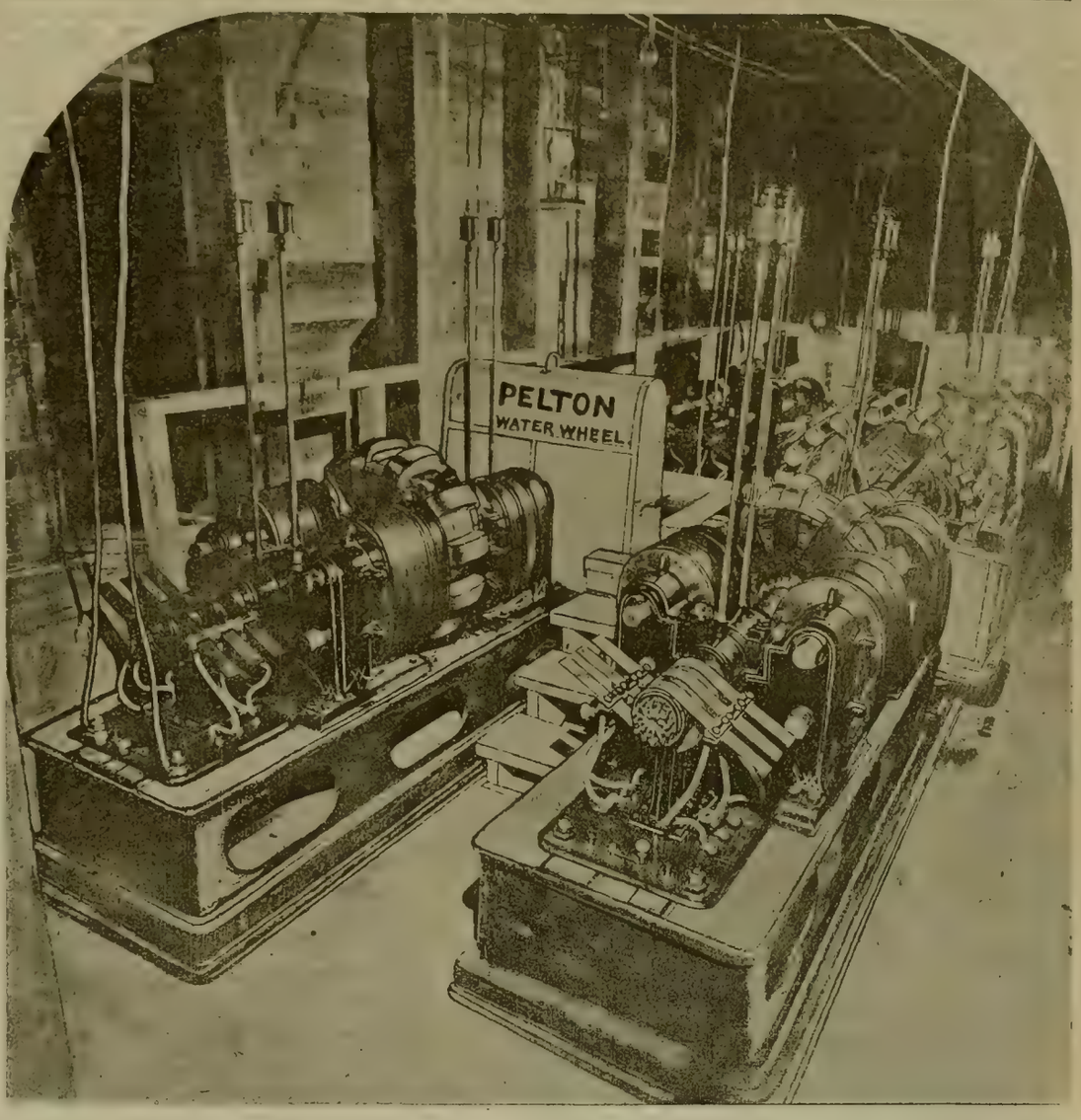
There were obstacles to be surmounted in putting in and successfully operating an electrical plant so far down in the bowels of the mother earth. Some of these could not be foreseen, and could only be remedied after the generators were set up and put in motion for a test run.

That which gave the most trouble and caused the greatest delay was that it was found necessary to take off and wrap anew the coils of the greater part of the bobbins of the armatures—a very great task. All parts of the dynamos were perfectly dry when taken into the mine, and it was naturally supposed would so remain, as there is not a drop of water in the rock in which the chamber that contains the apparatus was excavated. The air in this chamber is, however, very warm and contains by actual measurement 78 per cent of moisture. This being the case, any piece of cold metal which is taken into it—as a crowbar, axe or hammer—begins to "sweat," as the miners say. The cold metal condenses the moisture of the atmosphere and in a short time becomes quite wet. It was this moisture that collected in the coil of the dynamos wherever the atmosphere penetrated. Had this trouble been foreseen, the dynamos might have been so heated that when landed in the chamber their temperature would still have been above that of the atmosphere of the place. One would have supposed that the heat of the machines would have driven off this moisture, and it would have done so but for the fact that they were in this damp atmosphere for six weeks before being started, but it seems that when it had once taken up its residence in the coils, it stubbornly held possession, and would not be driven out by any ordinary means.

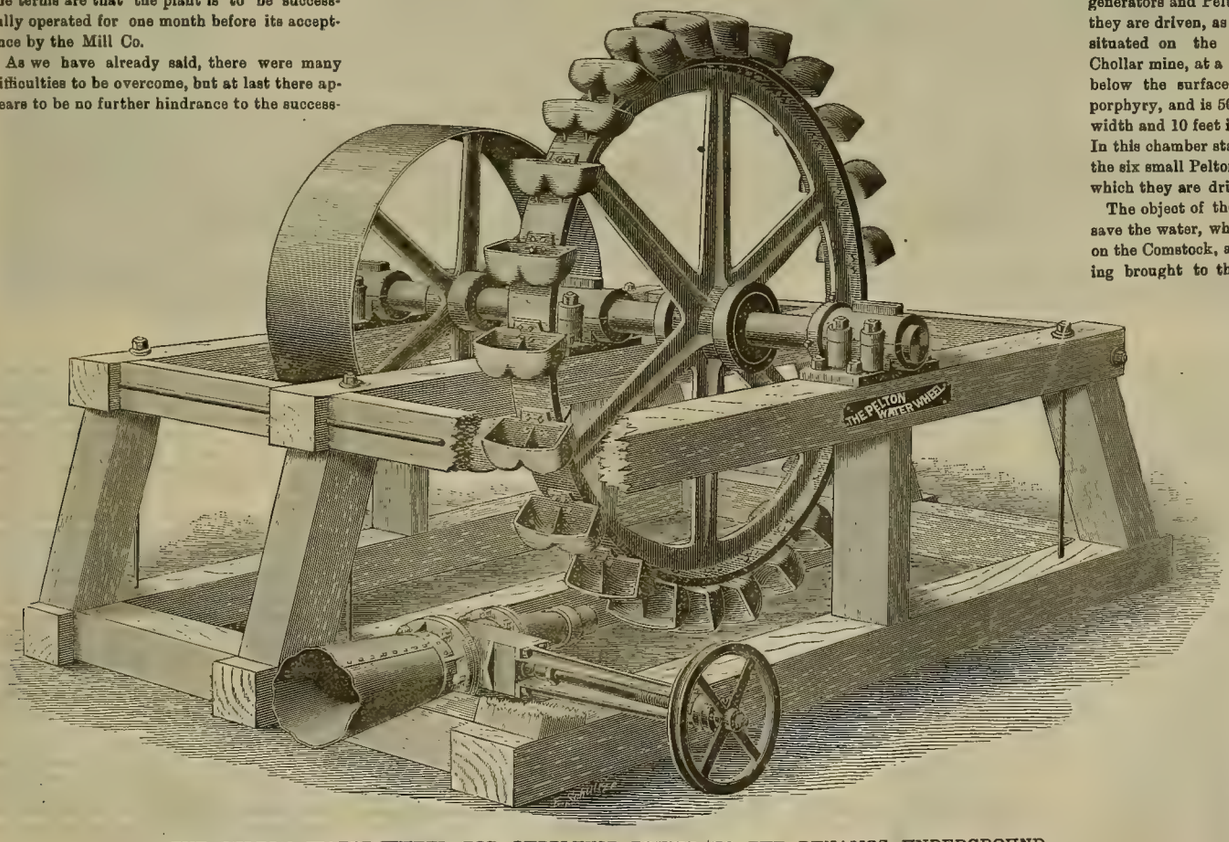
The motors that were in the power-house above ground, and not subjected to dampness, have not given the slightest particle of trouble, but worked from the first as if they had been doing it for years.

The Nevada Mill Co. contracted with the California Electric-Light Company George H. Roe, Secretary and Manager, for the plant. They are general agents for all the Brush apparatus—the kind here in use—and the terms are that the plant is to be successfully operated for one month before its acceptance by the Mill Co.

As we have already said, there were many difficulties to be overcome, but at last there appears to be no further hindrance to the successful operation of both generators and motors. The subterranean chamber in which stand the generators and Pelton water-wheels by which they are driven, as shown in the engraving, is situated on the Sutro-tunnel level of the Chollar mine, at a vertical depth of 1630 feet below the surface. It is excavated in solid porphyry, and is 50 feet in length by 25 feet in width and 10 feet in hight, clear of all timbers. In this chamber stand six Brush generators and the six small Pelton water-wheels, by means of which they are driven.



THE UNDERGROUND STATION, SHOWING DYNAMOS AND WATER-WHEELS.



THE PELTON WATER-WHEEL FOR SUPPLYING POWER TO THE DYNAMOS UNDERGROUND.

The object of the electrical apparatus is to save the water, which is both scarce and dear on the Comstock, all in use for any purpose being brought to the lode from streams in the Sierra Nevada mountains, a distance of about 30 miles. By twice using the same water on the Pelton wheels, a very large saving may be made, with an efficient means of transmitting the power on the second Pelton wheel, or set of wheels. At the C. and C. shaft of the Consolidated California and Virginia mines, the power is transmitted by means of steel-wire cables. There the same water is used on four different wheels. It is first used on a wheel ten feet ten inches in diameter on the surface [the pressure being derived from a pipe that runs from a tank high on the side of Mt. Davidson] in the California Battery Mill. It is then caught up and conveyed through a pipe to the C. and C. shaft, about 100 feet distant. In chambers

cut in the side of the shaft are three other Pelton wheels the same size as that on the surface. These wheels are 500 feet apart, the last being at the level of the Sutro drain tunnel, and the same water which is used above drives them all, it being caught up as it falls from each wheel and brought to bear on the next below, under a vertical pressure of 500 feet. By means of steel wire cables, the power developed by all three of the wheels is brought to bear upon a main driving shaft, and at the surface over pulleys, on which run cables, which transmit the power brought up the shaft 1500 feet, a further distance of 1600 feet, to the California pan-mill—a total distance from the bottom wheel of 3100 feet.

At the Nevada mill the object is to do by means of electricity what is done at the California mill by use of cable. The Nevada mill contains 60 stamps, with the usual complement of pans, settlers and other apparatus. On the surface, in the mill, is a Pelton wheel 10 feet 10 inches in diameter. An iron pipe leads to this wheel from a tank on the side of the mountain, and the stream thrown from the nozzle into the buckets of the wheel is under a vertical pressure of 460 feet. The water that falls from this wheel flows to a tank, whence it is conveyed to the main shaft of the Chollar mine through two iron pipes, one 10 inches and the other 8 inches in diameter. These pipes descend the shaft and thence the incline, at the bottom of which a Y unites them to a single wrought-iron pipe 14 inches in diameter. Out of this large pipe-head, six six-inch pipes run to the nozzles of the six Pelton wheels.

The Pelton wheels are 40 inches in diameter, and made of phosphor bronze, weighing only 220 pounds. Each wheel is capable of developing 125 horse power, with a stream of water passing through a nozzle less than half an inch in diameter, or 750 horse power in all. The object of introducing the dynamos and motors is to convey the power to the surface to run the machinery of the mill; to do by means of electrical energy, passing through copper wires, what is being done at the C. & C. shaft by means of steel wire cables, running over a series of pulleys. It was thought that the power might be transmitted in this way more effectively than by means of cables.

At the Chollar mine, instead of using water on a series of wheels, that is along down the shaft or incline, the whole of the water is at once carried in pipes to the level of the Sutro drain tunnel. There the enormous pressure of this column of water, 1630 feet in vertical hight, is applied to the Pelton wheels.

As no water-wheel of any kind had ever before been subjected to a force so tremendous, there were not wanting those who predicted that the wheels would be stripped of their buckets and broken to pieces; but they ran as smoothly and quietly as though under a pressure of no more than 500 or 600 feet.

The electrical chamber is lighted up by 36 incandescent lamps; all is a blaze of light. Although there are several lamps in the incline, the effect upon first stepping in the chamber is at first blinding, and almost startling, so great is the glare of the light.

On entering this subterranean lightning factory, the attention of the visitor is at once attracted to the huge humming dynamos. In vain they peer about for the power that sets the big machines in motion. Not a single wheel, piston or other object that seems capable of imparting power is in sight. The dynamo appears to evolve its wonderful energy from its "inner consciousness." The rapid motion seems the effect of internal rage. At last, after being long inwardly puzzled, the observer is sure to ask, "What is it that gives the dynamos their fearful velocity?" The querist is then told, to his astonishment, that it is a little water-wheel inclosed in the thin and small sheet-iron box seen standing at the end of each dynamo. The box is so small that it appears to be merely the head piece of the big generator, which it is causing to spin around at a speed of 900 revolutions a minute.

When the casing is removed from the wheel, the observer is even more astonished at the simplicity of the little wheel he sees before him. He examines it for a moment, and then cries, "Why, any one might have invented it." The wheel and its little box appear so simple that the first thought of every one is that he could have made such a wheel himself if it had happened to come into his head. Just there is the point; it didn't happen to come into his head. The same thing is true of a thousand other wonderful inventions.

After his first glance at the wheel it is discovered that the buckets are not so simple in construction as he for a moment before thought them. He finds that in the center of each rises a wedge-shaped partition, and that the stream of water striking this is divided and sweeps out through the curved sides in such a way as to produce a reactionary effect, in addition to that of the impact. At the same time the water is so deflected as to escape contact with the next buckets, thus preventing what in a turbine wheel would be technically termed "back lash." Another surprise is the small amount of water retained in the upper part of the wheel, in fact nothing is seen there but a mere spray. By the peculiar shape of the buckets, all the water is at once thrown down and out of the way of the wheel. After having spent its force, it falls to the bottom perfectly inert.

There has never been any trouble at the Chollar with the Pelton wheels. The hight of the column of water pressing upon them being at all times the same, their motion is necessarily unvarying. All the experimenting has been with the apparatus for the electrical transmission of the power developed by the water-wheels. Indeed, by means of a governor which has been added, the Pelton wheels have been made to regulate the vagaries of the generators and motors. This is effected by increasing or diminishing the flow of water through the nozzles.

At present there is a great scarcity of water. The amount obtainable is only sufficient to run 40 of the 60 stamps of the mill, and this in addition to the power transmitted by two of the lower Peltons to two generators and motors. But 40 stamps, with the complement of amalgamators and concentrating apparatus, are now being run with about 120 inches of water, running it first over the wheel on the surface and then into the pipes and down the shaft to the lower wheels, as previously explained.

The transmitted power and that developed by the upper Pelton now unite and pull together on the main driving shaft without the least discord. For some time past the two powers have been running together thus harmoniously, ever since the putting on of proper governors.

Mr. F. E Smith, the electrical engineer in charge, states that three, four or all six of the generators and motors may now be put on if thought necessary, and will work as smoothly in connection with the water-wheel above as now do the two in operation. But sufficient water to drive more than 40 stamps is not at present obtainable.

Before the motors were started, it required about 300 miners' inches of water to run 40 stamps, with their complement of pans, settlers, etc., but since the motors were started 120 inches only are required to do the same work, making thereby a saving, as will be seen, of 180 inches, or 60 per cent of the amount formerly used, by the use of the transmitted power.

As regards the per cent of power transitted, in a test made January 11th, the Pelton wheel which drove the generators developed 110-horse power, while the motor in the mill delivered to its belt 72-horse power, giving a net delivery of 65½ per cent. The speed of the generators, which is 900 revolutions per minute, is now kept constant by means of a hydraulic governor designed by Mr. Devereux of Aspen, Colorado, but modified and improved by Mr. Smith and the Pelton Water-Wheel Co., so that it now works to perfection.

Each generator is provided with an ammemeter. From the generators insulated wires lead to a switch-board situated at the foot of the incline, where any generator can be put on any motor circuit with only a moment's interruption. From this switch-board the wires follow the pipe line up the incline shaft out through the short tunnel, and are carried to the motor-house of the mill, where they again enter ammemeters and voltmeters and then are connected with each of the six motors. Each motor is capable of developing about 75 horse power, making 450-horse power available at the mill.

The power developed is transmitted a distance of about 2800 feet. At one place in the shaft the wires pass through a regular shower bath of water for a short distance. The loss at this place is said not to be noticeable. The ammemeters show the amount of current being developed and transmitted, and the automatic hydraulic speed-indicator, invented by Mr. Smith, shows the speed and steadiness at all times at a glance. This is connected with the Pelton wheels.

It seems that electrical transmission of energy is now to prove as successful on the Comstock as at Aspen, Colorado, and in many other places. The effort has been to make the transmitted power pull evenly from the same driving shaft with power developed by a water-wheel on the spot. Upon the success of the plant on the Comstock much has depended, as, being the largest one of the kind in the world, great attention has been attracted to it.

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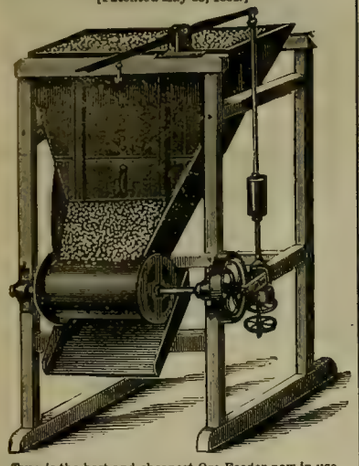

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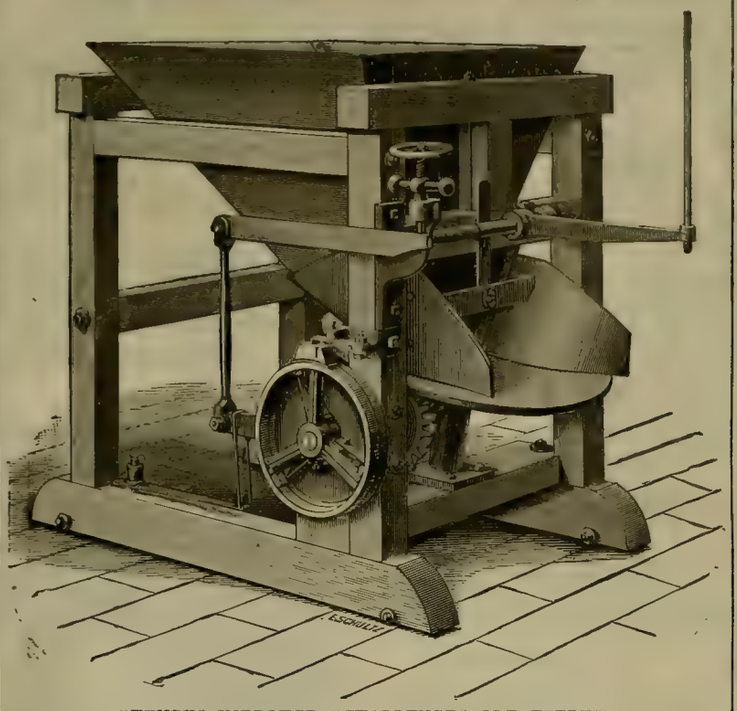

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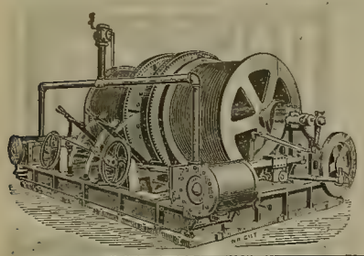

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THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Lefler, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

L. C. MARSHUTZ T. G. CANTRELL.

NATIONAL IRON WORKS

N. W. Corner Main and Howard Sts., San Francisco,

—MANUFACTURERS OF—

Stationary and Compound Engines, Flour, Sugar, Saw and Quartz Mill Machinery.

AMALGAMATING MACHINES. CASTINGS AND FORGINGS Of Every Description

ALL WORK TESTED AND GUARANTEED.

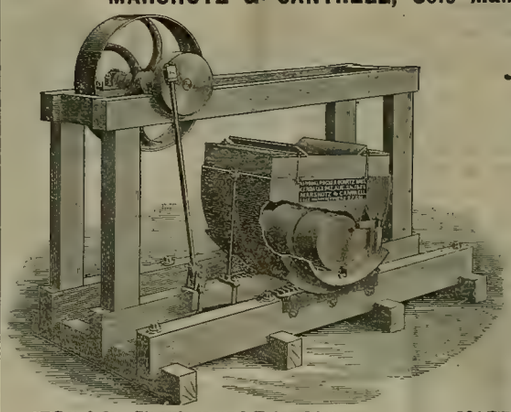
IMPROVED PORTABLE HOISTING ENGINES.

NATIONAL ROCKER QUARTZ MILL.

KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 3 H. P.

MARSHUTZ & CANTRELL, Sole Manufacturers.



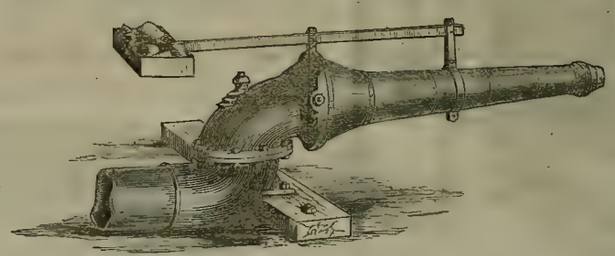
The Patentee and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity
2. The freight to mine is less than one-half of stamps.
3. The cost of erecting is less than one-fourth of stamps.
4. The power to drive it is less than one-half of stamps.
5. The wear is less than one-quarter of stamps.
6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machine in use.
8. In its simplicity of construction.

We challenge competition with Stamps, Ball Pulverizers or and other ore crushing machines now before the public.

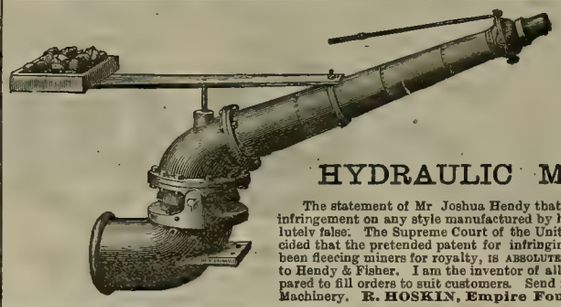
☞ Send for Circulars and Price List. MARSHUTZ & CANTRELL.

IMPROVED FORM OF HYDRAULIC GIANTS.



THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture. We guarantee purchasers of this form of Giants against all costs, expenses or damages which may arise from any adverse suits or actions at law. We are further prepared to furnish Single-Jointed Giants when required. Prices, discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent on application.

JOSHUA HENDY MACHINE WORKS, 39 to 51 Fremont St., San Francisco.



HOSKIN'S IMPROVED ONE-JOINTED HYDRAULIC MACHINE.

The statement of Mr Joshua Hendy that ANY STYLE of machine is an infringement on any style manufactured by him, he knows to be absolutely false. The Supreme Court of the United States on March 19th decided that the pretended patent for infringing, which he has for years been fleecing miners for royalty, IS ABSOLUTELY VOID, with costs of suit to Hendy & Fisher. I am the inventor of all styles in use, and am prepared to fill orders to suit customers. Send for list of prices of Hydraulic Machinery. R. HOSKIN, Empire Foundry, Marysville, Cal.

MINERS ATTENTION!

SPRAGUE ELECTRIC RAILWAY AND MOTOR CO., OF NEW YORK.

LOW-GRADE ORES CAN BE PROFITABLY WORKED BY ELECTRIC TRANSMISSION OF POWER FROM DISTANT WATERFALLS.

Plants will, in many cases, pay for themselves in from 1 to 5 years by the saving produced by Electric Transmission compared with other systems.

Suspension and Surface Tramways, Hoists, Pumps, Drills, Stamp-mills, etc., operated by Electric Motors.

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WIRE WINDOWS, GUARDS, OFFICE SCREENS, FENCING, GATES, ROOF CRESTING and WROUGHT IRON WORK.

Buildings and Steamships Wired for all Systems of Electric Lighting. Telephone No. 1508.

Electricity Triumphant.

The Largest Electrical Power Plant in the World.

The electrical plant for the transmission of power at the Chollar mine and Nevada mill, erected by the California Electric Light Co. of San Francisco, Cal., and under the supervision of Mr. F. E. Smith, the company's electrical engineer, is the largest electrical plant for the transmission of power on the globe.

The plant consists of six 120-horse power Brush compound-wound constant-current generators, situated on the 1600 level of the Chollar shaft.

The power used to operate them is water applied to Pelton wheels under a 1630-foot head, each generator being provided with a wheel of its own.

The water is conveyed to the generators through two lines of pipe—one 8-inch and the other 10-inch—which unite at the station. These pipes are carried down the shaft and incline to the station, whence the spent water is carried off through the Sutro tunnel to the Carson river.

The station is cut in solid rock and is 25 feet wide, 50 feet long and 12 feet high, and is lit by 7 incandescent lamps, which are supplied with current from the motor circuits. The average temperature of the station is about 68 degrees Fahrenheit.

The generators are each supplied with improved hydraulic governors, which control the speed perfectly. Each generator is also provided with a constant-registering hydraulic speed-indicator, which shows the least change in speed should it occur.

The terminals of each generator are connected to a switch-board situated at the entrance to the station, which is provided with ammeters and voltmeters, and arranged in such a manner that any generator can be connected to any motor circuit at a moment's notice. From this switch-board six circuits are run up the incline and shaft to the Nevada quartz-mill, which contains 60 stamps, with their complement of pans, settlers, agitators, rock-breakers, etc.

In this mill, on the surface, are placed six of the latest-improved Brush motors of 125-horse power each, connected by a belt to one line of shafting which is provided with belt-holders, thereby enabling an attendant to stop or start a motor at will. The motors are also provided with ammeters and voltmeters and speed indicators. Communication between the motor-house and station is by means of electric bells.

The electrical transmission of power has now been fully demonstrated on the Comstock to be not only feasible, but reliable and economical, and as the water supply in Virginia is limited, the economical use of it is a vital question. Sufficient has already been accomplished to prove that powerful electric generators could be placed on the Carson and Truckee rivers and their power transmitted to the Virginia City mills, thereby effecting such a saving in cost of milling expenses as to place the mining companies in a position to reduce low-grade ores at a profit.

Now that we can be assured of a steady stream of water in the Carson river by the building of a large reservoir, there will be sufficient power furnished not only to operate the mills in Virginia, but also for lighting purposes in the mines and for hoisting.

Mr. Smith has already set up hoisting plants in California, and he assures us that he feels perfectly confident of being able to put up a hoist plant that will raise all that any treble-decker on the Comstock will hold.

When Mr. Smith came to Virginia, he came under the impression of having to put up a long-distance transmission plant, and he longs for the opportunity of proving to the world that the electrical transmission of energy is the cheapest form of transmission and for long distances the only feasible system.

Two dynamos now run 40 stamps during the day, in conjunction with the Pelton wheels, using 78 inches of water. If there was enough water, the full complement of the mill could be run with the electric plant alone and there would always be one motor to spare.

It is proper to state in this connection that but for the electric plant at the Nevada mill, the scarcity of water would force its shutting down, throwing many men out of employment.

This immense plant was not started under the most favorable circumstances, because of the unlooked-for circumstances encountered in underground work of this description. It was found necessary to alter the insulating material used in the generators in order to overcome the difficulties arising from the collection of moisture in the coils, and this difficulty has now been entirely overcome and the generators are working to perfection.

Another cause for delay was the inability to obtain a first-class water-wheel governor that would perfectly control the Pelton wheels while working under an immense pressure, but after a great deal of experimenting with governors, a very simple device was found which works to perfection.

Having successfully overcome all the obstacles encountered in underground work of this description, Mr. Smith feels confident that in future there will be no cause for delay in starting any other plant of this kind.—*Virginia (Nev.) Enterprise.*

The Pelton Water-Wheel.

On another page of this issue is given a detailed description of the electrical plant now running in the Chollar shaft on the Comstock lode.

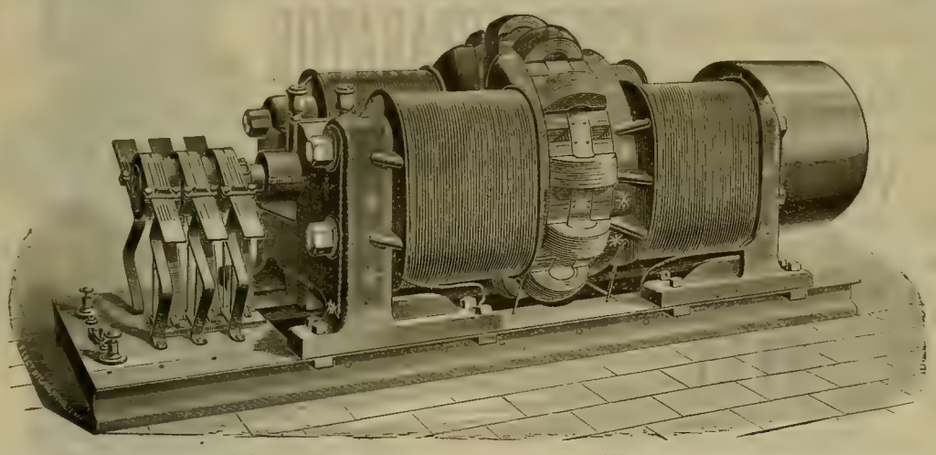
We desire to call attention to the fact that the cut (p. 209) showing dynamos and Pelton wheels in the underground chamber greatly exaggerate the wheels as regards size, as also the buckets on the face of the wheels. The wheels are only 40 inches in diameter and the buckets only 2½ inches in width. The illustration herewith shows a standard six-foot wheel as ordinarily set in frame ready for use, excepting the cover. This reduced about one-half would give a correct idea of the wheel-running dynamos referred to.

In this instance the wheels are attached to the dynamo shafts direct, thus dispensing with all intermediate gearing, and made of a size to give the proper speed to the dynamos, 900 revolutions. They are calculated, however, to stand the enormous speed the velocity of the water would give them running without load, which would be 1800 revolutions, giving the periphery of the wheel a speed of 18,864 feet per minute, the water flowing from the nozzle with a velocity of 19,260 feet per minute. It may be here stated that under this tremendous pressure, there is no loss of efficiency in the wheels, the average being from 88 to 90 per cent.

Our readers are so familiar with the Pelton wheel that a detailed description is unnecessary. No one at all acquainted with the industrial progress of the Pacific Coast during the past few years in the department of mining and manufacturing can fail to be impressed with the important part this wheel has borne in the rapid development of these varied interests. A fine engraving of the wheel is given on page 209.

The Pelton wheel is the product of California genius, and as such is our especial pride. It was evolved out of the most pressing necessity, a condition of things that nowhere else existed, and to which no other form of wheel was adapted. The wonderful success that has attended its operation on this coast, as well as in all other localities where it has been introduced, marks a new era in the use of water as a power.

On account of the large volume of water required for turbine wheels, and the limited head under which they can be run, comparatively few of the great number of water powers the country affords have been utilized. The high efficiency of the Pelton wheels admits of great results being accomplished from a small amount of water, especially when a considerable head can be obtained. This is in the majority of cases much more easily accomplished, from the fact that the reduced quantity of water admits of being carried by pipe a considerable distance at comparatively small cost. Thus the old forms of water motors are giving place to the new, with great gain in the matter of economy as well as with a much wider range of application.



BRUSH DYNAMO-ELECTRIC GENERATOR FOR CONSTANT CURRENT.

California has given the world not only its wealth of minerals, but what is of equal value, the wealth of its resources in mechanical achievements, which for boldness of conception, originality of design and adaptability to existing conditions, bear favorable comparison with the products of any of the older States.

Water has come to be recognized as one of the most potent of all natural forces, and the appliances for its high utilization are enlisting interest and attracting attention now as never before all over the world.

The Generators and Motors.

The electrical plant on the Comstock at the Chollar mine and Nevada mill is on the Brush system. The Brush electric motor is a perfected machine of which many thousands are in use, taking the place of small engines and other power devices. The motor is *not* an electric-light dynamo run as an electric motor, but specially adapted for the work it is to do. The motors are strong, compact and built to withstand a great strain. The mechanical details have been thoroughly considered.

The generators return a very high percentage of driving-power, and are built in all sizes. The plant on the Comstock consists of six 120-horse-power Brush compound-wound, constant-current generators, each generator having its separate Pelton wheel for power. Special improved hydraulic governors control the speed. Engravings in detail of both the dynamo and generator are given in this number of the MINING AND SCIENTIFIC PRESS, and the larger engravings show them in position.

The result of the application of this power on the Comstock has been so successful that it will doubtless be used in many other places on this coast where circumstances admit. The adaptability of the system for power and lighting purposes in mining has been elsewhere proven; but this on the Comstock is the largest electrical-power plant in the world.

The Fox Platform and Coupling.

The Nevada County Narrow-Gauge Railroad Company has recently, after an extended trial, adopted the Fox platform and coupler for its cars. The device is also being tried on another road in this State and will doubtless be adopted there also, as it has given great satisfaction. It is an improvement on the Miller in many ways. The cars can be readily uncoupled even when there is a strain on the bars, and this can be done when the cars are on a curve as well as when they are on a straight line of track.

The bumper comes flush with the platform and has an automatic lateral motion, adjusting itself to any curve. Close parallel connection is made between the platforms on a curve, the same as on straight track. A spring is placed at the back, so the edges are kept flush at all times.

The coupling is in shape much like the Miller, but connects and disconnects much more readily. By means of the ordinary lever on the platform a bolt is pulled back and the head then turns itself so as to release or catch automatically. This swinging or movable action of the head on the bar simplifies the whole action of coupling and uncoupling. A very slight pressure uncouples the cars even on a sharp curve.

The construction is such that by taking out a bolt another head may be put on to couple with the Jenny type of coupler. It will, in the ordinary form, couple to the Miller as well as to its own type.

A company has been formed in this city to manufacture this appliance. It is called the Fox Platform and Coupling Co. L. C. Parke is president, and the other directors are B. T. Lacy, Squire V. Mooney, W. B. Wilshire and F. A. Fox. Contracts for manufacturing have been made with the Pacific Rolling Mills. At the office of the company, 21 and 23 Fremont street, is a miniature track and cars, where the practical workings of the device may be examined. John F. Kidder, president and manager of the Nevada Co. R. R., says the invention has been placed on their passenger coaches and meets his approval in every respect, doing all that is claimed for it under the most trying circumstances, viz.: Coupling and uncoupling without any trouble on a 24° curve. He thinks it the best coupler he has ever seen, and will apply it on all the cars of the road, both passenger and freight.

At the Convention of Railroad State Commissioners at Washington this month, they urged upon the Interstate Commerce Commissioners to consider what could be done to prevent the loss of life and limb in coupling and uncoupling freight cars used in interstate commerce. At the close of the session, R. R. Commissioner Coffin of Iowa, now representing the Brotherhood of Brakemen, stated that in Iowa alone, in ten years, 2424 men were killed or maimed while using the old pin and link coupler and hand brake on freight cars. Last year there were 349 killed. On the 150,000 miles of railroad in this country over 6000 active, strong men were killed or maimed last year from these two causes alone.

This is a startling statement and it is time there was enforcement of some rules compelling the use of automatic couplers on freight as well as passenger cars. The Fox coupler works so much more easily than the Miller and overcomes the difficulty the Miller has in operating on curves, that it is very probable its use will rapidly spread as its merits become known. No time at all is lost in uncoupling, the withdrawal of the bolt by the lever allowing the head to swing instantly.

To the Miners of California.

The following circular addressed to the miners of this State being self-explanatory, it need only be added that the names thereunto attached, many being omitted, represent parties prominent in every branch of mining—vein, drift and hydraulic alike:

As is well known, numerous parties engaged in the business of mining in this State have been enjoined from working their mines by order of the courts. While the properties so restrained from being worked have thus far consisted mostly of hydraulic mines, they have included also those worked by drifting as well as by other methods more or less in use.

The reason assigned for closing these mines is that their tailings foul the water and so fill up the beds of the outletting streams as to injure the land lying along them and impede navigation. As no class of mines can be operated without contributing in some degree toward causing the injury complained of, it follows that all, vein and placer alike, are exposed to be closed by mandate of the courts. Such being the case, it behooves the miners everywhere to make common cause against this common danger, to which end they should lose no time in coming together and organizing for mutual protection.

There exists already an institution known as the "Miners' Association," formed originally for the above purpose, and which might now be availed of for carrying out the same, or a wholly new organization might be formed if deemed expedient; the object of this circular being to impress upon the miners the importance of taking early and efficient action in the premises.

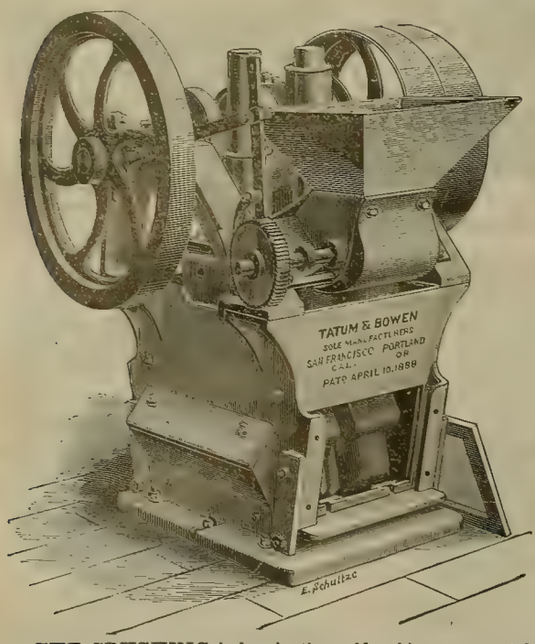
In addition to the State organization above alluded to, with its headquarters in San Francisco, local associations should be gotten up in every mining county in the State, and which, while giving special attention to home matters, would act in concert with the central organization.

The Debris Commission provided for by Act of Congress is now in the field and actively engaged in the discharge of its duties, which consist in ascertaining whether or not any plan can be devised whereby the present conflict between the farmers and the miners can be adjusted and the mining industry be rehabilitated. The present is therefore an opportune moment for the miners to organize, and through united action aid the members of this Commission, as far as possible, in the hope that their report to Congress will be of such a character as will induce that body to appropriate means sufficient to carry out such plan for disposing of these tailings as the Commission may recommend.

EGBERT JUDSON,
THOMAS BELL,
G. W. OSBORN,
ABRAHAM HALSEY,
M. ZELLERBACH,
L. L. ROBINSON,
S. A. RAYMOND,
WM. S. CHAPMAN,
J. H. THOMAS.

MESSRS. FRENCH & LINFORTH, 35 Beale street, this city, are agents for the "Everlasting Whiffletree," something new in construction, the body being steel pipe tapering neatly toward the ends. They are durable, strong and light, and there is no danger of the trimming becoming loose, as is the case with wood. This firm is also agent for Gandy's American cotton belting, made of fine-grained cotton duck stitched in a peculiar way to insure an even surface and large gripping-power. This belting is specially adapted for heavy stamp-mill machinery. It runs straight, does not slip or harden, and is not affected by atmospheric changes. The same firm is also agent for Robert Mann & Sons' chopping axes; Thos. R. Mann & Co.'s Climax (all steel) axes and Robert Mann double-bit axes; J. Barton Smith Co.'s screw-tang files and rasps and their saws; Nashville Spoke & Handle Co.'s ax, pick and sledge-handles; Thos. Devlin & Co.'s malleable iron-pipe fittings and hardware, and several other things in the hardware line.

MR. C. H. AARON has resigned his position in the State Mining Bureau, where he has been engaged for some little time.



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PERFECTED

DOUBLE

Economic

Quartz

Mill.

Attached to each Mill is an effective

Automatic Ore Feeder.

THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

IMPROVED ROCK BREAKER.

Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address:

TATUM & BOWEN,

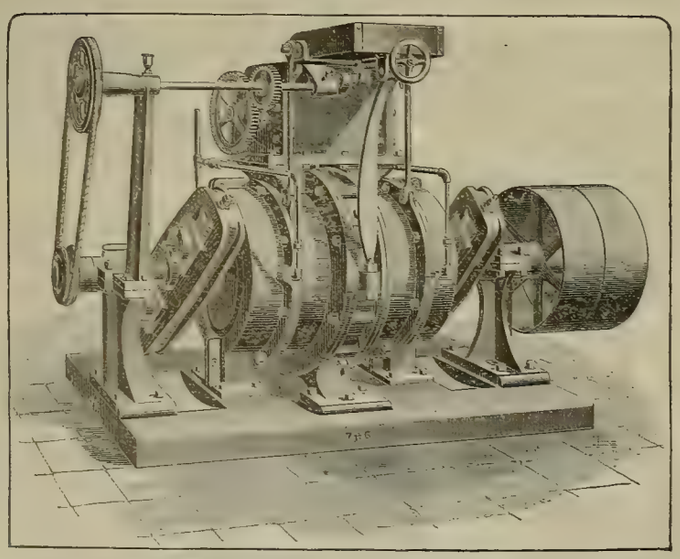
34 and 36 FREMONT ST., SAN FRANCISCO, CAL.,

AND PORTLAND, OREGON.

MANUFACTURERS OF MINING AND SAW MILL MACHINERY.

FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; is in successful operation and we guarantee its work as represented.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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E. E. EYRE, President. JAS. H. GRAHAM, Vice-Pres. & Manager. G. M. PINCKARD, Sec'y.

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Successors to SAVAGE, SON & CO.,

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MINING MACHINERY,

Stamp Batteries, Pans, Settlers, Etc. "Dodge" Rock Breakers, Pulverizers, Concentrators.

SAWMILL MACHINERY,

Refrigerating and Ice Machinery,

STEAM ENGINES,

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Shafting, Pulleys, Hanger and Boxes, Etc.

Special machinery of all kinds. We have a large list of Standard Patterns, Gears, Pulleys, Boxes, etc. REPAIR WORK SOLICITED.

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GOLD SEPARATOR

A Proven Success.

Was Offered to the Market One Year Ago

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Now there are

140

Of these Separators

—IN—

SUCCESSFUL OPERATION.

Send for descriptive Circular and Price List.

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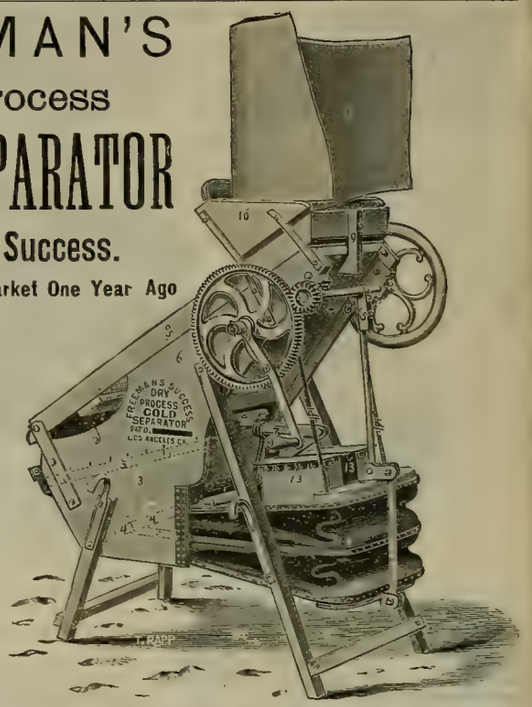

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VULCANIZED RUBBER FABRICS

Adapted to Mechanical Purposes in the United States.

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EMERY WHEELS.

(Large Wheels made on Iron centers)

Cuts Cooler and Freer

THAN ANY OTHER WHEEL IN THE MARKET.

EXTRA RUBBER BELTING and HOSE

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Circular woven Seamless Antiseptic RUBBER LINED "CABLE" HOSE and TEST HOSE for the use of Steam Engines, Force Pumps, Rolling Mills, Iron Works, Factories, etc.

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Practical and Industrial Chemist, Assayer and Geologist,

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Will report on the condition and value of any mining property on the Pacific Coast. Rare Chemicals made to order. Instructions given in Assaying and Practical Chemistry.

AMALCAMATING MACHINERY.

Stamp Mills for Wet or Dry Crushing. Huntington Centrifugal Quartz Mill. Drying Cylinders. Amalgamating Pans, Settlers, Agitators and Concentrators. Retorts, Bullion and Ingot Moulds, Conveyors, Elevators, Bruckners and Howell's Improved White's Roasting Furnaces, Etc.

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CONCENTRATING MACHINERY.

Blake, Dodge and Comet Crushers, Cornish Crushing and Finishing Rolls, Hartz Plunger and Collom Jigs. Frue Vanner & Embrey Concentrators, Evans', Calumet, Collom's and Rittenger's Slime Tables. Trommels, Wire Cloth and Punched Plates. Ore Sample Grinders and Heberle Mills.

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Hoisting Engines, Safety Cages, Safety Hooks,

ORE CARS, WATER & ORE BUCKETS,

Air Compressors, Rock Drills, Etc.

GENERAL MILL AND MINING SUPPLIES, ETC.

Sectional Machinery FOR MULE-BACK TRANSPORTATION.

Pumping Engines and Cornish Pumping Machinery,

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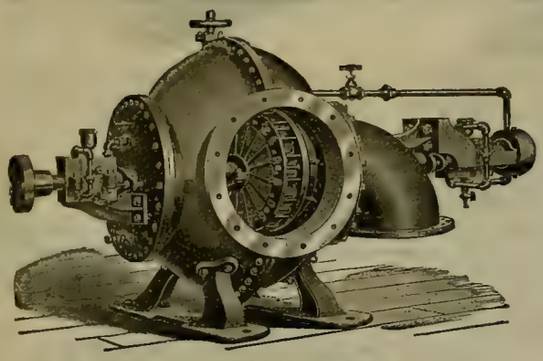

JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,
Springfield, Ohio, or 110 Liberty St., New York.

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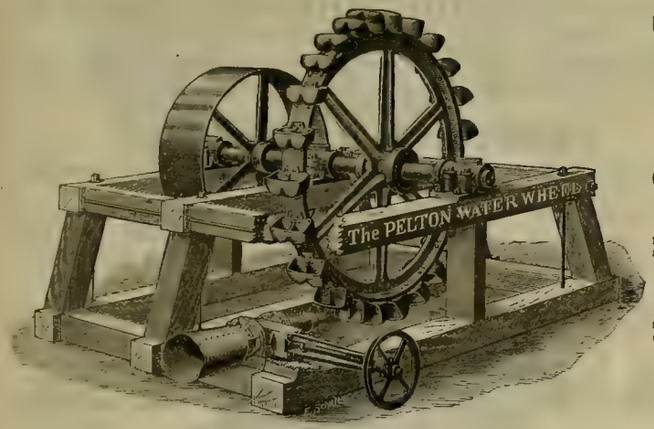

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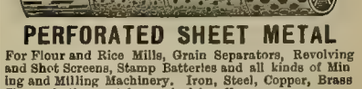

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MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Baltimore S M Co	Nevada	4	25	Feb 4	Mar 8	Mar 26	A R Grim	402 Montgomery St
Belcher S M Co	Nevada	37	50	Feb 19	Mar 25	Apr 12	J Crockett	327 Pine St
Con Pacific M Co	California	10	15	Feb 5	Mar 11	Apr 2	F E Luty	330 Pine St
Crocker M Co	Arizonia	6	10	Feb 25	Apr 2	Apr 24	A Waterman	309 Montgomery St
Christy M Co	Utah	1	10	Feb 20	Mar 25	Apr 15	G R Spinney	310 Pine St
Eureka Con M Co	Nevada	11	50	Mar 19	Apr 27	May 20	H P Bush	306 Pine St
Gray Eagle M Co	California	12	05	Mar 19	Apr 23	May 14	O H Bogart	327 Pine St
Grand Prize M Co	Nevada	20	30	Mar 15	Apr 20	May 13	R R Grayson	327 Pine St
Golden Prize Con M Co	Nevada	2	30	Feb 16	Mar 20	Apr 10	C D Bennett	328 Montgomery St
Julia Con M Co	Nevada	23	10	Jan 30	Mar 7	Mar 28	J Stadfeldt Jr	309 Montgomery St
Lapanter Con M Co	Nevada	1	03	Feb 23	Apr 5	Apr 24	J Stadfeld Jr	309 Montgomery St
Martin White M Co	Nevada	22	25	Jan 19	Mar 6	Mar 26	A B Cooper	325 Montgomery St
Mexican M Co	Nevada	37	25	Mar 5	Apr 10	Apr 30	C E Elliott	309 Montgomery St
Mono M Co	California	27	50	Feb 23	Apr 2	May 8	B L Burling	309 Montgomery St
North Peer G & S M Co	Arizona	5	05	Feb 25	Apr 1	Apr 24	H Deas	309 Montgomery St
New Coso M Co	California	22	30	Feb 5	Mar 14	Apr 1	J L Hunt	308 Montgomery St
Oak Con M Co	California	1	03	Feb 25	Apr 8	Apr 23	E J Ryan	230 Montgomery St
Peer M Co	Arizona	7	10	Jan 23	Mar 5	Mar 23	A Waterman	309 Montgomery St
Piedmont M Co	Nevada	1	05	Jan 28	Mar 6	Mar 27	J J Scoville	309 Montgomery St
Sierra Nevada M Co	Nevada	94	25	Mar 5	Apr 9	Apr 29	E L Parker	309 Montgomery St
Utah Con M Co	Nevada	6	25	Mar 5	Apr 10	Apr 29	A H Fish	399 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Evening Star M Co		J J Scoville	309 Montgomery St	Annual	Mar 20
Jackson M Co		W R Drake	327 Pine St	Annual	Mar 28
Magenta Con M Co		D A Jennings	401 California St	Annual	Mar 27
Sutro Tunnel Co	Nevada	P W Ames	320 Sansome St	Annual	Mar 28

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M Co	Nevada	A S Cheminaut	328 Montgomery St	03	Mar 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 23.		WEEK ENDING Mar. 7.		WEEK ENDING Mar. 14.		WEEK ENDING Mar. 21.	
Alpha	2.05	2.30	1.90	2.30	1.75	1.90	1.80	2.15
Alta	2.15	2.50	1.90	2.10	1.80	1.90	2.00	2.15
Andes	.90	1.00	.90	1.00	.85	.90	.90	.95
Argenta	....	.10	....	.10	....	....	....	....
Belcher	3.05	3.50	3.10	3.65	1.75	3.00	2.80	3.25
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	4.70	5.25	4.35	5½	4.05	4.35	4.20	4.65
Bullion	1.00	1.10	.90	1.00	.85	.90	.85	.95
Baltimore	.20	.30	.20	.30	.20	.40	.40	.45
Belle Isle	....	....	....	....	....	....	....	....
Bodie Con	1.50	1.55	1.35	1.55	1.25	1.30	1.45	1.50
Benton	....	....	3.00	3.50	....	3.50	....	....
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	....	.50	.40	.50	.30	.35	....	.35
Con. Va. & Cal	8.00	8.50	7⅞	7.50	7.50	7.75	8.25	8.75
Challenge	4.50	5⅝	4.60	5¼	4.15	4.55	4.15	4.75
Champion	....	....	....	....	....	....	....	....
Chollar	2.05	3.10	2.55	3.15	2.40	2.65	2.40	2.80
Confidence	14	16½	14	16	13½	13½	13½	14½
Con. Imperial	.70	.80	.70	.80	.65	.85	.65	.75
Caledonia	....	.40	....	.40	....	.35	.35	.45
Con. Pacific	....	....	....	....	....	.20	.15	.20
Crown Point	5.00	6⅜	5.25	6⅜	4.35	5¼	4.60	4.95
Crocker	.60	.75	.55	.60	.35	.05	.45	.50
Central	....	....	....	....	....	....	....	.25
Dudley	....	....	....	....	....	....	.20	.25
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	....	....	2.00	....	2.00	....	2.00
Exchequer	1.00	1.15	.95	1.05	.80	.95	.80	.90
Grand Prize	1.05	1.10	1.00	1.10	.80	1.00	.70	.90
Gould & Curry	2.80	3.20	2.65	3.10	2.45	2.60	2.65	2.85
Hale & Norcross	3.85	4.25	3.85	4.40	3.70	3.90	3.70	4.00
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	.25	.30	....	.25	....	....	.30	.40
Justice	1.60	1.85	1.60	1.75	1.45	1.60	1.50	1.65
Kentuck	2.25	2.35	2.15	2.30	1.85	2.00	1.80	2.00
Lady Wash	.40	.45	.35	.40	.30	.35	.35	.40
Martin White	....	....	....	....	....	....	....	....
Mono	....	1.05	....	.85	.55	.60	.75	.80
Mexican	3.20	4.20	3.50	4.10	3.35	3.65	3.60	3.95
Mt. Diablo	....	....	....	....	....	....	....	2.00
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.40	1.50	1.40	1.45	1.00	1.25	1.00	1.05
North Belle Isle	2.55	2.65	2.55	2.65	2.55	2.70	2.55	2.60
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.75	2.80	2.90	3.00	2.95	3.10	2.90	3.05
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.55	1.70	1.50	1.70	1.35	1.50	1.35	1.45
Ophir	5⅞	6.50	5.25	6.00	5⅛	5.50	5⅛	6.50
Overman	1.35	1.55	1.40	1.50	1.30	1.40	1.40	1.50
Potosi	2.20	2.60	2.30	2.70	2.15	2.25	2.15	2.35
Peerless	.60	.75	.65	.80	.45	.65	.40	.60
Peer	....	.25	....	.35	.25	.35	....	....
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	3.05	3.45	2.90	3.30	2.75	3.00	2.75	3.10
S. B. & M	3.00	3.30	3.05	3.20	2.70	2.95	2.75	3.05
Sierra Nevada	3.10	3.80	3.15	3.65	2.85	3.10	3.00	3.30
Silver Hill	.70	.75	.65	.75	.65	.70	.60	.70
Silver King	....	....	....	....	....	.90	....	....
Scorpion	.55	.65	.55	.60	.50	.55	....	.55
Syndicate	....	....	....	....	....	.10	....	.10
Union Con	3.15	4.10	3.60	4.05	3.50	3.70	3.70	3.90
Utah	1.30	1.50	1.30	1.45	1.20	1.25	1.25	1.35
Yellow Jacket	4.00	4.60	4.40	4.90	3.75	4.25	3.80	4.10

Sales at San Francisco Stock Exchange.

THURSDAY, Mar. 21.

100	Andes	90c	
100	Belcher	2.90	
100	B. & Belcher	4.30	
100	Bullion	85c	
400	Baltimore	40c	
100	Chollar	2.50	
65	Con Va & Cal	$1	
500	Crown Point	4.80	
500	Crocker	55c	
50	Dudley	20c	
110	Exchequer	85c	
225	Grand Prize	75c	
50	Hale & Nor	3.80	
50	Kentuck	2.00	
100	Mexican	3.70	
200	Mono	75c	
185	Ophir	5 87½	
800	Peer	35c	
200	Peerless	60c	
100	Savage	2 80	
100	S. B. & M	2.90	
100	Union	3.70	
200	Weldon	35c	
250	W Comstock	30c	
120	Yellow Jacket	4.05	

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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GEO WILSON—Sacramento Co.
J. C. HOAG—San Francisco.
CHAS. F. BLACKBURN—Idaho.
FRANK S. CHAPIN—Colusa Co.
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Mining Share Market.

Speculation in Comstock stocks the past week was tame, as if the pool is quietly operating for a gradual sinking in prices to keep the short element from filling, and at the same time take in all the outside stocks offering. The nature of the work going on in several, if not in all, the mines also gives color to the above. Take as an example Best and Belcher. By those who should know whereof they speak, it is asserted that in running the four crosscuts as each came to the ledge, work was discontinued. This, no doubt, if the case, was done for the pool to find out the extent of the ledge and its richness, and at the same time make small deals in that of other sympathetic stocks. The news this week from the mines is as follows; A still further improvement on the 400 level of Hale and Norcross running toward Savage, an improvement on the crosscut in Savage running to intersect the ledge from Hale and Norcross, and quite a decided improvement in the Ophir winze and upraise. An important improvement is reported on the Yellow Jacket 300 level near the Challenge line. The ore in Crown Point is reported as assaying about $36 per ton. There is no official statement as to the assay of the ore of this mine, and as for that of several other mines, notwithstanding the law states that must be done weekly. Advices from Virginia City are confirmatory of large deposits of snow in the mountains. The latest advices of it being reported by telegraph state that in the canyons and gulches several feet of snow are piled up, while on a level the snow is about six feet deep. This assures water for milling purposes well into August. The question is naturally asked, with an abundance of water, why the 60 stamps in the Nevada mill are not dropping, and also why the California pan-mill is not started up? In the outside stocks—Tuscaroras, Bodies and Quijotoas—trading the past week was, like in the Comstocks, decidedly tame, although toward the close more was doing, with a slight advance in the last two. The news from the mines in the three districts is of the same tenor as heretofore published.

At the Chollar annual election both secretary's and superintendent's reports were read, which did not differ materially from former reports.

Ore shipments from Comstock mines last week aggregated 6393 tons, and included the following: Con. Cal. and Virginia, 2550 tons; assay value, $34.90; Savage, 530 tons; assay value, $20.49; Hale and Norcross, 900; Confidence and Challenge, 807 tons; assay value, $26.68; Crown Point, 888 tons; Overman, 268 tons; Justice and Alta, 450 tons. The bullion yield of the above ore was about $135,000.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. California and Virginia, March 16, $75,000: Hale and Norcross, 16, $78,098; Savage (for February), $29,066; Justice, 19, $2625; Overman, 6, $9171; Hanauer, 12, $5900; 13, $2000; 14, $3300; 15, $3300; 16, $6200; Mt. Diablo, 18, $7443.

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The works are situated at Daggett, Cal., in the Calico Mining District, and on side-track of the Atlantic & Pacific Railroad. They contain a first-class 50-horse power Engine and 45-horse power Boiler with Ore Crusher and other machinery, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPY & CHILDS, 123 California street, San Francisco.

ASSESSMENT NOTICE.

Gray Eagle Mining Company.—Location of principal place of business San Francisco, California. Location of works, Placer County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 19th day of March 1889, an assessment, No. 12, of Five Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Room 9, No. 327 Pine Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23d day of April, 1889, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 14th day of May, 1889, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

O. H. BOGART, Secretary.

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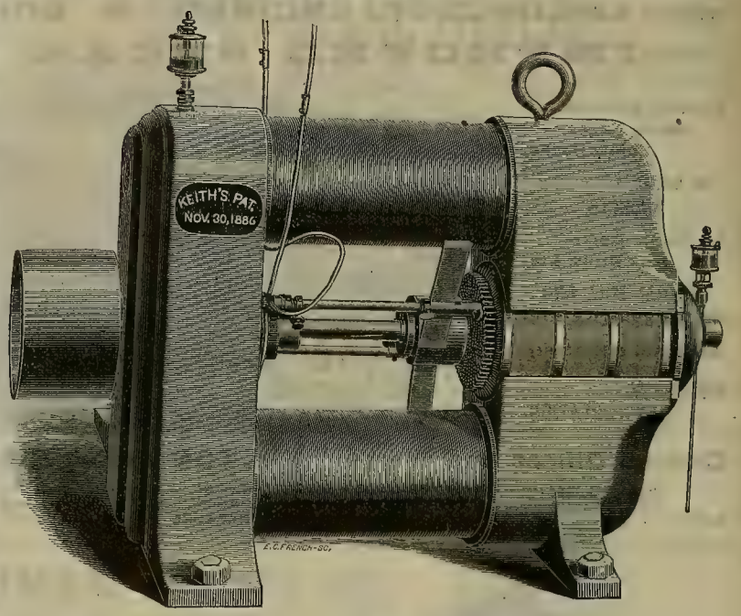

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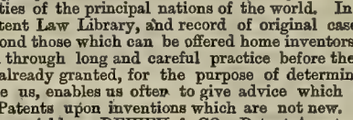
Scientific Press  **Patent Agency.**

ESTABLISHED 1863.

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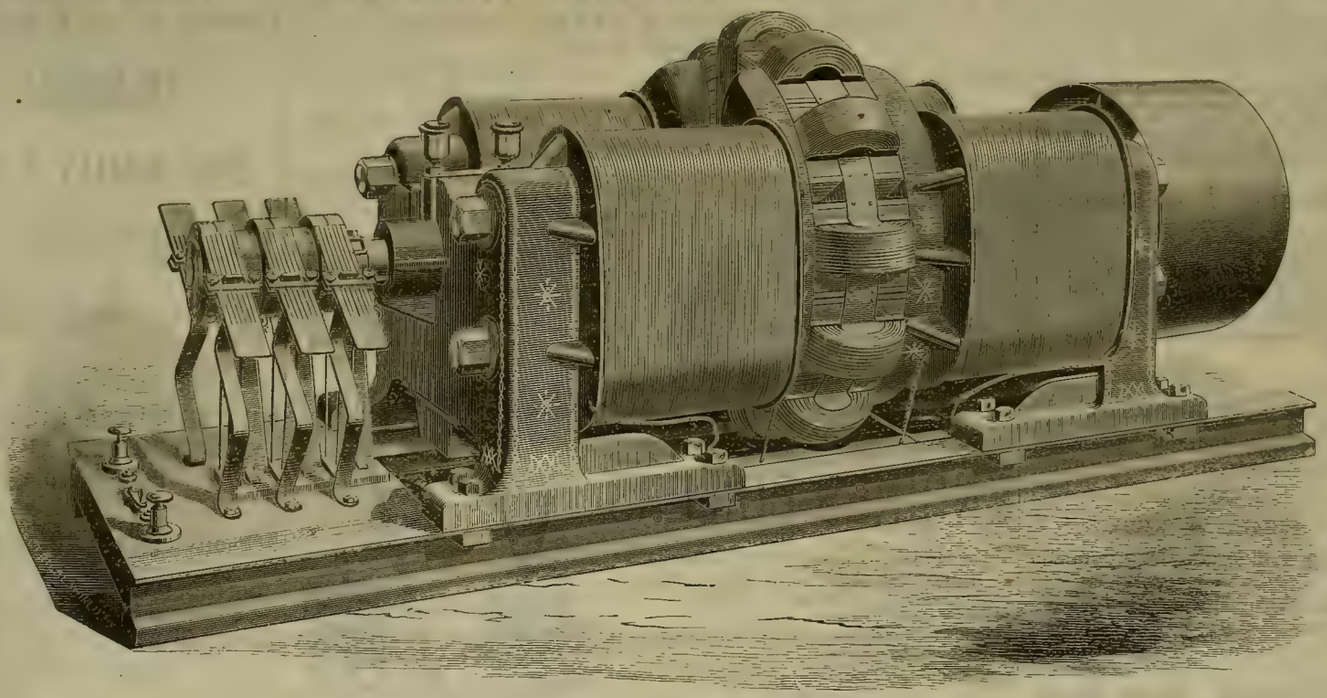

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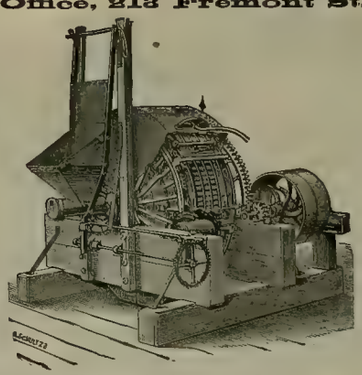

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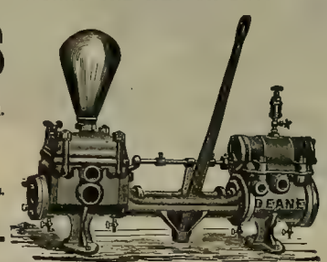

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A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for $2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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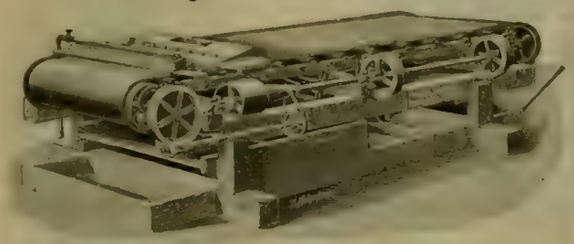

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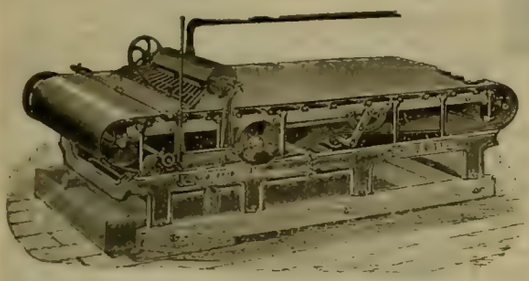

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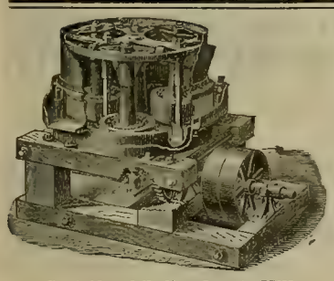

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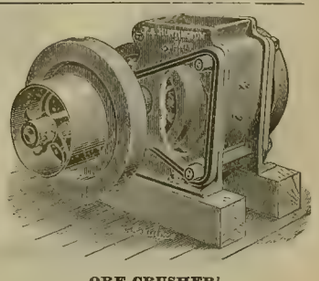

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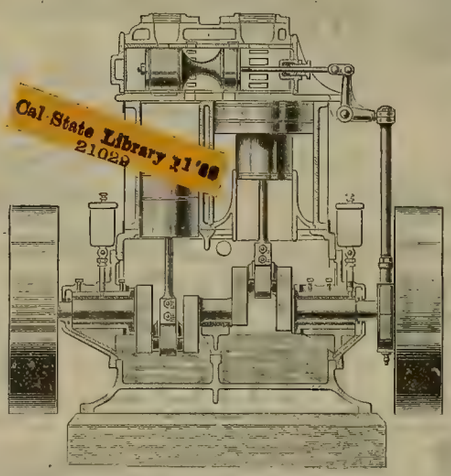

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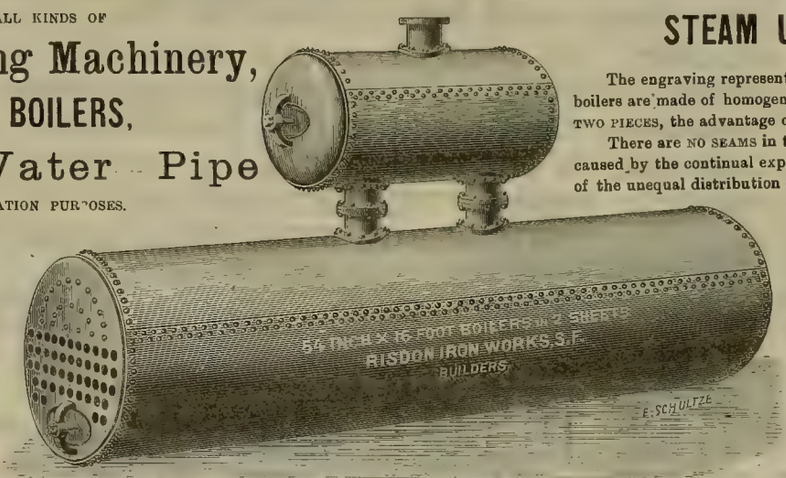

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STEAM USERS, ATTENTION!

The engraving represents our standard 54 in. x 16 ft. Boiler. These boilers are made of homogeneous STEEL, and the shell, as shown, being in TWO PIECES, the advantage of this will be readily appreciated by steam users.

There are NO SEAMS in the fire to leak, nor loose rivets to contend with, caused by the continual expansion and contraction of the plate on account of the unequal distribution of the heat under the boiler, the bottom presenting a smooth, even surface which can be easily cleaned. We place a manhole at the back end above the tubes, and one in the front end under the tubes.

The FRONT MANHOLE gives free access to the sheet over the fire, THE VITAL PART OF EVERY BOILER. This point is often overlooked by purchasers, and boilers are supplied with a small hand hole, and the remaining space filled with tubes which allows absolutely no access for cleaning, and in a short time tubes and sediment are one solid mass, and instead of gain in efficiency by a few feet of tube surface, the result is a positive loss.

SPECIFICATION OF BOILER AND FIXTURES:

1 Boiler, 54 inches diameter by 16 feet, with 46 3½ inch tubes; Shell, 5-16; Heads, 7-16.
1 Steam Drum, 36 inches diameter by 72 inches long.
1 Breeching.
1 Smokestack, 30 inches by 60 feet, Nos. 12 and 14 Iron.
300 feet galvanized strand for Guys.
1 C. I. Front, complete.
1 Foundation Plate for front.
1 Set Grate Bars for coal or wood.
1 Back Bar Bearer.
1 Ash Cleaning Door and Frame.
1 Back Arch Plate.
1 Set Binder Braces and Bolts for Brickwork.
1 Stand for back end of Boiler.
1 Steam Gauge and Syphon.
1 Glass Water Gauge, complete, with column and 3 Gauge Cocks.
1 Safety Valve.
1 Stop Valve.
1 Feed Valve.
1 Blow-off Valve.
1 Check Valve.

These Boilers are tested to 150 pounds hydrostatic pressure and are intended for a working pressure of 100 pounds. Total weight of Boiler and fixtures, 17,000 pounds.

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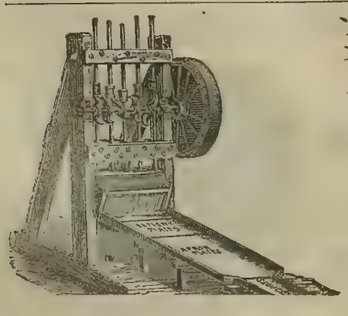

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SAN FRANCISCO, SATURDAY, MARCH 30, 1889.

VOLUME LVIII.
Number 13.

Manilla Rope Transmission.

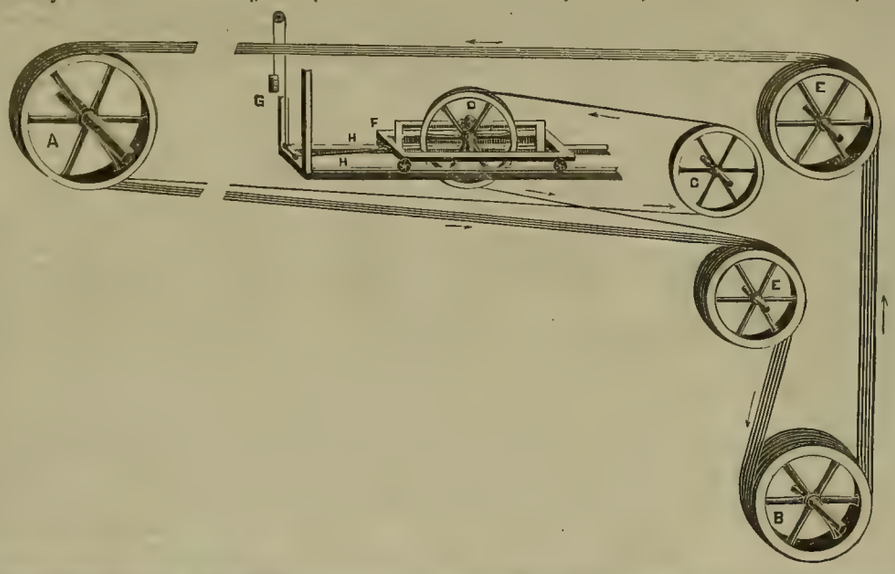
The engravings on this page show the Dodge patent system of rope transmission of power, as applied in the new boot and shoe factory of Buckingham & Hecht, on Twenty-sixth street in this city. Large wood-split pulleys are used. The driver, the driven and the winders have several grooves in which is wound the manilla rope, the number of wraps being used for the purpose of gaining rope surface in contact for the greater adhesion.

In this system the power may be carried to any angle, and shafts may be placed at any angle to each other. The device for taking care of the slack and giving the proper tension to the rope is entirely new and most ingenious. One strand of the rope (the slack side) as it comes from the driving pulley up over an idler, then to a six-foot idler attached to the movable carriage on wheels, takes up the slack of the rope caused by strain and a dry atmosphere, and again pays in slack in case of dampness or other atmospheric changes. It further acts for obtaining a greater adhesion of the rope; and as to tension, the impelling weight attached to the carriage may be increased or diminished according to power required.

The system does away with the annoyance of belts, and the power is transmitted with ease and silence. The manilla rope is "tallow-laid." The power can be taken from the main line at any desired angle, great or small, from one floor to another, on roof or in basement, or wherever needed. The actual strain on the rope is divided by the number of wraps, and is only in proportion to the actual strain required to do the work.

The cuts show the general plan and also the arrangement of details in the Buckingham & Hecht factory, where an Eclipse Corliss engine is used as the source of power. *A* is the main driver on main shaft; *B*, main driven line shaft; *C*, winders; *D*, carriage pulley for slack; *E*, carriers for carrying rope around corner; *F*, traveling carriage on wheels; *G*, impelling or tension weight; *H*, track for carriage.

The Joshua Hendy machine works are agents on this coast for this system. They have applied it at Buckingham & Hecht's, California Electric Light Co., Hooper planing-mills and Hubbard & Co.'s planing-mills in San Francisco; at the Oakland Electric Light Co. and California Door Co., Oakland; the Verdi mill and Essex mill, Verdi, Nevada; the Santa Rosa planing-mills; Front-Street Cable R. R. Co., Seattle, and other places.



THE DODGE SYSTEM OF TRANSMISSION OF POWER BY MANILLA ROPE.

COMSTOCK ORE YIELD.—The ore yield of the Comstock mines during the week ended March 23d aggregated 5553 tons, divided as follows: Consolidated California and Virginia, 2717 tons, battery sample assays showing a value of $35.10 per ton; Savage, 505 tons, assaying $21.37; Hale and Norcross 625 tons, assaying $28.06; Confidence, 658 tons, assaying $27.07; Crown Point, 808 tons; Overman, 301 tons; Justice and Alta, 500 tons; Gould and Curry, 65 tons, assaying $19.28. The bullion yield of the above was about $140,000.

MINING SUITS.—The Benton Consolidated M. Co. has sued W. S. Wood, as executor of the estate of Seth Cook, to recover $15,000,000, the alleged value of 150,000 shares of stock in the corporation. The same corporation has sued the Alta M. Co. for an accounting, alleging that the Alta people, who had the control of the Benton mines, appropriated $200,000 to their own use which should have been credited to the Benton Co.

WORK on the $100,000 reservoir, to be built by the State of Nevada on the Carson river, will soon be commenced. The construction of this reservoir will provide ample motive-power for the Carson river stamp-mills throughout the year.

THE Carrizo gold-fields are attracting men from many towns in Arizona.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Ruby City Mines.

EDITORS PRESS:—Your paper reached this remote part of the country at last. Owing to the irregularity of our mails at times, we are deprived of news for several weeks. At present a new line of stages has been running from Spokane Falls to Ruby City twice a week, and will undoubtedly give us news from the outside more regularly.

It may be of interest to the readers of the PRESS to know how to reach this new mining camp. As yet, there is but little mentioned of it in papers. Ruby mountain, in which the mines are located, is situated northwest 162 miles from Spokane Falls, that being the nearest railroad to this camp at present. It takes then three days' ride by stage, in which the traveler has a full view of the highly-spoken-of Big Bend country. The traveler crosses the Columbia river at Condon's Ferry, thence across the Indian reservation, now occupied by the great warriors Moses and Joseph. After traveling 25 miles across the reserve the Okanogan river is reached at a distance of 24 miles from its mouth, running into the Columbia. Thence one goes up the Salmon river or Conconully creek to Ruby City. The charges from Spokane Falls are about $20. This place is also reached by stage in the summer season from Ellensburg at a distance of 175 miles. The difference between the two routes is very little in distance or time.

Our mining boom has just started. The Arlington mine takes the lead as usual. The company will erect a plant this summer of about 50 tons' capacity daily. Weather permitting, work will commence the early part of April. This mine is opening up splendidly. Weekly samples taken from an average of the ledge at each place worked give very satisfactory returns, with an increase of gold as depth is gained. The entire ledge will yield by working test about $64 per ton in silver; gold, from $10 to $12. Assays at times go as high as $27 per ton. This is considered the best property in the camp for the reason it is the most extensively developed.

The 4th of July, situated a little to the northeast of the Arlington, has been sold to a Montana company. The sum paid for it I did not learn. They purpose to put on extensive machinery and sink the present shaft to a depth of 300 feet. It is now down 75 feet. This enterprising mining company of Helena, Montana, will give great courage to the prospectors of the camp generally, as all that is needed is time and money to make this camp second to none on the coast. The War Eagle Co. have also started operations. This property is owned by St. Paul capitalists, and they intend to operate extensively this summer. The work is under the superintendency of Capt McCafferty, a practical go-ahead mining man. Their intention is to sink and drift. Machinery will also be erected for hoisting. Several other claims will be in operation. Among the most permanent claims is that of the Lone Star, situated about four miles north of the Arlington mine, near Conconully City. The mine is owned by a company from Tacoma, who are now engaged in sinking by means of a donkey engine and a small-sized steam pump. The prospect is good. At or near the mine is a concentrator already in operation concentrating ore from several different mines in the vicinity. It has a capacity of 25 tons daily.

Everything shows favorably for the opening up of a large mining camp this summer. The city of Loup Loup is a thriving little town which will be the main trading post for the greater number of the mines. It is reached by wagon-road from the Okanogan river, a distance of 14 miles; but we will soon have the iron horse near the town, as the N. P., also the Lake Shore and Seattle railroads are fast approaching. MINER.

Ruby City, Okanogan Co., W. T.

Nitro-Glycerine Cannon.

EDITORS PRESS:—J. P. Cizek of Vallecito, Calaveras county, Cal., is the inventor of a nitro-glycerine shell and a cannon constructed to fire the same with safety. By the peculiar arrangement, this principle when applied to guns in use increases their range on an average two miles. In consequence, the range is not lessened as in the dynamite guns, but increased. Another feature, which will be admitted is of the most importance, is the fact that the shell can be discharged at any desired angle or in a direct line. The cannon is self-cleaning, and its construction admits of 120 shots being fired in one hour. The construction is such as to make it almost automatic in its operation. The chief execution, however, is by the shell. No special make of powder is required in driving the shell, which once it has reached the object to be demolished, explodes by concussion. The destruction is in proportion to the size of the cannon and corresponding shell, Mr. Cizek putting the average charge at ten pounds. In this invention, Mr. C. claims to have solved the question of America's defense from foreign navies. With a range increased, the ability to fire at any angle and the well-known power of nitro-glycerine, Uncle Sam once supplied with this new weapon of destruction, could bid defiance to the combined navies of the world.

A single shot would suffice to sink the stoutest war vessel. For want of the necessary capital, Mr. C. has not been able to bring his invention before the proper authorities and have it given the test and publicity it deserves. As a patriotic American, he makes this proposition: "I will allow the U. S. Government to make a cannon after my model. I will furnish instructors and plan of shell. If when tried, the gun proves effective and is adopted, Congress to give me what that body may think is justly due me for the invention, the Government to be at all expense in the manufacture and trial of the gun." To prove the effectiveness and safety of the invention, Mr. C. has applied it to a shot-gun, with which he fires a distance of 700 yards, penetrating a two-inch plank at that distance. Inasmuch as the gun and shell are not patented, I am not at liberty to describe the manner in which the increased velocity of the discharge or the rapidity in firing the nitro-glycerine is accomplished. I only ask some one of our representatives in Washington to bring the invention to the notice of the war department, and give California the credit of producing a weapon of destruction that once placed in position, will enable America to exchange her present defenseless harbors into Gibraltars of defense. E. F. SCHAEFFLE.

Southern California Mines.

EDITORS PRESS:—The Kentuck mine, in the Julian mining district, was sold last week for $25,000. Mr. D. C. Kling, a St. Louis expert, bought the mine in the interest of a St. Louis syndicate, who propose to commence developing the mine at once by running a tunnel and erecting a mill. This mine was prospected several years ago by two shafts and some crosscuts.

It is stated by San Diego papers that Gov. Waterman has refused $3,000,000 for the Stonewall, which is in the Julian district.

The report of the State Mineralogist has been of incalculable value to Southern California, as it corrects a number of misapprehensions which capitalists and others have formed in regard to this country.

We have within 100 miles of Los Angeles some as fine prospects for paying mines as can be found in the State, and now that the "boom" in town lots is over, capitalists are beginning to invest in mines.

We were shown some specimens of gold-bearing quartz the other day which showed free gold all through it and assayed away up, yet because it is not in Lower California we hear of no rush in that direction. The ledge from which they were taken is 14 feet wide and runs from $10 to $60 in free-milling ore. The owners are developing it right along. It is strange that people will rush off to Santa Clara or Old Mexico when there are just as good quartz mines close home and whose owners they see every day, but who, owning valuable property which can only be injured by any such craze, are not given to "blowing" or "booming" it up. P.

Mineral Resources of Nevada County.

EDITORS PRESS:—We started about the 1st of December on a sort of geological expedition to study the mineral resources of Nevada county, and also to collect for museum purposes. The mineral districts which we have visited are important mostly for their quartz and gravel mining. You are kept pretty well posted on these specialties. We are satisfied that the quartz industry is only partly developed, and that the gravels will afford work for active hydraulicking for more than 100 years to come.

It is our opinion that the Government can well afford to make liberal appropriations to secure the working of these mines, in view of the great revenue which will be the result. From what we have seen we are satisfied that this county has many rich quartz and gravel mines. There are, however, many other resources which must, in the near future, be considered as sources of wealth. We find chrome iron, iron ore, copper and manganese, magnesite in considerable quantities, and some indications of cinnabar, with unmistakable indications of iridium. We have seen considerable good granite for building purposes, also two or three varieties of marble.

There are considerable quantities of kaolin or fire clay. There are some five varieties of agate, bloodstone, and opalized fossil wood, good for polishing.

We have not as yet had a good chance to study the geology of the country, but have made some observations. We find impressions of leaves in the kaolinite of the gravels; also in a kind of primary coal formation at Moore's Flat, and in the volcanic mud formation at North Bloomfield; also in the brown iron or sulphureted cement at North Bloomfield. We have been shown several fossil impressions from other localities. The impressions seem to be mostly resembling black oak, live oak, willow, alder, manzanita and maple. We have seen several varieties of fossil wood showing the borings of insects. We hope to be able in the near future to give you some more items on the resources of this county. A. K.

Separations.

[Written for the PRESS by C. H. AARON.]

Cadmium from Zinc.

In acetate and probably in acid and neutral solutions generally, except thiosulphate, and in absence of ammonium salts, cadmium is precipitated by sodium sulphite while zinc remains dissolved. The precipitate dissolves in aqueous sodium thiosulphate.

Copper, Nickel and Cobalt from Zinc and Cadmium.—In this sulphate solution, by potassium xanthate, the cadmium and zinc remain in solution. Ammonium salts do not interfere. In some other solutions cadmium is precipitated by potassium xanthate and is not then redissolved by aqueous sodium thiosulphate.

Copper, Nickel and Cobalt from Each Other. The mixed xanthates are washed with dilute ammonia as long as that yields a yellow precipitate with acetic acid, which reprecipitates the nickel xanthate, though it is generally necessary to add a little more potassium xanthate to complete the recovery; 19 6 per cent nickel. The copper (cuprous) and cobalt xanthates remaining on the filter are washed with aqueous potassium cyanide as long as that gives a yellow precipitate with acetic acid, which reprecipitates the dissolved cuprous xanthate; 34.85 per cent copper. The cobalt xanthate remains on the filter; 19.6 per cent cobalt.

The cuprous xanthate may be washed finally with alcohol or with ether, the nickel and cobalt xanthates with water; they are partly soluble in alcohol and in ether. However, the cobalt xanthate may be washed with ammonium if desired for quicker drying. All three may be dried on the water-bath for the weighing, or they may be calcined to oxide.

The separation must be made without previous drying of the mixed precipitates, as, when once dried, it is almost impossible to wet them thoroughly, even with the aid of alcohol, and the separation cannot be perfected.

Richmond Consolidated.

Richmond Consolidated shareholders have held their half-yearly meeting. The production from 4573 tons of ore has been 2325 ounces of gold, 97,054 ounces of silver and 452 ounces of lead, of a gross value of £40,073. The directors have very serious news to report to the meeting. They state that "the United States Government having commenced suits against the Richmond, the Eureka Consolidated, and other mining companies and individuals in the State of Nevada for the value of the wood used by them for mining purposes and cut from the public domain, both the Richmond and the Eureka Company have found it necessary to close down their works and suspend all mining operations. Rumors of these suits have been prevalent for some time, but no one supposed that the Government would ever authorize such proceedings, which, if persisted in, must of necessity paralyze and destroy the mining industry of the State, and throw thousands of persons engaged in mining operations out of employment. For years it has been the custom to cut and use for mining purposes the wood, which, in this district, is not suitable for lumber, but is of a stunted and scrubby growth of little or no value, except for fuel, and without which the mines could not have been worked.

"The Richmond Company has been in operation about 16 years, and for the Government to lay by all this time and to raise this question now is most astonishing. The value of the operations of the Richmond Company to the State may be realized from the fact that since 1871 no less than £4,450,000 had been expended by them, principally in wages and materials. In addition to this the company had established in Eureka very extensive reduction and refinery works at a cost of upward of £100,000, thereby creating an entirely new industry, and it is not too much to say that the Richmond and Eureka Consolidated Companies together have been the principal cause of the prosperity of the town of Eureka, and made it today the second town of importance in the State. The amount claimed by the Government in respect of the wood exceeds the total amount of the profits made by the company, which means, in other words, that had the company been called upon to pay for the wood at the price now set upon it by the Government, it would have been working throughout the whole time at a loss. These proceedings of the Government have caused the greatest consternation throughout the State. The shareholders having at the last meeting approved of the suggestion that a portion of the reserve fund should be invested in the purchase of another mine, Mr. Probert has examined several, but has not yet found one that he can recommend; in the face, however, of these timber suits, it behooves the company to be very careful how they invest any further capital in the United States."
—*Mining Journal.*

J. MCROBIE, manager of the Western Union Telegraph Co. in this city, has been appointed superintendent of the American District Telegraph Co., vice H. G. Phillips, resigned. Mr. McRobie has also been appointed superintendent of the Gold & Stock Telegraph Company. He will hold both of these positions in conjunction with his position as manager in this city of the Western Union Telegraph Company.

How Roads Are Made in Santa Clara County.

Many of the counties of California should make immediate and adequate efforts to secure better roads. Probably this fact will press itself home upon the attention of our readers who have been required to travel to and from their market towns since the recent glorious rain. The same facts will enforce themselves again next summer, when the sea of bottomless mud is transformed into a desert of deep dust begemmed with chuck-holes. The way some counties neglect the making of proper highways is reprehensible. They are not the poor, undeveloped counties, either, but some of the richest in the State. Even in some fruit regions, where development has progressed farthest and the hauling of tender produce would seem to demand the finest roadways, the very worst in the State are to be found. There is even land valued at $300 to $1000 per acre which is situated alongside of a slough in winter and a dust mine in summer. Both good repute among visitors and actual hard profit to resident fruit-producers demand better roads.

Some localities are better situated than others to secure good roads cheaply because road-making materials are handier in some regions than others, and yet something should be done even where rock and gravel are most expensive. Santa Clara county has the reputation of being one of the counties having the best roads and keeping them in the best condition, and it will no doubt be both interesting and instructive to our readers to know how Santa Clara county roads are made and cared for. The Marysville *Appeal* recently secured from W. O. Watson, one of the supervisors of Santa Clara county, a statement of the way his county's roads are improved, from which we quote as follows:

"Public roads in this county run over all classes of soil—clay, sandy loam, adobe, gravel, red loam—all needing a different treatment as to grade, amount of gravel or macadam and drainage. The general method used here, in making new roads, is to grade the road first, and for that purpose we use three kinds of scrapers. For filling up large holes or very uneven places, we use the common two-horse scraper in general use; also the late improved two-horse scraper that runs on wheels, which for heavy grading is economical and a great improvement over the common ones.

After the road has been graded with the above-named scrapers, we then plow the sides of the road, turning as many furrows as are needed to make the necessary grade. We then take the large road grader (McCall pattern), using ten horses, and throw the sides, already plowed for that purpose, to the center, making, when finished, a complete grade smooth and uniform in character.

When the road is completely graded, as above described, it is then ready to receive the gravel or macadam, as the case may be. The usual amount of gravel or macadam used on new roads is about four cubic yards to the rod. The cost of grading and graveling roads depends largely upon the character of the soil over which the road runs, and the distance the gravel has to be hauled to cover the same. This county is well supplied with gravel, within convenient distances to nearly all of our roads. Our experience is that no soil except gravelly soil will make a good road that will stand much travel without being well graveled or covered with macadam. In some of our main avenues where converging roads center a great amount of travel, nothing but good trap rock, broken to proper size, will stand the traffic.

In the past few years our county has entered upon a system of sprinkling the public roads, where water can be obtained conveniently, which greatly improves the roads and at the same time makes them very pleasant to public travel. This system of watering the roads in the dusty season is somewhat more expensive than not to water at all, but the pleasure and convenience is so great to the traveling public that the taxpayers do not object to the greater expense. This county spends annually on the public roads $80,000."

These statements will be found of wide value. Of course local methods will depend upon local conditions. The general principle is to do something effective, and to do it before the State gets much older.

MINERALS ON RAILROAD LANDS.—The Commissioner of the General Land Office has indorsed Receiver Linthicum's decision in the case of the C. P. R. R. vs. S. V. Valentine, the Big Oak Tree mine case. The decision gives title to mining claimants on "odd sections" of railroad land in this State. In effect it decides that the railroad company was *not* entitled to minerals on the sections granted to it by Congress. The case will be appealed to the Secretary of the Interior.

THE names of over 100 men are now on the pay-rolls of the Pioche Con. and Yuba Mining Companies, and upward of $10,000 per month is disbursed. A few pay-days at this rate and the effect will be generally felt.

THE Lost Confidence mine, Iron Mountain, Shasta county, which is referred to more at length in another column, has this week made its first shipment of silver bullion since the cave last fall.

Another Bearing Date Palm.

In our issue of February 16th we gave a large photo-facsimile of a bearing date palm and its companion staminate tree in the garden of J. R. Wolfskill, near Winters. The facts there recited concerning the date palm in California have also a bearing upon the handsome engraving on this page, and the reader is referred to them.

The picture presented herewith is a reproduction by the Dewey Engraving Co. of a photograph taken last fall by W. R. Nutting. The observer looks toward the northwest and the distant hill-outline is the crest of the Coast Range northward of Putah canyon. The foreground is on the farm of the late S. C. Wolfskill, now owned and conducted by his wife and children. The interest centers in the row of date palms which are the most prominent feature of the picture. These trees sprang from the seed of the date of commerce and still stand in nursery row as they were first set out. The first fruit was borne in 1877 when the tree was about 12 years old, the date of bearing and the age of the trees agreeing closely with the fruiting of the tree shown in our issue of February 16th. It was the fruit from one of the trees in this picture which was shown at the Mechanics' Fair of 1877 as the first California grown date brought to public notice. It was one of the trees from this row which was taken up by W. G. Klee, and planted out on the grounds of the New Orleans World's Fair in 1885, the tree surviving well its removal and long journey to Louisiana.

As the engraving indicates, the trees have suffered by their close association in the row, and are not as shapely as the trees in John Wolfskill's garden, where they have more room and rather better treatment.

The picture shows the tree in fruit, its heavy clusters emerging from the base of the leaves. The fruit in this case is a bright yellow, rather more than an inch in length, and it is a later maturing variety than the tree shown in our earlier engraving. Some seasons are, however, propitious for its ripening, and the fruit is highly esteemed by the family.

BEARING DATE PALM ON THE FARM OF MRS. S. C. WOLFSKILL, NEAR WINTERS, CAL.

Eastern Nevada.

Mr. David C. McQuitty, Assemblyman from White Pine county, Nevada, who recently visited Salt Lake City, gave the *Tribune* editor the following confirmatory testimony as to the character of his part of the State. He has lived at one time or another in nearly all the towns he names and in some others, grown cattle and horses, been in trade, worked mines, and traveled all over the State and through to Los Angeles and back on the general route of a railroad to that point. A divide about 6000 feet in altitude zig-zags across the State in the vicinity of the 40th parallel, whence the drainage is north and south. This is the mining belt as well as the arable and pasturage belt, full of springs, the mountains broken, presenting frequent passes feasible for railroad purposes. His idea of a line is to swing around the north end of Shell creek range and go up Steptoe valley to and through Hercules Gap in Egan range into the upper end of Long valley; thence over low hills into Newark valley, leaving Hamilton a dozen miles to the left; from Newark valley on by way of Fish Creek valley south of Eureka, Hot creek, Stone Cabin and Ralston valley; down the latter east of Death valley to Ash Meadows, and then to Mojave or Barstow, preferring the latter, using the A. P. line to Los Angeles for a time and finally building through.

Mr. McQuitty says the Deep Creek, Antelope, Shell Creek, and Egan ranges are mineral bearing for a hundred miles in length, and the roads would have mining districts and towns on either hand within 5 to 20 miles from Deep Creek to Ralston Valley. Following are capital towns of mining districts: Cherry Creek, Shellburn, Taylor, Ward, Ely, Mineral City, Hamilton, Treasure Hill, Seligman, Eureka, Hot Creek, Reveille, Belmont, and Tybo. At Seligman a $240,000 reducing plant was completed only last year. Mr. McQuitty says that Ely alone would send in 100 tons a day of $60 ore. Ely and Seligman are base bullion districts.

There are, without doubt, 20 districts within 200 miles of the city, and that would be 5 to 25 miles from the railroad, which would furnish three or four carloads of ore a day, and, inclusive of coal, as much outward freight.

SOME eight or ten men are now employed in removing the machinery from the Grand Prize mill, says the *Times-Review*, preparatory to tearing down the building and the erection of concentrating works upon the site of the present structure. The plans of the new works are completed, and the use of the mill foundations, which are solid and just suited for the purpose, will materially lessen the cost of construction by rendering a large amount of grading and mason work unnecessary. A trial test of 200 tons of concentrating ore from the Prize has just been completed at the Queen works, which proved highly satisfactory, working up to a high percentage.

THE ELECTRICAL SOCIETY.—The principal feature of the third meeting of the California Electrical Society at B'nai B'rith hall was a paper by F. M. Speed entitled "The Work on an Electric Circuit." The president, N. S. Keith, on behalf of the Executive Committee, reported progress in the negotiations pending between the society and the Mechanics' Institute, which have the making the society a branch of the Institute in view. Both bodies look favorably upon the proposition.

THE KENTUCK MINE SUIT.—The defendants in the case of Washington Smith vs. Wales L. Palmer, C. C. Stevenson and the Kentuck Mining Company have filed their second amended answer. They deny specifically all the allegations set forth in the complaint in relation to the manner in which it was charged Governor Stevenson managed the affairs of the company.

THE suit of Charles Forman vs. the Overman Mining Co. to recover $6000 for salary as superintendent, was concluded in the district court recently, the jury returning a verdict in favor of the plaintiff for the full amount claimed.

THE Eureka Con. Company will soon receive some 700 tons of coke, several carloads of which arrive by every train. This indicates that their furnaces will start up in the near future.

Minerals on Railroad Land.

The Big Oak Tree Mine.

Some months since the *Examiner* published in full the decisions of Register Hetzel and Receiver Linthicum of the Sacramento Land Office in the case of the Central Pacific railroad vs. S. D. Valentine—a contest hinging on the question of whether or not the railroad company was entitled to the possession of mines and mineral lands developed on the odd sections granted to the corporation under the Act of Congress of July 1, 1862. The Central Pacific Company claimed, of course, that the title to the entire area of the "odd sections" was vested in them, whatever the character of the lands, which proposition the defendant, who had bought the Big Oak Tree mine from the locators, William Morry and associates, claimed to be negatived by the provisions of the mining law. The particular claim in question is situated about 1½ miles northerly from Colfax, Placer county, on a vein running parallel with the rich Rising Sun mine, but the principle involved in the contest was of course of far greater importance than the mere value of the individual piece of property at issue.

The two decisions from the Sacramento Land Office, of which mention has been made, were delivered September 24, 1888, that by Register Hetzel finding for the railroad, while Receiver Linthicum's was to the effect that the mineral claim of Mr. Valentine was just. According to the rule where there is a conflict of this kind, the matter went to Commissioner Stockslager of the General Land Office at Washington, who on Tuesday indorsed Linthicum's decision in favor of Valentine.

This result of the contest will be received with unbounded satisfaction by the mining men of the State, as virtually settling all the other similar cases, of which there are many. It is probable, however, that the railroad company, before abandoning a point upon which hinge such important interests, will carry the matter to the Secretary of the Interior himself, whose decision will be final.

THE West Granite mine, Phillipsburg, M. T., has been purchased by St. Louis capitalists.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

GOLD AT THE MISSION PEAK.—*Reporter*, March 16: The scent of gold and silver traces recently discovered in the hills near Mission Peak, brought a number of mining experts to view the prospective lode. That there is gold in Alameda county was known away back in the early days, for the Mission Indians frequently brought nuggets and gold dust to exchange for commodities at the store at Mission San Jose. Several organized attempts have been made to find the ledge, but without success.

Calaveras.

THE UNION MINE.—Calaveras *Prospect*, March 16: While on our way from Angels last week we stopped at the Union mine to ascertain if possible what was being done on the new lead. We found that there had been work done on three shafts, two of which were being worked, while at the third or south shaft there is not much work being done at present, but we understand the company will commence sinking on the last-mentioned shaft in a short time, or as soon as hoisting works can be put up. The north shaft which is near the old Irvine waterwheel on the bank of Calaveritas creek is down about 90 feet. The ledge looks well and the prospect is satisfactory to the owners. At this point the ledge is several feet wide and the ore is of a good quality. The middle shaft is about 400 feet south of the north shaft near the road leading to the old Union mine. This shaft is down about 65 feet and has three compartments. At 60 feet the vein is 15 feet wide and the rock looks well and prospects well too. The south shaft is about 40 feet deep and work will be resumed on it in a short time. The machinery for the hoisting works is already on the ground. This shaft is at least 600 feet from the middle shaft and the vein looks well at this point. A 10-stamp mill will be built as soon as the lumber and machinery can be put on the ground.

MILL COMPLETED.—*Prospect*, March 22: The sound of a clatter of stamps coming from the direction of Fourth Crossing the forepart of the week, attracted our attention. The sound came from Rathgeb's mill, one mile from the Union mine, near the Darnel ranch. This mill has been in process of construction for a year past and has just been completed. The ground is laid off for a 40-stamp mill, but at present 20 stamps are used. Six hundred tons of rock and decomposed quartz that are now on the dump is being crushed. As soon as this quartz is crushed the owner of the mill intends to hoist out the water that is now in the shaft by means of a skip and then go to sinking on the lead. The shaft is about 100 feet deep. They have a large body of ore, but do not know exactly how wide the vein is. The rock is of good quality and carries considerable sulphurets. All the machinery of the mill and hoisting works is new and of the latest pattern, including a steel boiler set in cut soapstone and cemented. The engine in the mill is 50-horse power and the hoisting engine and gearing is heavy enough to sink the shaft 600 feet. Everything about the works is solid and substantial. Mr. Lem Wilcox superintended the putting up of the machinery.

El Dorado.

AN IMPETUS.—Cor. S. F. *Call*, March 19: An impetus has been given to mining in El Dorado by the reopening of the Pacific mine, which has been closed down for the last seven years. This mine is situated on what is known as the Greenstone or mother lode, running north and south through Calaveras, Amador, El Dorado, Placer, and Shasta counties. The richest and most extensive mines developed in Northern California have been found on this belt. Other and rich deposits are found on ledges running parallel with this lode. New locations are being made, and old deserted shafts are being cleaned out, and a revival of the mining interest is being prosecuted all along the line. One of the most practical and enterprising schemes in operation for thoroughly prospecting these ledges is that adopted by the Big Tunnel M. Co., organized for the purpose of running a tunnel 3000 feet across 18 well-developed ledges, including the mother lode. The tunnel is 6x7½ feet, and they have run 552 feet, cutting through three gold-bearing veins that will pay to mill. The mother lode is 1700 feet from the mouth of the tunnel, and will be crossed 1200 feet below the surface. They have just cut through a ledge of slate 55 feet wide, which is pronounced by experts the finest quality of slate in the world. The ledge is cut 350 feet below the surface, and this immense body of slate, free from iron, sand or any foreign substance, can be easily mined in blocks of any desirable size, and can be split into sheets not thicker than blotting paper. It is firm, smooth and sufficiently hard to polish—equal to marble. This ledge is the same as that upon which Mr. Mothersol has been operating for the past year (one and a half miles distant) and from which he shipped 22 car-loads of 20,000 pounds, 11 car-loads of which has been used by the Southern Pacific railroad for roofing their depot buildings. The demand for this slate is constantly increasing.

TAILINGS.—Placerville *Observer*, March 23: Mr. Potts, at the Granite mine, Smiths Flat, in washing up a pile of tailings finds nuggets of gold weighing as high as $12. At the Bassett mine at Weaver hill, in the North tunnel, now in 80 feet, gravel is being taken out that shows free gold in every carload. At the Gignac mine activity prevails. The mill is up and the machinery will soon be in position. The head carpenter of that institution, Mr. Stone, is a rustler.

THE SUPERIOR.—This mine is situated about three miles south of Placerville, and has three parallel veins on the mother lode. An ore chute on the footwall vein has been explored for a distance of 150 feet, with pay ore in the face, the width of the vein being from 2½ to 10 feet. The upper tunnel crosses the formation 80 feet below the surface. The lower tunnel, following the formation southerly, is in 700 feet, giving a depth below the surface of 160 feet. The two exploring tunnels aggregate 950 feet. They have a shaft down 180 feet deep on the incline. This mine was worked in early times before the reduction of ores was understood as it is at the present day. Further south than any developments have been made, there are heavy croppings on the surface for hundreds of feet, which is an indication that a larger ore body will be found than has yet been encountered.

JOSEPHINE.—The Josephine mine, situated about eight miles northeast of this city, was attached by a few of the impatient hands employed by Supt Dauvenspeck, on Friday last. Sheriff Anderson and Attorney Bennett came over from Placerville Friday and went through the mine. We understand the amount for which the attachment is levied is $1300. It is our belief that the debt will be paid, and the Josephine, which we have reason to believe is one of the best mines in the county, will have men at work again by the last of April. They were working on No. 5 tunnel, and by pushing along on low-grade ore for three months would strike the pay chute, when a still larger force would be put on, and we hope and are confident that some of the vast amount that has been expended will come back into the pockets of the owners. In the last year the mill has been increased to 20 stamps and eight new concentrators put on, and in fact they have now got it in good condition to develop. We understand that the pay chute is 600 feet long in tunnel No. 4.

NEW LOCATIONS.—Placerville *Observer*, March 19: A vigorous policy is being pursued by our miners. New locations are being made, and old shafts are being repaired and cleaned out preparatory to thorough and systematic working. Lively times will be seen in the near future.

BIG TUNNEL.—One of the most practical and enterprising schemes in operation for thoroughly prospecting these ledges is that adopted by the Big Tunnel Mining Co., which has organized for the purpose of running a tunnel 3000 feet, cutting across 18 distinct ledges, including the mother lode. Their tunnel is 6x7½ feet, and they have already run 552 feet, cutting through three ledges, the rock from any one of which bears gold and will pay to mill. The mother lode is 1900 feet from the mouth of the tunnel, and will be crossed 1200 feet below the surface. They have just cut through a ledge of slate 55 feet in thickness, which is pronounced by experts to be the finest quality of slate in the world. The ledge is cut 350 feet below the surface. The Big tunnel is situated one and one-half miles from the Sacramento & Placerville railroad depot and is easy of access.

THE BASSET.—This mine is situated two miles south of this city, and was noted in early times for its rich crevices. As high as $7000 were washed out in one day by two men. Later a hydraulic was placed on the ground and the front rim washed off as far as it could be on account of the hardness of the gravel. A small mill was erected which was so imperfect that only the coarse gold could be saved. A tunnel is now being run on a west bench which is showing blue gravel which prospects rich in gold of a heavy character. This gravel will require machinery for reduction.

THE GIGNAC.—Active operations have been commenced on the Gignac cement gravel mine. Several men are at work opening the mine, track is being laid, a fine car has been made at the Placerville machine shop, lumber has been delivered on the ground from the Blair Bros.' lumber yard. Carpenters are at work building a mill, which will soon be in operation, when we shall look for good results. The gravel in this mine is known to be rich, but is too hard to be worked by the ordinary process of sluicing.

OAK RANCH DEEP GRAVEL M. CO.—This company has about completed an incline to strike a bench of gravel west of the main channel, which was partially prospected in 1851. At that time the gravel paid about $5 a day to the man for drifting and washing in sluices, which was not considered remunerative at that time. It is the intention of the company to thoroughly open this bed of gravel, which is thought to be extensive, and arrange for having it worked in a mill.

THE ROGERS.—This mine is situated near Smiths Flat, and is one of the oldest mines on that range. Supt. Coughlin is now running a drift north from the main works to strike a west bench, when good gravel is expected to be found. He is also making an upraise to strike an upper drift in order to get good air. They are now breasting out some good gravel from another part of the mine.

YOUNG MINERS.—Dozens of boys have been busy between showers, during the past week, with pans and scrapers, working out the wagon ruts on the old emigrant road, near its intersection with Main street in Upper town. They find considerable gold along the road when the loose dirt has been washed off by the heavy showers of rain.

THE GRANITE MINE.—Mr. Potts, owner of this mine, is preparing to wash a body of tailings which have accumulated from washings of gravel from the drifts in the mine.

Fresno.

THE HILDRETH MINES. — Fresno *Expositor*, March 13: Jesse Morrow returned last night from his mine near Hildreth. He is working 12 men in the tunnels of his mine and is putting up the hoisting works. The ledge is two feet four inches wide and the rock assays from $40 to $100 a ton. At the Abbey mine they are working 60 men. At the last cleanup the other day, 18 days' run, $11,700 was realized. The Wilsons, husband and wife, are mining a one-horse arastra and cleaning up $100 a week. The Last Chance mine is looking up. Some very rich prospects have been recently discovered. At the Temperance Flat mine, Sherwood & Co. are running a two-horse arastra. But by far the largest and most important developments recently made in the district—developments which promise to be a bonanza—are those in the old Jim Harron mine above Newt Murphy's. This mine was sold for $300, and recently $20,000 was offered for it and refused. The strike made in this mine is one of the richest ever made in the district. The ledge is two feet four inches and free gold can be plainly discerned all through it. There is enough rock in sight to make its owners handsomely well off. There are many strangers and mining experts throughout the district looking for mine land bargains.

Los Angeles.

A QUARTZ-MILL.—Los Angeles *Herald*, March 26: The existence of gold in the canyons above Newhall has been an established fact for many years past, and placer claims are worked there regularly every spring by Mexicans who, however, quit when the water gives out, for the mines are then no longer profitable. This continuous prospecting has revealed the fact that, in addition to the placers, there is gold-bearing quartz averaging, say $10 or $15 a ton, and a few weeks ago Messrs. Sanford Johnson and Ed Dunham started in to work on an idea that has long been talked about but not acted upon. The scheme is to put up a large quartz-mill in the center of the gold district, for as soon as this is done prospectors and miners will flock in from all directions and the venture will undoubtedly be made a paying one. After careful consideration and due investigation, Messrs. Sanford & Johnson decided to embark part of their fortunes in the speculation, and left for the North last week for the purpose of obtaining the necessary machinery. The machinery will be shipped down and put in position as soon as possible. The location of the mill will be about 12 miles above Newhall.

Mariposa.

THE TINGLE TAN MINE.—Mariposa *News*, March 23: If half the reports are true about the recent strike on Bear creek, G. C. Myers and C. A. Schlageter have struck a good-sized bonanza. It is about a half-mile from the old Mexican mine and nearly the same distance from the Feliciana. The samples of rock brought in by different parties have been estimated to go from $50 to $200 a ton, and there is lots of it in sight. A gang of men are now at work running a tunnel so as to strike the pay chute some distance below the surface. Mr. Rattry was over from Cathey's valley Wednesday. He reports a good pay chute in the old Kendall mine, now being worked by him and Mr. Anderson. The 10-stamp mill at the Bondurant was running short of water previous to the storm. It can now keep running till late in the summer.

HITE.—The Hite mine started up a few days last week, by the men. They were to run it and thus try to get their wages. It was shut down again, however, by order of Judge Walker. His lease has been extended to July 1st. Negotiations are now pending for its sale. This is why it was closed down so quickly.

DARRAH.—Mariposa *News*, March 16: Geo. S. Holeman is working his mine here. He expects to make a strike soon. The Vanderbilt mine made a cleanup last week of $2000 on a 20-days' run; this was quite satisfactory to McDonald. If the rock will pay that well right along he would run the property, without a doubt, on a larger scale.

PINE TREE.—The construction of the ditch and laying of pipe for the air compressors at the Pine Tree mine has been completed.

Nevada.

A PROMISING MINE.—Grass Valley *Tidings*, March 26: A quartz stringer showing coarse gold freely was cut on Monday in an excavation being made for a bob-pit on the Roach & Manion claim, Deer Creek, back of Greenwood cemetery. The claim has been worked for years by horse-power, but with depth and an increase of water in the mine, machinery is now imperative. W. C. D. Body, the well-known millwright, is engaged in placing the Rising Sun (Willow valley) pumping and hoisting plant on the mine, and calculates on completing the job within a fortnight. One thousand feet of pipe is to be laid from the Excelsior ditch to the mine, where water-wheels are to be put in and the machinery operated by water-power. Although the ledge of the Roach & Manion mine is not large, it is in good working ground and is rich, crushings yielding from $50 to $130 a load. There are many rich stringers in the locality, and Mr. Body and other gentlemen are confident that the development of these will add to Grass Valley's resources another group of mines.

BRIEFS.—On Monday the pumps at the Coe will be started up and the mine cleared of water and cleaned up for inspection. Capt. White is managing the property and has appointed Marshal Reynolds, who is one of our best miners, as his foreman. When the water is "forked," the Denver (Col.) bondee, Mr. Craig, will thoroughly inspect the property and determine whether to proceed with development work. Rumors of a settlement with the attaching creditors of the Green Mountain Con. Co. were bruited about the streets to-day. The mine is owned by a poor but enterprising company, a fact that should act as a buffer to any attempt to crowd it to the wall. The reported continued improvement of the ore of the Metropolitan mine, near Moore's Flat, was confirmed to-day by the receipt in this city of a small box of the quartz. The ore has a lively appearance, showing many coarse "colors," lead and sulphurets. The vein is a two-foot one and in favorable ground.

NEW YORK HILL MINE.—Grass Valley *Union*, March 21: The sale of a controlling interest in the New York Hill mine has been consummated by a deposit of the money to the account of the stockholders who placed their shares in the agency of the Citizens' Bank some weeks ago. The purchasers are understood to be James D. Hague and W. B. Bourn. It has been the supposition that the purchase was made on behalf of the North Star Co., but this is an error, Messrs. Hague and Bourn being the individual purchasers, although they are also largely interested in the North Star. At present there is a steam plant on the mine. This will be replaced or supplemented by water-power taken from the North Star pipe line which passes within a short distance of the main working shaft of the mine, and could be introduced at quite a moderate cost. The mine has paid a number of dividends and is right in the middle of the rich belt of quartz veins on the west side of Wolf Creek which has produced millions of value in gold bullion.

Placer.

CLEANUP.—Placer *Republican*, March 21: A cleanup is made at the Mayflower mine every two weeks. Last week the result was about $31,000, and the preceding cleanup yielded $52,000.

SMALL PIECES. — Several small pieces of gold have been picked up in the streets during the recent rains. The other day J. B. Chamberlin found a three-dollar nugget on the road down from his house.

Shasta.

PAUL PULVERIZER.—Shasta *Democrat*, March 20: The Calumet company is adding a Paul pulverizer to their already large plant. It is shaped like a barrel, revolves on axles, and pulverizes ore dry. It is said to be an excellent dry crusher. A landslide, caused by the heavy rain last week, covered up a tunnel on the Riley mine on Squaw creek, burying out of sight the tool-house and a lot of tools. Lee Fader has between 30 and 40 men at work on the new road between Kennet and Squaw creek. A miner named Patterson last week sold the old Black Jack mine on Flat creek to a Mr. Carter for $1500. Patterson left this morning for the gold-fields in Lower California.

LOWER SPRINGS PROSPECTS.—Cor. Shasta *Democrat*, March 20: The placer and gulch mines have been worked over and over until we can almost say that the last nugget has been picked up; but you can still see the many quartz ledges cropping out from our low hills and mountain-tops. From what experience I have had in quartz mining I do believe this place contains mines that, when developed by capital, will be the leading ones in the State. The White Oak, owned by Mrs. S. H. White, is one of the oldest locations in our place. There has been a great deal of money taken out of the mine. Mr. White—a man over 70 years of age—can show you ore that he is taking out every day that would make a prospector's heart feel glad to find. The Bulkhead, discovered and located by J. E. Tiffin—who still owns three-fourths, Mrs. E. Penrose being owner of the other fourth—lies 1000 feet north of the White Oak, also running east and west, has been crosscut by a tunnel 50 feet below the surface, showing a well-defined ledge from three to four feet wide, porphyry and slate walls, and prospects in free gold from $10 to $30 per ton, the sulphurets being very rich. A shaft sunk 400 feet east, shows a ledge at the depth of 38 feet, ten wide, yielding mostly sulphurets that assay $25. Then comes the Gem, supposed to be an extension of the Bulkhead. The Gem was located about four weeks after Tiffin struck the Bulkhead by William Kennett. After taking out a $400 pocket, Kennett sold to the Muchmore brothers. They made the big strike—took out about $10,000—and sold it for $35,000 to Mr. Miller, the present owner. This is one of the richest mines, but is lying idle for the present. A little north of the Gem is Mr. Wm. Lucas' claim. This is an old location, and has been worked mostly on top for pockets, and a deal of coarse gold taken out. West of and beyond the Gem are the Grotefend and Frick claims. These are locations made after the Muchmore brothers made the big strike. Mr. Frick has some very rich ore and is going to grind it in a horse arastra. These mines I have spoken of are not more than two miles from Sacramento river, where machinery can be worked cheap with free water-power.

REDUCTION WORKS.—Redding *Free Press*, March 16: We learn that Charley Butters is making a grand success of his reduction works at Kennet. He is buying the tailings of the Central mine, which he is working at a profit. Mr. Butters has been to a great expense, but can now see his way clear to make money. There has been considerable talk relative to the success of the Walker Bros. at Old Diggings; but the fact still remains that gold is being constantly produced, and some 30 men receive their wages promptly.

WILL NOT PAY.—Shasta *Courier*, March 23: It is reported that the owners of the North Fork Cottonwood and Eagle creek ditch will turn the water back into their original channels, as it will not pay the ditch-owners to keep it up, since hydraulic mining has been stopped by a few spies, blackmailers, and Sawyer. The stoppage of water running in that ditch, or rather canal, will work more injury to gardeners, orchardists and farmers than all the hydraulic mining did a hundred times over.

Siskiyou.

RIVER MINING.—Yreka *Journal*, March 20: The Kanaka claim at Klamath river is to be opened this season by a company of Portuguese miners, who will commence putting in wingdams within a few weeks. A San Francisco company, who bonded the Swiss Bar claim on Klamath river, expects to commence work early next month. They intend working the same by a new method, in using steam engines for hoisting and pumping, besides drifting in place of making open cuts. Messrs Heckathorne & Wademan, who have pounded out considerable gold from their quartz in a mortar at Greenhorn creek, built an arastra lately, but have not water enough yet to run it. Greenhorn creek has never been so dry as during the past winter, but there may be a good supply yet, if we have plenty of spring showers. The late rainstorms have furnished considerable water on several of our mining streams, giving the miners a chance to work the dry diggings and perform some ground-sluicing.

QUARTZ.—In this county there are at least 140 stamps in use in the several quartz-mills several being worked by steam. In addition there are also several arastras for prospecting, to be followed by erection of mills just as soon as the existence of permanent ledges can be established. Many of the rich croppings discovered are only pockets, that indicate good paying ledges somewhere in the vicinity, if not directly where the discoveries are made.

Santa Barbara.

BEACH MINING.—Lompoc *Record*, March 16: Parties have been engaged in mining gold from the beach sand for eight miles below the mouth of the Santa Ynez river; they have made good wages by the simplest process, and we have been informed that there was employment there for a thousand men for years to come. J. C. Barnes, an experienced miner, visited the beach gold-field Tuesday last, and says there is no doubt that large quantities of gold are contained in the black-sand region along the beach. He estimates that 1000 colors were obtained in a single pan of washed sand. There is a probability that a company will be formed to mine on a large scale. An engine could do efficient work in raising ample water to sluice off 30 tons of sand per day, which at the lowest estimate would yield $300 in gold. If this is to be the result, there are millions of dollars in gold in the miles of black sand south of the Santa Ynez river. We look for a big rush to this new El Dorado as soon as 'tis known on the outside.

San Diego.

STONEWALL CLEANUP.—Julian *Sentinel*, March 23: Gold by the bucketful at the Stonewall. Could some of the Lower California boomers have seen the cleanup at the Stonewall mine this week they would stop prating about ounces. The amalgam filled two large zinc buckets, and was valued at $35,000. Stop your blowing about Lower California.

Trinity.

THE MINES OF NEW RIVER.—Redding *Free Press*, March 16: In conversation with a gentleman

from New River we learn that the weather in that region has been unusually open. About Jan. 10th there was a heavy fall of snow which went off gradually and is now nearly all gone. Water is scarce; there is not enough water for the quartz-mills as is required, and the placer miners are having a hard time. He says, however, everybody is at work, it being a very busy camp and has bright prospects before it. G. C. Narvis is opening up two claims which he owns, the Occident and Goodenough. On the former he exposed a good body of about $20 ore, while on the latter he struck free gold and sulphurets. Gus Gutzen, who owns an extension claim on the same ledge, called the Golden Gate, has developed a 16-inch vein bearing $30 rock. The Ridgeway, 600 feet distant on the line with same ledge, is in the hands of an English company, which is working 15 men getting out necessary timber and tunneling. A tunnel is being driven which is to be 700 feet long and will tap the ledge at a depth of 400 feet. It is the plan of the company to spend $25,000 in the development of the mine. J. S. Thompson is operating the Excelsior mine with a quartz-mill, and doing well. The Mountain Boomer, owned by Clements & Ladd, is being worked right along with good pay. The mine has been bonded for $60,000. The extension of the Ridgeway, called Hard Tack, run through 15 tons of rock and cleaned up $185 per ton.

Tulare.

DUNLAP.—*Visalia Times*, March 16: The shaft on the Ninety-nine mine at Dunlap postoffice is now down about 70 feet. The ore bed at this depth is four feet thick and assays from $40 to $70 per ton. A six-inch strata of very rich ore is now found alongside the regular vein, and gold is discernible in this with the naked eye. None of the rock from this narrow strata has been assayed as yet, but it has the appearance of being rich enough to assay up into the hundreds. The owners of the mine, who are residents of this city, feel much elated over the find.

NEVADA.

Flowery District.

A POOR MAN'S MINE.—Virginia *Chronicle*, March 18: A recent cleanup of five tons of ore from the Adriatic mine, in Flowery District, netted the lessees, Messrs. Shepard and Lees, about $1200 each. The ore is gold-bearing and the pay streak narrow, requiring about three months' labor to extract a batch of five or six tons, but the bullion yield returns the lessees a handsome profit for their toil. The streak from which the pay ore is obtained resembles wall rock and had been passed by as worthless, for years, until the present experienced prospectors obtained a lease of the mine. The mine is worked through a winze below the main tunnel floor.

Hot Springs District.

EAGLE MINE IN CHURCHILL.—Reese River *Reveille*, March 21: J. N. Caldwell arrived here yesterday from Hot Springs mining district, and stopped at Triplett Springs to-day on his return. He tells us that with A. Woodworth, W. S. McCrackin and Thomas Canyon, as partners, he has been working on the mine for two years, and has now got it in good shape to work. It is called the Eagle mine, working it by a main tunnel 500 feet in length, and connected with a shaft 110 feet down, by making an upraise of 112 feet. By drifting 90 feet east from the tunnel they have cut a good-sized ledge, which will average $30 to $40 per ton in gold and silver, and at the bottoms the ore carries two-thirds gold. It is in a porphyry formation, and he claims that it resembles the ore at New Pass. They have a mill of five stamps, and collect the gold and silver by running it through a Howell improved amalgamating pan.

Jumbo District.

FAVORABLE.—Virginia *Chronicle*, March 20: The open winter has been very favorable for mining in Jumbo district. The Pandora and Wild Goose continue to yield the usual amount of gold bullion from ore worked in Six-Mile Canyon mills and Carson river arastras. Numerous locations in this district will be developed this year. The recent snow and rainfall is sending a heavy flow of water down the canyon on the Ophir grade road, and a string of sluices for placer mining have been set up in the ravine.

Kirman District

TO RESUME.—Virginia *Chronicle*, March 26: Operations in the Norrie mine, Kirman district, will be resumed next month. It is probable that a steam hoist plant will be substituted for the whim, with which a depth of 500 feet has been attained. Mr. Norrie, the divining-rod high priest, under whose direction the mine was located, is still sanguine that an important ore development will be made if the owners of the ground continue explorations. A majority of the locations made in the district three years ago have been abandoned.

Tuscarora District.

RICH SPECIMENS.—Reno *Gazette & Stockman*, March 21: At the Depot Hotel can be seen specimens of ore from a recent discovery in the Tuscarora mining district, which is hard to beat in any country. There are about 15 pounds of the ore, and Mr. Farrington of the Reno Reduction Works says it will average $40,000 to the ton, free gold being perceptible all over and through the specimens. Two men, George J. Smith and Hugh M. Kerr, are said to own the entire find, which they call the Eira.

BELLE ISLE.—*Times-Review*, March 22: West crosscut, 250-foot level, extended 15 feet, passing through about two feet of spar carrying a little iron.

GRAND PRIZE.—East drift, 300-foot level, extended 11 feet in a good width of high-grade ore; 400-foot level: West drift on the old vein extended 8 feet; face shows some improvement.

FOUND TREASURE.—Preparations are being made to sink the shaft 100 feet deeper, and to prospect the country—lately restored to us by the courts—which lies east of the east vein.

NORTH BELLE ISLE.—The stopes above the 300-foot level show an improvement in first-class ore. The stopes above the 150-foot level are yielding some very fine ore.

COMBINATION SHAFT.—The Combination shaft has been sunk and timbered 10 feet below the third station. The rock continues hard and shows some iron.

COMMONWEALTH.—225-foot level: South drift from No. 1 west crosscut has been advanced 11 feet. At the intersection of No. 1 winze from 150-foot level, the body of ore is developing fine, both north and south. Average assay from car samples $285 per ton.

NEVADA QUEEN.—The stopes are yielding good concentrating ore, and the concentrators are doing good work.

NAVAJO. — The stopes are without material change, and the usual quantity of ore has been sent to the mill.

Wolverine District.

CHROME IRON.—Virginia *Chronicle*, March 26: The chrome iron discovery made in Wolverine district last year is developing in importance. Assays of the ore resulted in the discovery that it carries a high percentage of gold and silver. The vein is about 40 feet wide and the ore is almost solid metal. On the opposite side of the ravine from where the chrome iron deposit was found, a vein of decomposed quartz, assaying high in gold, has been developed.

ARIZONA.

MOHAVE NOTES.—*Miner*, March 23: There are 18 men employed at the Copper World mines. The Rogers Bros. and Fisher have recently made a rich strike on the Smuggler, an extension of the C. O. D. They have worked for some time on the claim without any encouragement to speak of, and were about to give up when the strike was made. Rob't Steen and Geo. Koster left Saturday for Cedar district with a pack train of five mules loaded with mining supplies. A strike of high-grade ore has recently been made there and the indications are good for a good mine. The ledge is wide and easily worked. Considerable excitement has existed during the past ten days over the discovery of placer gold-fields at Carrizo, in Apache county, about 15 miles east of Holbrook. Fifty men left Gallup one day this week for the new fields. Every kind of conveyance is being put into service to carry passengers and freight from Holbrook to the placer-fields. By, and Wm. Sherman returned from Mountain Springs, Burro mountain, where they have been developing several copper claims this winter. They have an abundance of copper, but the distance from the railroad does not warrant their working at present. They spent a month working in the placer-fields in Yavapai county, and say it was an easy matter to make wages there. They will work on their claims in the Wallapais this summer.

DAKOTA.

LUCILLE.—Deadwood *Pioneer*, March 23: Howell Jenkins is prospecting for the upper contact. The Co. has a good small ledge of ore, and is seeking for the larger body.

RUBY BELL.—Silence at present prevails at the above favorite mine. The large quantities of high-grade ore in the old tunnel are too well known for mention here, but on the upper tunnel little is known. Considerable work is being done in the south part of Ruby. The Mountain Rose has a shaft to a depth of 106 feet; no water as yet and the indications are the most favorable.

RUBY BASIN.—Notwithstanding the reduction works catastrophe, a visit to Ruby Basin gives one pleasure in noticing the development and prospecting that is steadily being performed. At the Troy the drift from the bottom of the 50-foot shaft is being pushed toward the supposed ore body as per survey of Harmony vein.

IDAHO.

OPHIR MOUNTAIN.—Cœur d'Alene *Record*, March 17: In our Friday issue we made brief reference to the fact that on Wednesday last a body of ore of remarkable richness was struck in one of the tunnels of the mother lode. We referred to a small specimen of the ore which a *Record* reporter had in his possession, saying that the lowest estimate of its value was about $25 per pound. To-day we are able to speak from actual weights, which show that the piece in question which weighs 29 oz. 9 pwts., contains at least 10½ ounces gold, and is worth nearly or quite four times as much as the low guesses put it. We confidently expect to prove to our readers within a week that a single wheelbarrow load of the ore has turned out more than $5000. We know that there are plenty of pieces as good as the one we have tested, and we know that 50 pounds, such as it, would yield nearly if not quite $5000. As we have already said, it is impossible to foretell the extent of the pocket, as it is called, though there is nothing except the superior richness of a few feet of the vein to attract the notice of the casual, inexperienced observer. From the mouth of the tunnel up to the pocket, as we will continue to call it, which is about 180 feet distant, the ore vein carries pretty uniformly about $30 per ton. This is about the value of it both above and below a space of some ten to twelve feet in the center and upon the upper half of which is a pocket about 3x1½ feet on the face; the depth is not yet known. This is the fifth discovery of this kind made in Ophir hill, one at the foot, one at the top, and three between, suggesting the idea of convenient lodging stations along the white trail of the yellow incumbent of rock-ribbed mountains.

THE DESTINY OF CŒUR D'ALENE.—Wardner *News*, March 16: The manifest destiny of Cœur d'Alene is upward and onward. We are entering on a new and grand era of prosperity that will greatly accelerate the development of our mines and do much toward increasing the deep interest taken throughout the country in all portions of our mineral domain. Nature has done much for this favored region, and man is doing his share in return. The work is progressing bravely, and at every point, from our most accessible valleys to our almost inaccessible summits, the prospector is employed, the miner is delving deep into the mountains, and the wonders of this wonderland are being brought to light. In this age of advancement when the rich and poor alike strive to keep pace with the progress of the day, there is no country on earth that offers so wide a field to both the moneyed and the laboring classes. To the former, if he possesses the faculty of keen observation, the opportunities offered here for increasing his wealth are unlimited. To the latter, the chances of rising from comparative penury to affluence are equally flattering, as many instances illustrating the fact can be found among us. Numbers of men who landed in Cœur d'Alene penniless have acquired a competence, while there are many of the same class who are now accounted wealthy and are on the straight road to become millionaires. These are the advantages that a mining country alone presents. That Cœur d'Alene possesses them in a greater degree than any other portion of the Northwest, none who have ever visited our mines will care to dispute.

LOWER CALIFORNIA.

THE GOLD MINES A FAILURE.—Cor. S. F. *Examiner*, March 28: The much-extolled placer diggings of Santa Clara are a failure, and the argonauts of 1889 will go down in history only as the victims of a glittering delusion. There is gold there, beyond a doubt, but it is scattered so thinly that it is costing much more than a dollar for every dollar's worth that is taken out. I was offered good claims in Mexican gulch, which is considered to be the richest of all, for from $20 to $100 each. On the road to the mines I met scores of gold-seekers returning. One of these, a Mexican who had a mine to sell, showed me a $17 nugget and a $5 nugget, which he assured me had been taken out of his claim. I also passed several unfortunates, each of whom had a roll of blankets and a coffee-pot strapped on his back, his blistered feet being bound in gunny-sacks. One of these showed a $3 nugget and another about $4 or $5 worth of gold in a pill-box. They were going back to the United States, cursing the country and all that was in it. The greater load of profanity was dumped upon the shoulders of the International Land Co. of Mexico, which, the victims declared, was responsible for the lies that had been told about the richness of the placers. Mexican gulch, or that part of it which is being worked for gold, is about three-quarters of a mile long, with a depth of from two to six feet. A ditch two feet wide by one foot deep runs through it, and into this ditch the water of the rainfall has been turned. At intervals of 40 or 50 feet holes six feet in diameter by about three feet in depth have been dug as reservoirs, in which the water used for cooking and drinking is allowed to settle. All the water used for general purposes comes from the watershed of the mountain sloping to the gulch, and in the absence of any more rain, it will be only a few weeks hence when mining will have to be suspended for lack of water. I estimated there were 250 men working in Mexican gulch and about 200 of them wanted to sell out. In Mexican gulch 120 placer claims, 65 feet square, have been taken up, and 56 quartz mines and extensions in that locality have been placed on record. American camp, which is a spur of Mexican gulch, was next visited. Here I counted about 150 tents, including the inevitable store and saloon. Between 100 and 150 miners are stopping here, but they have done but very little work in American canyon. A good stream of water which will last several weeks flows through the canyon, but it is not being utilized save by 40 or 50 miners, who have not washed the dirt to a greater depth than two or three feet. The new diggings, which are four miles by trail from Mexican gulch, are known as the Arroyo Alamos. They are in a bog of black sand and loam, part of a plateau which extends for several miles east and west and north and south. Directly west of the Alamos is a tall, rocky peak, separating the Arroyo Alamos from American and Mexican gulches. About 200 miners were working in the little stream with pan and rocker, with but indifferent success. Water for domestic purposes is obtained from holes dug two or three feet in the bog. Horses and burros graze here on a dry bunch grass that will barely sustain the life of the hard-worked animals. The placer mining here is attended with great difficulty, for the reason that the dirt has to be carried to the water to be washed. Near my tent, in which I write this dispatch, three men are shoveling dirt into a wagon to which four horses are attached. On the wagon-bed is spread a piece of canvas to keep the dirt from falling through the crevices. The horses are then driven through the miry ground to the stream 100 yards away, where the dirt is shoveled into a rocker and washed. This gang of five men in three days took out $16 worth of gold dust. A careful estimate gives 1200 as the number of men now on the ground. "There is something very peculiar about these diggings," said a miner. "I began washing dirt in my pan from the surface of the ground to the bedrock. The first three or four inches of soil consist of black sandy loam, and I could not get a color in that. The next few inches are a greenish-brown dirt, and here I got gold. From that to the bedrock I got nothing." "There is no bedrock here," said an old miner, working several yards above the claim of the last speaker. "It is, as you see, a blue clay or a slate. Most all the gold taken out of the Alamos diggings has been found a few inches from the surface." Other disappointed miners were loud in their assertions that the placers had been salted. "These fellows," said one, "who want to sell claims and leave the country, carry some gold-dust in their mouths, and when you step up to see how they are getting on, they slyly spit into the pan. Others will offer you a chance to try your luck. They will hand you a shovel and tell you to shovel some dirt into the pan. You accept the invitation, and when you have finished washing you will find a $3 or $4 nugget." Everywhere I went I heard the same story of misrepresentation and blighted hopes. The boom is indeed dead. They came with buoyant hearts and new shoes, heedless of the fields of clover through which they passed, or of the bowlders in the road over which they stumbled. They returned with their blistered feet tied up in gunny-sacks damning the country. Ten tents were struck in the Alamos to-day, and as many wagons took the homeward road. It will not be many weeks before the jackrabbit will vainly burrow for water in the prospect-holes of Mexican Gulch, and the slinking coyote will devour the last scraps of bacon-rind left there by the miners.

MONTANA.

THE APEX PROPERTIES.—*Inter-Mountain*, March 23: A deal was consummated in this city yesterday whereby the Apex properties will be still further developed. Some two weeks ago the ownership of the properties was transferred from John H. Shober and I. William Adams to the Climax Mining Company, and yesterday Mr. Adams came over from Helena and filed articles of incorporation of the latter company. The Climax Co. will be a close corporation. Its incorporators are John H. Shober, I. William Adams and Ed. Hicks. These are the gentlemen who two years ago bought the Apex properties from Wm. Burton in the interest of Kansas City parties, who failed to come up with the money. Legal complications then arose and the development, which had begun on a large scale, was stopped for a time. The properties were bought in at sheriff's sale by Shober and Adams, and for the past two years a force of six men has been prosecuting development work on the First Class claim. The properties consist of the First Class, Monument and Backbone, all on the same lead. The shaft on the First Class is now about 300 feet deep, and a large body of ore has been opened up. The Climax Co. will now erect a five-stamp mill on the property and has let a contract for the same to the Montana Iron Company of this city. This mill will be put up at once. The ore in the First Class carries both gold and silver from $40 to $60 per ton.

NEW MILL.—Phillipsburg *Mail*, March 14: The new Granite Mountain mill will not be put in operation for at least two weeks hence, owing to the non-completion of the tramway, which is the only way by which the ore can be conveyed rapidly enough from the mine to supply the mill.

NEW MEXICO.

NUGGETS.—Silver City *Enterprise*, March 23: Some very fine gold nuggets have been washed out by Mexicans at Cold Springs gulch, about half a mile from Hillsboro. The management of the Carlisle Mining Co. has received orders to sink the main working shaft 200 feet deeper. The Beck mine, at Stein's Pass, has been leased to John Craze of Tombstone. Hoisting works will be put up immediately. Rich silver prospects have been discovered about 30 miles south of Las Palomas, and if reports can be relied upon, must be very rich. The Flagler works are now prepared to purchase ores in small and large amounts, paying cash for the same. This is just what the prospector has needed for a long time. Bell & Stephens of Pinos Altos have just finished a test run of ore from the Ohio mine, which adjoins the Mountain Key on the south. It ran $15 per ton. The vein is 3½ feet at a depth of 112 feet, and still improves in width and value as depth is attained.

OREGON.

PLACER MINING.—Bedrock *Democrat*, March 20: The heavy rains of the past week give hopeful indications to the placer miner that the present mining season will prove more remunerative than was anticipated a few weeks ago. The snowfall of the past winter has been much lighter than usual, but the late rains indicate that while the showers have spread pretty generally over the valleys and range, in the mountains, from whence the source of water supply is obtained for mining, snow has fallen to a considerable depth. Mine-owners in various localities have taken advantage of the opportunity offered and have started or are preparing to start their claims, the more prominent of which are the placers of Sumpter, Granite, Robinsonville and Parkers. In these localities extensive operations are carried on scientifically, and during a favorable season the output of gold is large. At Sumpter, several claims are in operation, owned by both whites and Chinese. The claims of Archie Downie, probably the best-equipped with modern appliances in the camp, have commenced the season's work, and should the supply of water continue for a reasonable length of time, the yield from these claims will be immense. At Granite, placer mine-owners are preparing to commence the season's work. In the camps of Robinsonville and Parkers operations have commenced, and the outlook for a water supply is favorable. At Deer creek, the Deer Creek Mining Co., Dan Carn, superintendent, has started up and expects a good run. In other portions of Baker county some placer-mining operations will be carried on.

UTAH.

PARK CITY NOTES.—Cor. Salt Lake *Tribune* March 23: The past winter has witnessed a decided change throughout the district, from the steady, unchangeable movements of miners and mining men during the past ten years, or since the opening of the famous Ontario-Daly Company properties, yet the production of this one property alone is enough to thoroughly place the camp on a basis of established permanency. The discovery of the Woodside mine has also added considerably to the value and wealth of this district, and also established a fact that within a radius of three miles around Park City are prospects fully as valuable as the old producers, and all that is necessary is energetic mining and capital, to more than double its present output and value. Already this needed energy and spirit is being shown by the prospectors and mine-owners. The consequence has been that newer and better ground is being opened, not only in the Woodside locality, but in every direction from the camp. It is a most interesting and wonderful sight to even an old-time miner to witness the development-work, mechanical skill and systematic operations connected with the Ontario property. The heavy and costly machinery underground—that would puzzle an old-time mining man as to how they managed to get it down the shaft to a depth of 600 feet—is a remarkable study. Then, again, if you wish to see all the ground opened up in the Ontario-Daly, you would be compelled to travel a distance of 31 miles underground. There is estimated to be enough ore in sight to keep the two mills in continual operation for the next 20 years, and enough ground opened to keep 800 men employed there. The recent developments made on Woodside hill have given Park City a new and brighter impetus, and its people are awake to the encouraging opportunities now before them for money-making and proving the value of their camp. Ore is being uncovered on all sides of the hill, and leasers are engaging every opportunity to secure leases on every available piece of ground. The recent discovery made in the Creole property, situated within the city limits, has fully illustrated the fact that the entire hill is thoroughly mineralized. Ground is being opened for a mile along the hillside between town and the Woodside mine. The same class of ore as is being shipped from the Woodside at great profit has been found in the North Pole claim. The country is a perfect network of locations, and every prospector and miner is confident that with pluck and muscle he will find his fortune.

MECHANICAL PROGRESS.

Heating of Journals.

Journals and bearings heat from various causes: First, from lack of proper lubrication, this being the case with all kinds and under all kinds of conditions; a cause, however, that is easily remedied. But there are some causes that require some special study, and are not yet fully understood. One of the most important of these causes is that the materials in contact are of uneven texture. This is a cause which may not at first be apparent. A third cause which may exist independent of each of the first two mentioned is that the bearing surfaces are not properly fitted. As a variation of this may be stated a further cause, that the contacting surfaces, or, rather those surfaces which ought to be contacting, are not properly centered in line.

Let us consider the case of shaft journals made of puddled iron. From the very nature of this material, which is never homogeneous, but has a fiber more or less regular, caused by the presence of cinder or slag, such journals are difficult to keep cool under heavy pressure and high speed. We may turn, fit and center such journals with all possible accuracy, and when we put too much power upon them they will expand out of shape and cause heating. This trouble does not show itself with journals of cast steel or of any other homogeneous metal.

Still, as most of our journals are made of wrought iron and will continue to be so made, we must devise some method of doing the best we can with them. About the best way is to give them soft metal bearings, which will accommodate itself to the roughness and other irregularities of the journal. There is, however, one great objection to this, that once such boxes do heat, the babbitt will be apt to be melted and to run out of the boxes. It is very difficult to get a bearing metal soft enough to bed itself well to the journal and have other than a very low melting point. The disadvantage of brass for boxes (by brass I mean any compound of zinc and copper) is that it is seldom even in texture. For such cases, where a material is desired that possesses resistance to wear, while bedding itself well to the journal and giving no trouble from melting, raw hide may be strongly recommended. The steps of drill presses are run on raw hide. Phosphor bronze is about the only alloy of copper that is homogeneous.

It would be impossible to get any metal that would not become heated under great pressure and high journal speed; but when we take cast-steel journals and phosphor bronze boxes, we have two about as homogeneous bodies as it is possible to get, and the journal is the one that wears the least—as should be the case.

The heating of journals will of course follow a law; but the trouble is that so far there have not been enough experiments to enable us to apply this law through a full range of subjects. In framing a law and regulating our practice, there are three principal things to be considered: the power transmitted through and borne by the journal; the area of contact in the journal; that is, its diameter multiplied by its length, supposing it to be properly fitted, and the nature of the materials used for the journal, the box, and the lubricant. The power will, of course, depend directly upon the speed.

The greater the contact area of the journal, the less liable it should be to heat. In actual practice this is only so within certain limits, because in very long journals, if there be a crank upon one side, and the boxes are rigid, there will often be more heating than if the bearings are only 1½ journal diameters in length.

The reason that new journals, especially those of steam engines, are apt to run hot at first, is that the entire load comes upon certain very small areas of the bearing surfaces, and these heat. There are some cases where it is not well to have soft metal—as, for instance, where there is grit liable to get in between the contacting surfaces. If the bearing is of soft metal, the grit will get imbedded in it and form a "lap," cutting the journal away most thoroughly.

Circular-saw arbors, millstone spindles, and turbine steps are particularly liable to heat; the first because of the very high speed (from 750 to 1500 revolutions) and the second by reason of the heavy weight upon the bearing (about a ton in some stones). In the third, the weight of the wheel, shaft, etc., is sometimes supplemented by the downward pressure of the water.

Some makers recommend hard bearings for lathe spindles, and others soft; and perhaps both are right, but not always or entirely right. Where the frame of the lathe is very stiff and heavy, then the boxes should be as hard as they can be got. But if too heavy work be put upon a lathe with hard boxes, there will be trouble.

For heavy bearings, that is, for bearings that have a very heavy pressure upon them, which would squeeze out any ordinary lubricating oil, the best thing to use is graphite, either alone or in combination with oil or tallow. It has the property of filling up the roughness which has been formed, and cannot be squeezed out from between surfaces which are tightly pressed together. It has this disadvantage, that it cannot be combined with oil in such a way that it will flow readily and not settle in the bottom of the oil-cup.—*Cincinnati Artisan.*

WHAT TWENTY THOUSAND HORSE-POWER MEANS.—The London *Engineer* explains what 20,000-horse power means: It is more than probable that the White Star boats being built by Messrs. Harland & Woolf will develop 20,000-horse power. It is asserted that they will have each 12 boilers and 72 furnaces, worked with forced draught on Howden's system. Assuming that the engines will require 18 pounds of steam per horse per hour, then 160 tons of feed-water must be pumped into the boilers every hour. In 24 hours the feed-water will amount to 3840 tons. A tank measuring 52 feet on the side would hold one day's consumption, or it would fill a length of 493 feet of a canal 40 feet wide and 7 feet deep. Taking the condensing water at 30 times the feed-water, it will amount to 115,200 tons in 24 hours; or, for a six days' run across the Atlantic, to not less than 691,200 tons. This would fill a cubical tank 295 feet on the side—a tank into which the biggest church in London, steeple and all, could be put and covered up. The coal consumed will be 400 tons per day. This will require for its combustion 8600 tons of air, occupying a space of 222,336,000 cubic feet. It is impossible for the mind to take in the significance of these latter figures. It may help if we say that, if this air was supplied to the ship through a pipe 20 feet in diameter, the air would traverse that pipe at the rate of about 5 6 miles per hour. It will be seen that the circulating pumps and fan engines of such a ship have no sinecure.

AMERICAN SWORDS, BAYONETS AND CARTRIDGES.—According to the *Iron Trade Circular*, the *Times of India* publishes a statement by a military expert condemning the swords and bayonets of the Bombay army as unfit for service. The bayonets were lately tested, and the proportion of those rejected varied from 20 to 40 per cent. England lost the control of the Soudan through declining to use American copper cartridge cases. She has now adopted them. After she has lost some other country she will come to us for swords and bayonets. To use the words of the *Iron and Steel Trades Journal*: "In the days when Great Britain was the world's workshop the cyclical economic movements were more limited in their influence," or, in other words, England could then see that no other nation had better arms than herself. It is different now. Other nations keep shop, and sell a better article than the habits acquired in "the old monopoly days" allow her to manufacture.

A RECORD HARD TO BEAT.—In 1866 a Corliss engine was placed in the machine-shop of the Union Pacific railroad at Sacramento, Cal. The engine has a four-foot stroke and an 18-foot belt-wheel, and it has been run continuously since it was placed there, frequently running night and day, often until 10 o'clock at night. Up to this date scarcely $100 have been spent for repairs. Allowing but ten hours a day and 300 working days to a year, this engine has been working 66,000 hours, at the smallest calculation, since it was placed in motion. The belt wheel makes 70 revolutions per minute, and for the 66,000 hours it has been going has made 277,200,000 revolutions. The circumference of the belt-wheel is 56½ feet, and in making the 277,200,000 revolutions has traveled a distance of 2,964,354 miles, equivalent to more than 100 times around the earth. The belt-wheel has traveled at the rate of 45 miles per hour.

THE GRIP OF BELTS.—Experiments with a new eight-inch three-ply rubber belt upon new turned cast-iron pulleys, of diameters of 18, 24 and 36 inches, show that with 195 pounds tension and 90° arc of contact, the surface of contact being as 100, 133⅓ and 200, the grips were as 100, 105 and 147. With 180° contact and 195 pounds tension, the proportions of grip were 100, 114 and 172, while with 400 pounds tension they were as 100, 130 and 193; but these are only proportional. The proportional figures here introduced are to show that the greater the tension the less the influence of the pulley diameter with 90 degrees contact. This will, perhaps, go to show that the amount of tension to give a belt should depend upon the arc of contact.

THE METALLIZATION OF WOOD.—The process of imparting to wood some of the special characteristics of metal has become of considerable industrial value in Germany, the wood surface by this treatment becoming so hard and smooth as to be susceptible of a high polish, and, on being subjected to a burnisher of glass or porcelain, the appearance of the wood is in every respect that of polished metal, having, in fact, the semblance of a polished mirror, but with this peculiar and advantageous difference, namely, that, unlike metal, it is unaffected by moisture.

TO CUT A HOLE IN HARD STEEL.—A writer in an exchange says: Sometimes I have had to make holes in steel that was too hard to cut or file easily. Then I make a chemical mixture that will cut a hole. I mix one ounce of sulphate of copper, a quarter of an ounce of alum, half a teaspoonful of powdered salt, a gill of vinegar and 20 drops of nitric acid. This will cut a hole in any steel, or, if washed off quickly it will give a beautiful frosted appearance to the metal.

AMERICAN CARBONS.—It is said that American carbons burn longer than those made in Europe, but do not burn so steadily.

SCIENTIFIC PROGRESS.

The Canals of Mars.

A writer in a recent number of *Science* collates a number of facts in relation to the canals of Mars, so called, through which he gives us a very fair idea of the physical aspect of the little planet. Speaking of the canals, he says: "According to the observations of Schiaparelli, they lie in the torrid and warmer portions of the temperate zone, and extend from the Northern to the Southern ocean. They are in general 2000 or 3000 miles in length by from 30 to 150 miles in breadth. They are generally arranged in pairs 200 or 300 miles apart, and so exactly parallel that usually no deviation can be detected. They cut up the continent surface so that there is no spot more than 400 miles distant from one of these markings." If these canals are artificial, it may be asked, what is the use of making them so wide, and why should they be built in parallel courses? The late Prof. Proctor suggested that the canals are the diffraction images of rivers, produced by mists which hang over the river-beds. M. Fizeau suggests that they may be cracks between the masses of ice, and others still imagine they are strips of vegetation, the rest of the planet being bare. The canals are there, for many independent observers have seen them.

Considerable interest has been manifested to learn what the eyes that are looking through the great telescope at the Lick Observatory, in this State, have seen. It is confidently believed that revelations never before vouchsafed to man have been or may be revealed by the aid of that powerful instrument—that interesting facts in regard to our near celestial neighbor might be discovered and made known to the people of the State whose munificence has called this important instrument into existence, but thus far only little has been heard from it—in fact whatever has been noticed has been mostly given to the Eastern public or transmitted to European societies and journals. If nothing new has been or can be discovered, why not let the public know it, and why not let publication be made in the city where the noble founder of that observatory made his fortune and dedicated a large portion of it to the special purpose to which we refer?

Meteorological Lecture.

At a recent lecture given in Cincinnati on the above subject, Lieut. John C. Walshe, Chief of the Signal Corps, entertained a large audience for about two hours. The *World's Progress*, published in that city, says the lieutenant took the weather map as his subject, and from it proceeded to show that modern science had nullified the biblical assertion which says: "The wind bloweth where it listeth and ye hear the sound thereof; but whence it cometh and whither it goeth, ye know not." He told of the great general eastward drift of the atmosphere of the United States, how storms come either upward from the warm regions of the Gulf, or else entering the country from Western Canada blow southeasterly; how the general drift catches them in its embrace and draws them eastwardly over the Ohio valley and the great lakes and so out over the St. Lawrence valley to the Atlantic. He explained that the eastern side of these storms is warm and moist, because on that side is the upward drift from the Gulf of Mexico—warm and moisture laden, while the western side is cold and dry, because on that side is the cold and dry air from the barren shores of Labrador. He showed the mighty effect of the lofty barrier of the Rocky mountains upon our climate. He graphically and interestingly explained the construction of the weather map and illustrated how easily and simply predictions can be made from its systematized data. He showed how the errors in predictions arise from the fact that the Signal Service has as yet no facilities for getting at meteorological conditions outside the United States, whence the storms come, or in the upper atmosphere, where the conditions are widely different from those prevailing near the surface and are liable to affect them at any time.

SOUND UNDER WATER.—Recent experiments made by the French Government with the newly devised instrument called the hydrophone gave the following results: The sound of a bell weighing 300 pounds, which was struck under water, was heard at the greatest distance permitted by the configuration of the bay, namely, 5200 meters (3¼ miles). Excellent results were obtained on board a boat in motion, the bell being distinctly heard 1400 meters off, as well as the noise of the screw of the tug on board which the sounding instruments were placed.

MODES OF WRITING.—The various modes of writing that have existed since the human race began are both unique and amusing. The earliest method known was writing on bricks, tables of stone, ivory, and the bark and leaves of trees. There are several copies of the Bible extant written on palm leaves, hence the name leaf, of a book, referring to a tree, was derived. The Babylonians made their contracts of business on tiles or broken pots. The treaties between the Romans, Spartans and the Jews were written on brass. The speech of Claudius, engraved on a plate of bronze, is preserved in the Town Hall at Lyons in France. There are wooden manuscripts which must have existed prior to 1423. In the shepherd state people wrote with horns and awls, then they invented an iron bodkin. After that the stylus came into use, made sharp at one end to write with and blunt and broad at the other for effacing and correcting.

GENIUS, CAPITAL, MONEY, SKILL, BUSINESS, LABOR, FOOLISHNESS.—Tennyson, says a thoughtful writer, can take a worthless sheet of paper, and by writing a poem on it make it worth $5000. That's genius. Mr. Vanderbilt can write fewer words on a similar sheet and make it worth $50,000,000. That's capital. The United States Government can take an ounce and a quarter of gold and stamp upon it an "eagle bird" and "Twenty Dollars." That's money. The mechanic can take material worth $50 and make it into a watch worth $100. That's skill. The merchant can take an article worth 25 cents and sell it to you for $1. That's business. A lady can purchase a comfortable bonnet for $10, but prefers to pay $100 for one. That's foolishness. The ditch-digger works ten hours a day and shovels out three or four tons of earth for $1. That's labor.

AN ALLEGED NEW AND VALUABLE LITHOGRAPHIC PROCESS.—If what is stated in a French journal, *L'Imprimerie*, is true, M. Joseph Eberle, of Vienna, Austria, has discovered a method which is likely to transform the lithographic art, viz., that the principal advantages of the new process may be thus summarized: Drawings on stone will resist the strongest acids; the impression of crayon or pen and ink drawings is equal to the originals; long numbers do not affect the drawings; bad paper does not interfere with the beauty of impression; corrections can be done with the greatest facility; printing on dry paper is simplified, and it is easy to print machine, crayon and pen drawings, united in the same engravings; powdering is avoided, and in chromo work the colors preserve a sharpness of tone hitherto unattained.

THE EBB AND FLOW OF CIVILIZATION.—The covered reservoirs of Carthage, dating back fully 2000 years, are being restored by the Gas and Water Co. of Tunis. These reservoirs cover a space of 420 by 89½ feet, and are divided into 18 communicating compartments. They have been used several times before in widely separated periods. They were in full working order in the time of Hannibal, were again repaired under the Emperor Hadrian, and have been entirely neglected since the irruption of the Arabs, in A. D. 697, until the present French company took them in hand again. From the description given in *Le Genie Civil*, it would appear that the French engineers are practically reviving the plans of the original Carthagenian engineers; a remarkable instance of the ebb and flow of civilization in this ancient corner of our historical world.

A STETHO-TELEPHONE.—A Chicago inventor is reported to have developed what he cal's a stetho-telephone, which is a combined receiver and transmitter. A hollow extension about four inches long is attached to the receiver, from the end of which a small button protrudes slightly. This button is placed against the throat near the vocal cords, and the receiver is held against the ear in the usual manner. When the operator speaks, the vibrations of the throat are transmitted with, it is said, distinct clearness. The instrument is operated by the muscular vibrations that accompany the utterance of words. The device is the result of ten years of labor and is reported to have worked satisfactorily between Chicago and Milwaukee.

ALBO CARBON.—Those who have heard of "albo-carbon" as an element in house-lighting, and are not acquainted with its character, may be pleased to learn that "it is simply gas-light enriched by fine carbon." Of course there is a mechanical attachment requisite for its complete operation, but it is claimed for it that it reduces the cost of gas one-half, while the light is greatly improved. It is said to possess brilliancy and promote economy.

POWERFUL ELECTRIC LIGHTS.—The electrical search lights, with which every modern man-of-war is now provided, are in themselves articles of peculiar interest. They are of the arc pattern, ranging from 8000 to 30,000 candle-power, so arranged with reflectors that their rays can be concentrated into a single beam and thrown in any direction. An object two miles distant is easily illuminated.—*Electric Review.*

A BEAUTIFUL EXPERIMENT.—In the mechanical production of ice, freezing may be caused to take place so gently that a spray of roses may be put into a tank of water and frozen into the mass of ice without stirring a petal from its place. There it lies imbedded in all its beauty of form and color, as long as the ice can be kept from melting.

A NEW COMPASS or method of determining the true north by the use of electricity, but without the aid of the magnetic needle, is announced by the London *Electrician*. This will be welcome news to the sailing-masters of iron and steel ships, where the variation of the needle is often erratic.

USEFUL INFORMATION.

How to Model in Clay.

An outfit of five pounds of clay, a sharp jack-knife and one tool will do many wonders. This tool is made out of a piece of maple eight inches long; one end made flat about one-half inch wide, from the center gradually becoming thinner, until it is as thin as a knife blade. From the middle, slope down to the other end; hollow out the center, then sandpaper until perfectly smooth.

If the clay is not used immediately after purchasing, put it in any sort of a dish and cover with a wet woolen rag, keeping the rag wet.

Now for the work. It is better to buy a plaster slab, which costs only 10 or 15 cents at any pottery, although this is not necessary, as a common board or marble slab will do. In the first place make a tile six by four inches, and about one inch thick, by kneading the clay until all lumps are worked out; then throw it on the slab to make the clay more compact. With a rolling-pin roll until a little thicker than required.

If there should happen to be bubbles in the clay, prick them with a pin. Fill up the holes and make the tile smooth by rubbing it with moistened fingers. Turn it over and repeat the operation. If it is now thicker than required, smooth it down, and with the jack-knife cut it to the proper length and width.

Take a leaf for a model, for it is better to work right from nature; make an exact drawing of it, outline and veins, with the curved end of the tool. If the drawing cannot be done, a tracing may be substituted. Take the other end of the tool and cut this outline one-half inch deep, and then with a jack-knife cut away the clay outside the leaf, smoothing down the new surface.

Make the depressions in the clay leaf as in the real one. Sometimes the finger will be sufficient; sometimes the curved end of the tool will be necessary. There will always be some finishing touches to add, which the worker must see for himself.

When it is nearly dry, put in a background by simply rubbing the curved end of the tool over it in strokes. If the leaf proves a success, take it to a pottery, where for a few cents it can be fired. Otherwise it will crack and crumble away. If the leaf is unsuccessful, the clay can be worked over and used again.

After a leaf or two have been made satisfactory you can model flowers, or make something useful as well as ornamental, such as match-boxes, ash-receivers, and thermometer-holders, and perhaps, after practice, you will be able to model figures.

HOW TO SELECT ROPE.—A German paper, in an article on the present methods of rope manufacture from hemp, and the determination of the different qualities and the probable strength simply from the appearance, lays down the following rules: A good hemp rope is hard but pliant, yellowish or greenish gray in color, with a certain silvery or pearly luster. A dark or blackish color indicates that the hemp has suffered from fermentation in the process of curing, and brown spots show that the rope was spun while the fibers were damp, and is consequently weak and soft in those places. Again, sometimes a rope is made with inferior hemp on the inside, covered with yarns of good material—a fraud, however, which may be detected by dissecting a portion of the rope, or, in practical hands, by its behavior in use; other inferior ropes are made with short fibers, or with strands of unequal strength or unevenly spun—the rope in the first case appearing woolly, on account of the number of ends of fibers projecting, and, in the latter case, the irregularity of manufacture is evident on inspection by any good judge.

CALIFORNIA LICORICE.—There are fine growths of the licorice plant in several parts of California, but one of the best is near Madison, Yolo county. The Woodland *Democrat* says that the culture is extremely easy and the root is very profitable. Licorice is propagated like horseradish by means of root slips, which are removed from the main root. The soil must be well fertilized and thoroughly broken to the depth of three feet to attain the best results. It takes three or four years to perfect the roots for market, during which time the plant must receive constant and careful cultivation with the prong hoe. Lay off the rows two feet apart, and, after cutting the root slips into sections of five or six inches, plant them in vertical holes made with a dibble 16 inches apart, observing to thrust them several inches below the surface and cover over.

A NEW INDUSTRY has lately sprung up in Chicago—a railway seat manufactory. The seats turned out are novel in construction. They are double, each being operated separately, and made to face the front or back of the car by the simple pressure of a spring. The method is patented, and is the invention of E. N. Gilfillin and J. S. Emmert of Chicago. Fifteen roads have already adopted it, and the industry promises to very shortly assume considerable proportions.

A NEW STREET-SWEEPING MACHINE is on trial in New York City. The machine is a large circular water-tank, running on three wheels, underneath which are placed large rollers or scrapers set diagonally with pieces of rubber instead of bristles, as at present used in street sweeping. Under the driver's feet is a water-pipe, from which copious jets of water are thrown, washing away the sand, which is swept into the gutter and washed into the sewers. The machine cleaned two blocks in Fifth avenue, leaving the stone pavement as clean as it would appear on a summer's day. The time occupied was six minutes on each block.

DIFFERENCES IN DRAFT.—It is stated that if one horse can draw a certain load over a level road on iron rails it will take one and two-thirds horses to draw the same load on asphalt, three and one-third horses to draw it on the best Belgian block, five on the ordinary Belgian pavement, seven on good cobblestones, thirteen on bad cobblestones, twenty on an ordinary earth road and forty on a sandy road.

FRAUD IN PERFUMES.—A perfumer says that there is more downright fraud perpetrated in the manufacture of attar of roses than in the making of any other perfume. Connecticut is a prominent place of the production of attar of roses. Heliotrope, one of the most popular of perfumes, is made by combining violet and vanilla in certain proportions.

CALIFORNIA MAPLE SUGAR.—The sugar maple is found in various places in Central and Northern California. The Grass Valley *Tidings* recently acknowledged the receipt of maple sugar made from trees in Woodpecker ravine, east of the town.

A PENCIL GREASE for marking, which will keep soft the year round, is made by trying out some beef tallow and adding while warm a small proportion of sweet oil, say a teaspoonful of oil to a gill of the melted tallow. Keep it in a tin box.

OIL SURPLUS.—The oil-producers of Pennsylvania are encumbered with an accumulation of 3,500,000 barrels of the crude article, which they expect to sell eventually for less than $1 per barrel.

CRYOLITE for making candles is brought from Greenland, where important and little known mining operations are carried on.

SULPHUR IN LOWER CALIFORNIA.—The *Lower Californian* says there is sulphur enough on the peninsula to supply the world.

GOOD HEALTH.

Does the Sun Thicken the Human Skull?

One of the most interesting things mentioned by Prof. Virchow in his little book just published, entitled "Medical Remembrances of an Egyptian Journey," in which he describes an excursion up the Nile as far as the first cataract, is that the broken skulls on the first great sepulchral fields, dating from Roman times, are as thick and hard as Herodotus says those of the slain Egyptians were in comparison with the brittle ones of the Persians. The Greek historian explains this by attributing it to the early exposure of children to the heat of the sun; and in many parts of Upper Egypt the German travelers actually found young children thus exposed during their parents' absence in the fields in immense clay bowls, resembling in shape a champagne glass with a stem, into which they were put without shelter.

This discovery by Prof. Virchow is interesting, because it at once suggests the question whether the proverbial thickness of the skull of the negro has not been caused by exposure to the sun, and whether it is a peculiarity of savages of tropical countries that their skulls are thicker and harder than those of the inhabitants of temperate and colder countries. Students of craniology have never made any investigation to ascertain whether the skulls of different races vary in degrees of hardness.

It would be almost impossible to make such an inquiry. As is well known, the human skull increases in hardness from childhood to maturity and age. A miscellaneous collection of skulls of any given people would therefore be of no value in such an investigation. To obtain a collection of skulls of a number of nationalities, that should be taken from subjects of all the same age, to have them all similarly prepared and in sufficient numbers to make it possible to draw any conclusions from their comparison with each other, would be manifestly impossible. More attention has been given to the relative thickness of different skulls, or rather to their weight, from which their thickness may be inferred. Of the large collection of crania in the Army Medical Museum at Washington, the thickest are those of negroes and Alaskan Indians. The skulls of other Indians, both of North and South America, in tropical or temperate climes, and of the Esquimaux, do not appear to be particularly thick. Among the ancient Peruvian skulls recently received by the museum, and the ancient crania collected in Arizona last summer, there are frequent individual variations in thickness, but no tendency to unusual thickness.

The conclusion from these facts is that exposure to the sun probably does not cause thickness of the human skull. In connection with this subject, it is interesting to note that among the Australians the *sinus frontalis* is generally found to be solid in the males, instead of being hollow, as in the skulls of other races. This bone in the male Australians generally extends straight across the head, the lower side overhanging the eyes so that they seem to look out from under it, while in the North American Indians a modification of shape deprives them of that heavy look about the forehead. The heavy *sinus frontalis* of the Australians, of course, increases the weight of the skull.

WASH THE HANDS BEFORE EATING.—Children should be taught as we were taught when we were young, to wash the hands before sitting down to table. In coupling the injunction with the order to brush the hair and put on clean pinafores, we hide necessity behind propriety. The tousled locks and begrimed apron offend our eyes; the soiled fingers may work real evil to their owner. Dr. Cyrus Edson, in a lecture lately delivered, startles us by suggestions of the danger consequent upon neglect of this duty. The air we breathe, the dust we stir in the neatest apartment, the perfume we inhale, are alive. Tyndall says: "We find upon examination that dust is mainly organic matter, in part living, in part dead. There are among it particles of ground straw, torn rags, smoke, the pollen of flowers, the spores of fungi and the germs of other things." Teach the child, therefore, as soon as he can comprehend an order, to keep his hands away from his mouth, and never to touch a bit of food until they have been washed and dried.—*Marion Harland in the Home-Maker.*

TWO WAYS OF TREATMENT.—When a person gets a sprained ankle, the physician usually has the ankle painted with iodine and the patient kept in the house for a week or ten days. A physician who treats such an accident in a different way relates a case as follows: "I went over to a grocery store and got a pound of common soda. Then I got a pot of boiling water, put it in a tub and put the soda into it. Then I got some woolen rags, dipped them in the solution and wrapped them around the injured member. I wrapped dry cloths around on the outside, so that the steam could do its work thoroughly. I changed the bandages every 15 minutes and had his nurse do the same when I went home that night. When I called the next day my patient was all right. It would have taken two weeks for that iodine to have done its work. A peculiarity about this treatment is that no swelling remains and that the flesh is not even discolored."

CELERY AS A CURE.—Celery is the latest cure for rheumatism, says an Eastern exchange. It is asserted that the disease is impossible if the vegetable be freely eaten. The fact that it is so generally put on the table raw prevents its therapeutic powers from being known. The celery should be cut into bits, boiled in water until soft and the water drank by the patient. Put new milk, with a little flour and nutmeg, into a saucepan with the boiled celery, serve it warm, with pieces of toast, eat it with potatoes, and the painful ailment will soon yield. Such is the declaration of a physician who has again and again tried the experiment and with uniform success. He adds that cold or damp never produces but simply develops the disease, of which acid blood is the primary and sustaining cause, and that while the blood is alkaline there can be neither rheumatism nor gout.

A MEDICAL USE FOR THE PHONOGRAPH.—Dr. J. M. Bleyer, in a communication to the *Medical Record*, explains another use for the phonograph, to wit: teaching, recording, reproducing and demonstrating the physical signs or sounds of the normal as well as of the diseased condition of the heart and lungs. Like the great Lick telescope in astronomy, the phonograph in medicine has opened a new field of investigation. He says: "While the deepest tone that our ears are capable of recognizing is one containing 16 vibrations a second, the phonograph will record 10 vibrations or less, and can then raise the pitch until we hear a reproduction from them. Similarly, vibrations above the highest rate audible to the ear can be recorded on the phonograph, and then reproduced by lowering the pitch until we actually hear the record of those inaudible pulsations."

THE SOUL OF PHARMACOPŒIA.—The *Medical Record* prints the following list of drugs as representing the soul of pharmacopœia: Opium, mercury, iodides, quinine, chloroform, ether, sulphate of magnesia, salicylic acid, aloes, alcohol bromides, iron, chloral, castor oil, digitalis, arsenic, colchicum, ipecac, aconite, strychnia, cocaine, ergot, bicarbonate of potash, mineral acids, and nitrates. It adds: "Pepsin is a widely used remedy, but it can hardly be regarded as a drug, and it is very possible that, on the whole, it does more harm than good by pandering to a weakness rather than attacking its roots. Iron is another remedy whose value, except as a mineral food, is problematical. Naturally, the best 25 drugs will differ somewhat in accordance with climate and prevalent disease, but we should say that the foregoing list was a fairly correct one."

A MORNING DRAUGHT.—Add the beaten yolks of three eggs to two tablespoonfuls of powdered white sugar, three cloves, the rind of half a lemon and half a pint of brandy. Pour over it a quart of new warm milk, stirring rapidly, and serve immediately. This is recommended for those who live in malarial districts and for delicate persons.

A SALT SYNDICATE.—The formation of a salt trust now seems assured. The Michigan manufacturers met at East Saginaw, Mich., in secret and agreed to enter the combination. The idea is to cut down all works where fuel costs so much that there is only a narrow margin of profit, and the product of each district is to be regulated by the area it can control. The entire salt producing territory of the country is to be included. The trust is to have a capital of $25,000,000.

EX-MAYOR HEWITT and Edward Cooper, proprietors of the New Jersey Steel and Iron Works at Trenton, N. J., have been traveling in the iron regions of the South for several weeks on a tour of investigation. As a result, it is announced that about April 1st their works will be removed to Chattanooga, Tenn. Much of the raw iron and coal supply has been coming from there, and the company also have found a large market in that region. The works employ 1300 men.

MINING MUSEUM SPECIMENS.—Two fine specimens of the stone age have been put on exhibition at the State Mining Bureau museum. One is an ax found at the bottom of a Swiss lake, and the other is a diminutive hatchet from Chiapa, Mexico. Both are very fine specimens of ancient workmanship. There is also on exhibition a quantity of asbestos from San Bernardino county, and a perfectly smooth and symmetrical water-worn granite bowlder of egg shape from French Gulch.

FLOWERING PLANTS IN ARCTIC REGIONS.—Within the Antarctic circle there has never been found a flowering plant. In the Arctic region there are 762 kinds of flowers. Fifty of these are confined to the Arctic region. They are really Polar flowers. The colors of these Polar flowers are not as bright and varied as our own, most of them being white and yellow, as if borrowing these hardy hues from their snowy bergs and golden stars.

GARDNER F. WILLIAMS, who is in charge of the Kimberley diamond mines, Kimberley, South Africa, has recently, we are informed, had his salary raised to quite an important figure. Mrs. Williams and her daughter started from Oakland for Kimberley this week. Mr. Williams was formerly in charge of important gravel mines in California.

JAPANESE IN HAWAII.—The result of the extensive Japanese emigration to Hawaii has been to throw most of the Portuguese laborers out of employment, as they demand higher wages than the Japanese. About 2000 Portuguese are making arrangements to remove to the new State of Washington, if they can find suitable lands.

THE SILVER KING'S VICTORY.—The suits of the United States against the Silver King Mining Co., Arizona, for cutting timber on the public lands for mining purposes were tried at Phœnix before the United States Court recently. The jury found for the defendants. This is an important victory for the mining interests of Arizona.

THE Wheatland *Graphic* says a great many mining men and prospectors have visited Smartsville and vicinity of late, looking for mining investment. Kind fortune seems to be smiling on the town again, and old-timers who live in other places are casting longing glances at their old home.

THE amalgamation of the three great Chicago companies with $20,000,000 capital to make steel rails is now an accomplished fact, and will doubtless be greatly to the advantage of all the interests concerned, viz.: The North Chicago, the Union of Chicago and the Joliet of Joliet, Ills.

VESSELS' MASTS.—In many instances the captains themselves do not know the length of their masts to a few feet. One hundred and fifty feet is rather long, and there are probably 10 or 12 ships with masts coming to San Francisco whose length exceeds that.

GOV. WATERMAN has signed the bill providing for a commission of three engineers to make an investigation into the condition of the San Joaquin and Sacramento rivers, and has appointed William Ham Hall and P. A. Humbert as two of the commissioners.

THE Reese River *Reveille* says: Express Agent Crockett of Austin has footed up the bullion shipments from his office since 1885, and finds that they amounted to 1,707,704 pounds, of the value of $24,929,699.

IT is said that the smelters at Tacoma, Wash., will be ready for work May 1st. The statement that the parties who are building the smelter had changed their minds and would build at Portland is contradicted.

THE decayed remains of Walter Brown, a young Leadville miner, who has been missing since May 15, 1887, were found recently at the bottom of an old shaft of the Iron Silver mine, 125 feet deep.

A NEW SMELTER.—Portland's smelter and refiner is an assured fact, the company having purchased 110 acres several miles below town. The construction will begin immediately.

MINING AND SCIENTIFIC PRESS

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TABLE OF CONTENTS.

EDITORIALS.—Manilla Rope Transmission, 221. Passing Events; The Los Angeles Base-Line; Lower California Mines, 228. Hot-Ore Feeding Machine; Removing Concentrates and Sediments from Sluices, 229.

ILLUSTRATIONS.—The Dodge System of Transmission of Power by Manilla Rope, 221. Hoffmann's Hot-Ore Feeding Machine, 229.

CORRESPONDENCE—Ruby City Mines; Nitro-Glycerine Cannon; Southern California Mines; Mineral Resources of Nevada County; Separations, 222.

MISCELLANEOUS.—Richmond Consolidated; How Roads Are Made in Santa Clara County; Minerals on Railroad Lands, 222. Another Bearing Date Palm; Eastern Nevada; The Electrical Society; The Kentuck Mine Suit; Minerals on Railroad Land, 223.

MECHANICAL PROGRESS.—Heating of Journals; What Twenty Thousand Horse Power Means; A Record Hard to Beat; The Grip of Belts; The Metallization of Wood; To Cut a Hole in Steel; American Carbons, 226.

SCIENTIFIC PROGRESS.—The Canals of Mars; Meteorological Lecture; Sound Under Water; Modes of Writing; Genius, Capital, Money, Skill, Business, Labor, Foolishness; An Alleged New and Valuable Lithographic Process; The Ebb and Flow of Civilization; A Stetho-Telephone; Albo-Carbon; Powerful Electric Lights; A Beautiful Experiment, 226.

USEFUL INFORMATION.—How to Model in Clay; How to Select Rope; California Licorice; Differences in Draft; Fraud in Perfumes; California Maple Sugar; Oil Surplus, 227.

GOOD HEALTH.—Does the Sun Thicken the Human Skull; Wash the Hands Before Eating; Two Ways of Treatment; Celery as a Cure; A Medical Use for the Phonograph; The Soul of Pharmacopœia; A Morning Draught, 227.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 224-5.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 234.

Business Announcements.

[NEW THIS ISSUE.]

Lock-Joint Pipe—Dunham, Carrigan & Hayden Co.
Electric Lighting—Samuel H. Taylor.
U. S. Protective Bureau.
City Hotel—C. S. Fitch, Sonora, Cal.

See Advertising Columns.

Passing Events.

The latest advices from the Lower California gold-fields bear out the prediction made weeks ago in the PRESS, that they are by no means extensive and there is lack of water to work them. A number of quartz veins have been discovered, but capital is necessary to work with. A great many disappointed people are now returning.

Greater interest than ever is being manifested in the oil-fields of the southern part of this State. Vigorous search is also being made for natural gas. Eastern people have sent experts out, who are investigating these subjects in Ventura and Los Angeles counties.

In Arizona the excitement concerning the Carizo gold-fields is unabated, though there is no reliable news as yet from the district. The Harqua Hala mines, which latterly attracted so much attention, but were finally considered mere rich pockets, are now reported as improving in width and quality of ore as depth is attained.

Railroad business in California is now quite dull, and the S. P. Co. are curtailing expenses by reducing the force of men. It is stated, however, that it is the intention of the company to build some 200 miles of feeders and branch lines on this coast during the summer.

The Los Angeles Base-Line.

Its Measurement by the U. S. Coast and Geodetic Survey.

The measurement of a base-line in any scheme of triangulation over the surface of a country is the first and most important operation, for upon it in great measure depends the accuracy of all subsequent measures of distances. The base-line is that one of the three sides of a triangle that has been selected for actual measurement. At the three angles of the triangle each horizontal angle is measured, and from these measures and the base the other two sides are computed.

When the network of the triangulation is intended to extend hundreds of miles in any, or all, directions from the base, it is very important that the base-line shall be measured with the best apparatus and the highest skill. In the operations of such work in Europe and India base-lines have been measured with glass rods, wooden rods, steel bars, composite bars of steel and brass, steel and zinc, etc. In our country, the first measures by Hassler were with steel bars, and that is the latest method in Europe, and has been urged by Davidson for years in this country.

The primary apparatus of the Coast Survey is a composite bar of parts of steel and zinc, so arranged that the length of the compound bar is nearly compensated for changes of temperature and has therefore a nearly invariable length. There are two such bars practically of identical length. In the later European measures there is only one bar which is carried under a series of microscopes fixed in line. The operation of the field measurement is, generally speaking, as follows:

After the rear end of the first bar has been adjusted over the end of the base-line, the second bar is placed ahead of the first one in the line of the base, and the rear end of the bar is moved back gently to touch the forward end of the first or rear bar. When this contact of the two bars is adjusted the rear bar is released and carried forward of the standing bar and then brought in contact as the first was.

Of course it is understood that the alignment of the bars is perfect, that the inclination of each bar is accurately measured, so as to give the means for reducing the inclined length to the horizontal equivalent, and that the hight of the base-bars above the level of the sea is known so as to reduce the length to what it would be at the mean level of the adjacent ocean.

The temperature of the bars is also noted by mercurial thermometers and the Borda scales are read to reduce the length of the bars to a standard temperature.

The length of the bar has been a matter of personal consideration. Hassler used four bars of two meters each to form one measure; Bache used two compound bars of six meters each; Patterson adopted the present one of five meters; the Spanish and Swiss authorities use a bar of four meters. Questions of strain when the bar rests upon two supports enter the problem, but the weight is the principal consideration. In the base-bars of the Coast Survey the weight has been increased to the maximum which two men can handle in the rather unusual method of lifting, carrying, and setting them in place in the shortest practical time.

The present bars weigh 160 pounds each, and each has to be changed to a new position every minute when the other conditions for work are favorable. From the experience gained on the Yolo base the bars have been so covered with non-conducting material that ordinary changes of the temperature reach the bars only after two or three hours. The amount of this material limited the weight.

In European and Indian base-lines, and in some of the base-lines heretofore measured in the United States, the surface of the ground has been either carefully prepared and graded, or the lines, when short, have been measured on highways of the best character. In the last two bases measured by the Coast Survey the land has not been prepared nor graded, and no hesitation has been made about crossing streams upon trestles properly constructed. In the modern base-lines of Europe the practice has been to measure a short base of about one and a half miles at least two times. This involves the intervention of many triangles and the measurement of many horizontal angles before lines of 40 and 100, and even 150 miles, are reached, as on the Pacific Coast triangulations. These intervening measures are sources of error through which the value of an accurately measured base-line is soon lost. In the Coast Survey, where the development of the main triangulation has reached lines nearly 200 miles in length, the bases have been chosen as long as practicable for the best geometrical figures developed therefrom. In the Yolo and Los Angeles base-lines these lengths have been ten and three-quarters miles and the extension therefrom to lines of 40, 60 and 100 miles has been systematic and through well-conditioned quadrilaterals. Moreover, it has been shown to be economical to remeasure even such a long base-line, because the second measure may be considered almost a new base, and is made in much less time than the first without the double preparation and has a greater value because the persons manipulating the instruments are then well practiced and alive to all field sources of error. Another check is made in all well-measured bases, by the introduction of subdivisions in the line upon which the tests are made in the second measurements. General Ibaanez adopts subdivisions of 400 meters in a mile and a half base-line. The Coast Survey introduces subdivisions of 500 meters in ten and three-quarters miles. In the base just measured by Professor Davidson's party it was determined to measure it three times, and he believes that the third measurement should have more weight than either of the others in making up the mean value. Moreover, the third measurement was measured in much less time than either of the others, and therefore more economically.

In four months' time, which involved going to and leaving the field, building ten bridges or trestles over streams, crossing two railroads, clearing the ground of great tussocks of hard, stiff grass, etc, the first measurement of the line of 17,496 meters occupied 21 working days, the second 14 days, and the third only 11¾ days. In the second measurement the greatest distance measured in one day was a trifle over one mile; in the third measurement distances were made of 1700, 1700 and 1810 meters on three consecutive days, and the extraordinary length of 2000 meters was measured in one working day of seven and a half working hours. In the later measurements in Europe (Aarberg base-line) the measurements are considered good with 800 meters in five hours.

In the day of the greatest measurement on the Los Angeles base the bars were measured at rates of 100 bars in 96½ minutes, 104 minutes and 101 minutes. In the Aarberg base the shortest time for 100 bars of four meters each was 189 minutes.

In the three measurements which comprised the laying of 16,497 bars, so well were officers and men versed in their duties that no accident and no mistake was made by any of the 20 persons employed in this rapid manipulation. The greatest inclination of any bar was within two minutes of five degrees; in the Aarberg base not quite two degrees.

The position of the Los Angeles base-line is between Anaheim and Norwalk, and the northwest end is about 15 miles from Los Angeles. The line is peculiarly strong in its geometrical relation with the long lines of the survey upon the adjacent mountains and coast hills. On each side it develops directly through a quadrilateral, and when the figure immediately around it is connected by horizontal angles, it will be remarkably strong, with good lines for the development to the north and south and to the Santa Barbara islands.

The choice of the base-line was made by Capt. Jas. S. Lawson in 1886, and the survey of the line and the adjacent land was made by Mr. E. F. Dickins, both then attached to the party of Prof. Davidson.

After the measurement of the line, the extraordinary rapidity with which it was measured was particularly satisfying to Supt. Thorn, who mentioned it among other services in recommending Prof. Davidson to the President's notice for appointment as delegate to the International Geodetic Association.

From comparison with the conditions in the measurement of the Yolo base-line, and from a test of three measures of one-half kilometer on this line, it is believed that the probable error of the length of the Los Angeles base-line will not exceed one-quarter of an inch. This base serves as a check upon the measures of the lines of the triangulation brought southward from the Yolo base; and will be the base for the development of the triangulation hence to the Mexican boundary and through the Santa Barbara islands.

New features were introduced in the measurement of the Yolo and Los Angeles bases by the daily comparison of the measuring bars with a field standard bar that is subsequently compared with the ultimate standard at Washington. In making these comparisons, the quantities read by the observer are the one-two-thousandth of a millimeter or about the one-fifty-thousandth of an inch. In these comparisons the actual field conditions of the measuring bars and the standard base are realized, and must give more reliable results than what may be called office comparisons.

Lower California Mines.

Numbers of men are returning from the Santa Clara mines, Lower California, disappointed in both the extent and richness of the field. Many still remain, of course, and will thoroughly prospect the country. The majority of those who went to the new fields were "tenderfeet," with no knowledge of mining; but in the crowd were many miners of experience who will give the region a pretty good examination. The Mexican miners, familiar with the kind of placer-mining work necessary in that region, have been the most successful, but there was by no means paying ground enough for even one-tenth of the people who went to the district. The reports of rich finds were much exaggerated. Some rich spots were found, but the area of the placers is limited. On the other hand, the quartz finds are reported as numerous and apparently promising. Quartz mines, however, generally require capital to develop, and most of the people who went down there had very little of this. Those who had the luck to get hold of good quartz claims will doubtless be able to sell them before long, but before the mines can pay much, money must be provided for reduction works.

General Luis E. Torres, Governor of Lower California, has sent the following message to Senor Valdespino, Mexican Consul at San Diego: "Please publish through the press of San Diego that the richness of the Santa Clara placers has been much exaggerated. None but practical miners (gambuzinos) find gold. Possibly new discoveries may be made, but to date the placers found do not justify the excitement that has been caused. The prospectors coming in may probably rely on new discoveries, but about this there is no certainty."

This is a very sensible message, but it is to be regretted that it was not sent some weeks since, as it would have prevented much disappointment. However, the Governor could scarcely have expected such a rush of people to his Territory on so slight encouragement.

We see by a dispatch from the City of Mexico that the Government has decided not to sell to one company all the mining concessions in Lower California. It is preferred that practical miners shall take up claims, and every effort will be made to induce miners to enter upon mining lands.

RIVER AND HARBOR COMMISSION.—Among important bills passed by the Legislature was one entitled an Act to provide for the appointment and operation of a River Examining Commission. It provides that the Governor shall appoint three Commissioners to report upon the condition of the Sacramento and San Joaquin rivers, with the view of informing our members of Congress as to the general appearance and estimates of cost of improving these rivers and restoring them to the condition in which they were before hydraulic mining had filled them up. When we went to press last week, but two of the Commissioners were appointed. Since then the Governor has completed the appointments. The Commissioners are Charles F. Reed of Yolo county, P. August Humbert and Wm. Ham. Hall.

Aid Your Publishers.

Now that general success for this season is so well assured, we hope to receive early remittances from old subscribers and to add many new ones to our list. We shall be grateful to present subscribers who will call the attention of new-comers, as well as any old neighbors, to the importance of reading our paper, and supporting a journal that does so much for its subscribers and the welfare of the whole community on this coast.

Hot-Ore Feeding Machine.

In order to charge the hot ore evenly by a mechanical contrivance, Mr. Hofmann, in carrying out his trough-lixiviation process, has devised an arrangement, which, in combination with a Howell roasting furnace, is illustrated in the accompanying cuts.

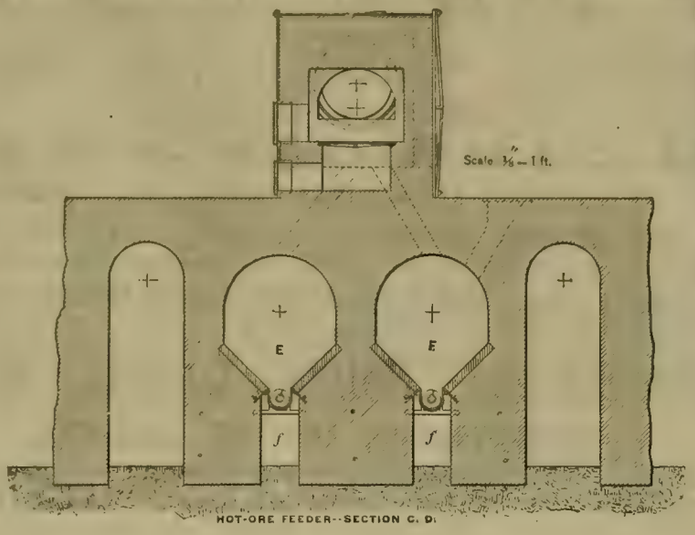
The ore from the furnace drops alternately into the bins or vaults *E* and *F*. The ore is recovered from the bins by conveyor screws. These, with the conveyor troughs, are placed below the inclination of the bins in order to keep them comparatively cool by the air in the channels *f*. The four-inch shaft of the conveyor, over which the cast-iron screw segments are slipped, consists of three pieces which are connected close in front of the journals by large flanges *g*, in such a way that the coupled ends do not touch each other. The object of these flanges is to keep the journals cool. For this purpose the vessel *h*, through which a small but continuous stream of water flows, is so placed that the flanges have to revolve through the water. The inflowing water strikes the upper half of the couplings to keep them also cool when not in motion.

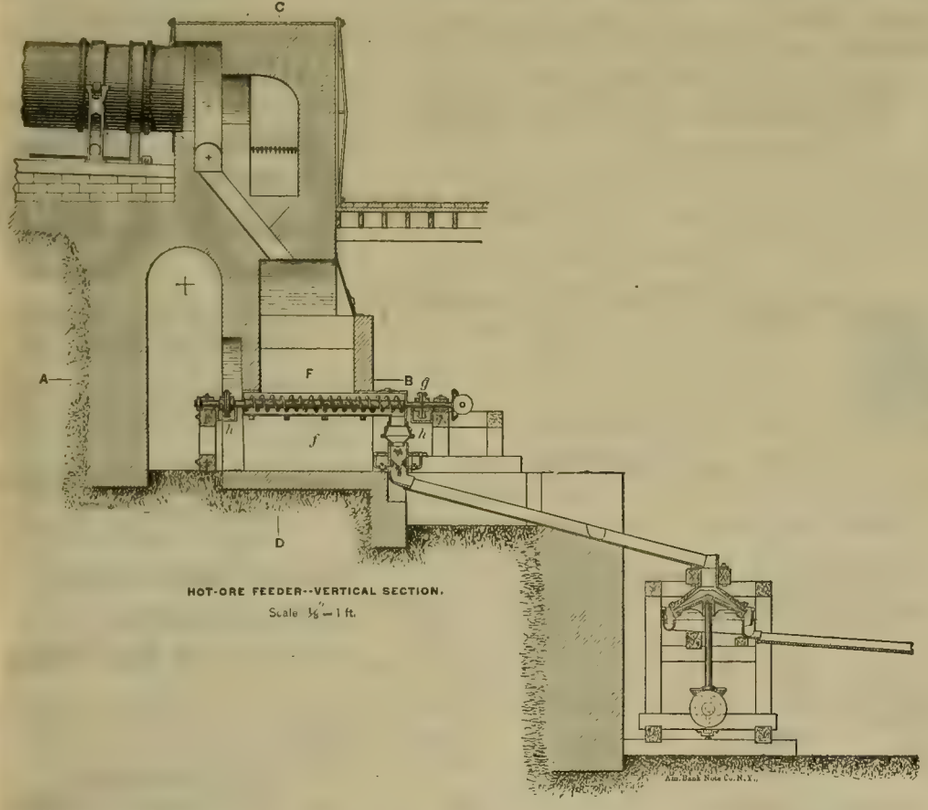
The conveyor discharges the ore direct into the cooling apparatus, as shown in the diagram, whence the water carries it down to the grinding machine. By having for each furnace two bins, which are alternately filled and discharged, oppo tunity is given to increase the chlorination of the silver of an incompletely chloridized ore.

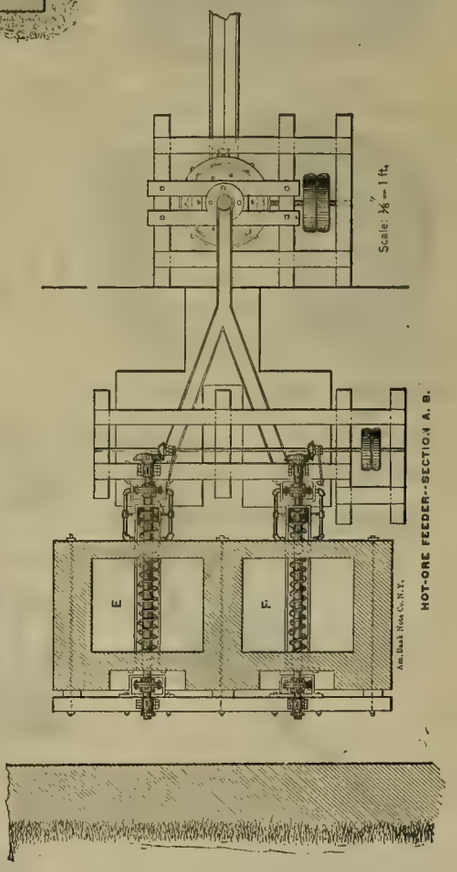
Not all, but most kinds of chloridized ores, when allowed to remain in a mass for some time harden in cooling, especially on the surface and sides; and it will be found necessary in such cases to assist the discharge by poking from time to time from above. To facilitate this, the bin proper is only four feet deep and accessible from the top, as shown in the figure. In case an ore hardens too much, and thus would make the described arrangement impracticable, the bins can be made much larger, but have to be provided each with a discharge door close to the bottom.

A short conveyor has to be placed in front of the bin and right under the discharge door. The end of the conveyor-trough nearest to the door opens in the shape of a hopper, into which the ore from the bin can be drawn by means of hoes in proportions of half a ton or a ton at a time. An ore which has once hardened in cooling and has then been removed, is not likely to harden again, and the conveyor will charge the ore evenly from this small hopper into the cooling tube.

If an ore is to be treated which roasts easily, and no increase of silver chlorination is produced by letting the ore lie in mass, there will be only one conveyor required for each Howell furnace. The ore then will drop directly from the furnace into the conveyor-trough, and will be carried to the base-metal leaching in the same proportion as the battery supplies the furnace with raw ore. In such a case, all operations, from the time the ore passes the rock-breaker until it leaves the leaching works in tailings, will be automatic. When other furnaces than Howell's are used, the roasted ore has to be dumped into bins. Mr. Hofmann does not intend to represent this hot-ore feeding machine for refractory ores as perfect, but with some manual assistance they will perform the work and will give more satisfaction than the present cooling-floor manipulations.







HOFFMANN'S HOT-ORE FEEDING MACHINE.

CŒUR D'ALENE MINES.—We are informed by a gentleman who is well posted on the mining interests of Cœur d'Alene, Idaho, that it is expected the district will, this year, double its last year's product, as all the mines are improving with every day's work.

THE EDISON CONCENTRATOR.—A special to the Philadelphia *Ledger* contains an account of the operations of the Edison concentrator, which concentrates ore, ridding it by mechanical means of dirt and earthy matter.

Removing Concentrates and Sediments from Sluices.

Frederick Sletcher of this city has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency a device for drawing off from a flume, sluice, ditch or similar conveyer the heavier portions of the flowing contents or all the solid matter held in suspension or carried by the water when the sand portions are worthless sediment, as in the case of ditches where it is desired to purify the water as much as possible. It is also applied for saving sulphurets and heavier concentrations from a sluice-box of any width or size through which the pulp of a battery or other valuable mineral-bearing sand or material is carried.

One section of the sluice-box or flume is made separate and has an opening or slot extending entirely across it. By means of rubber or elastic springs this section is connected with the upper and lower corresponding section of the flume or sluice, the slotted section being thus allowed a certain amount of end motion by the yielding of the cushion or elastic springs, without allowing any leakage at the joints.

Beneath the transverse slot or opening in the section is mounted a drum extending the full width and journaled so as to rotate. The slot has its lower side beveled or curved to the same arc with the periphery of the roller or drum so that the latter fits up closely, the upper side being nearly or quite level with the bottom of the sluice. The drum is rotated (by belt pulley) at any desired speed, the direction of motion being against the current flowing down the sluice.

At the end of the drum shaft Mr. Sletcher has arranged a mechanism so that as the drum rotates a series of hammers strike against lugs and produce a jarring action upon the movable flume section, this action being permitted by reason of the elastic or movable joints by which the section is united to those adjacent. The effect of the jars or blows is to produce a temporary stoppage of the water which will have the effect of precipitating the heavier matter downward. The heavier portions of the material flowing through the sluice are precipitated to the bottom, and flowing along until they reach the drum, will fall upon its surface and be carried downward and out of the sluice by its rotation. The drum may be fluted on its periphery. A stream of water is brought against the under side of the drum to remove the material it has carried out of the sluice. In the case of quicksilver, sulphurets, fine gold, etc., as many of these movable sections and discharge drums may be placed at intervals along the sluice as will be found desirable.

MEXICAN MINES.—The Cacachillas G. & S. M. Co., composed of Americans and Mexicans whose headquarters are in San Antonio, Texas, has secured a concession from the Mexican Government for ten years of a right to mine in the whole of the Cacachillas range of mountains which lie about 30 miles southeast of La Paz Lower California. It is proposed to treat the ores by the lixiviation process after awhile, but at present they will be shipped to this city for reduction. Chas. E. Hall, who is connected with the company, says that the machinery will be made in San Francisco, the workmanship and price both being more satisfactory here than in Chicago.

A WATER-POCKET.—A Prescott (A. T.) dispatch says: Advices from the copper mines at Jerome state that in the Wade Hampton mine, on Sunday night, three blasts were put in at the far end of the 800-foot tunnel. Two shots went off, and when the third shot was heard a volume of water shot forth, seven feet high and five feet wide, which lasted for five hours.

WILLIAM KEEHER was badly injured in the North Star mine, Grass Valley, last Saturday, by a rock falling on him.

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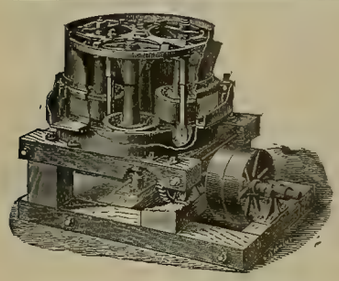

Centrifugal Roller Quartz Mill.

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MANUFACTURER OF

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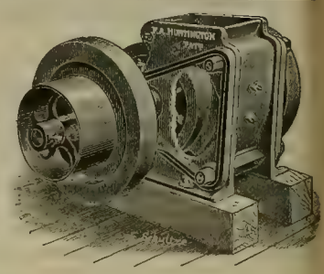
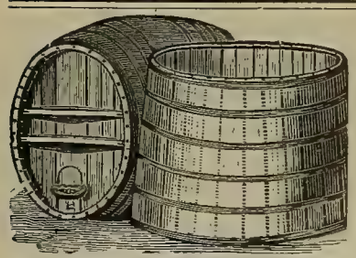


ORE CRUSHER.



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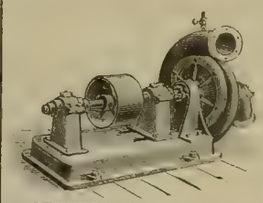

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Comstock Mining Stock Deals.

With the successful introduction of electricity for motive-power, the Comstock mines in Nevada should be mined for generations to come, but whether outside holders of shares in the mines will reap much benefit outside of what can be derived from the fluctuations in their market value is questionable. Many, if not all, the mills built by the mining companies have, by some kind of hocus-pocus, been secured by persons or incorporations whose charges for milling ore are said to be largely in excess of the actual cost, a fair marginal profit above the wear and t ar of the machinery, and also interest on the cost of the mills.

Be this as it may, yet to the dealers in the stocks of the mines' list on the two exchanges in this city, it is not the dividends that have such allurements as rapid fluctuations in the prices of the shares. That these never fail is well substantiated by the history of the deals in mining stocks, although, at times, many months, if not several years, pass before from $10 to $50 on the shares are return. By referring to the old files of the MINING AND SCIENTIFIC PRESS, it will be seen that running from 1868 to 1870 were dark days on the Comstock, when those owning the bulk of the shares of the mines gave out reports that they were negotiating to transfer their interests to English capitalists.

The greatest depression in the market value of the stocks occurred toward the close of 1870, when, commencing with Utah in the north and ending with Benton in the south, 28 of the leading mines' shares sold, taking stock-board quotations, at $4,696,700. Five years later, or at the hight of the Consolidated Virginia and California excitement, they were selling at the rate of over $275,000,000. This was in 1875. In 1877 the market value of the shares had depreciated to less than $30,000,000. These low prices were followed by a higher range in 1878, when the mines were selling at the rate of over $114,500,000 during what was called the Sierra Nevada; shares in the latter mine were sent up from less than $3 a share to nearly $300, a clear profit of about $100 on each and every dollar invested at the low prices.

On April 26, 1884, the same mines sold at the rate of $1,853 000. From this date they advanced under successive small spurts until at one time they sold at the rate of over $11,000,000. From these figures they were sold down, with slight reactions, until in September, 1886, they sold at the low rate of $1,300,000, but by December, in the same year, they sold at over $50,000,000; this deal being chiefly in the North End mines' stock, for Ophir advanced from 60 cents a share to over $30 a share. Within three months from the time these figures were reached, on a big scare, they soon sank down to figures which aggregated a little over $12,000,000. Running through the spring months of 1887, they had attractive fluctuations, reaching at one time nearly $30,000,000, but by May, 1887, they had fallen to about $10,000,000. Attractive but slight fluctuations were had up to the spring of 1888, when what was known as the Confidence deal set in and the mines sold at the rate of about $35,000,000, only to be followed by lower—with at times reactions—prices up to July and August, when bottom figures were touched, for in the fall months values had advanced by turns until they averaged over $4 profit for each dollar invested at the lowest range. Since then the market has been drifting by degrees to low figures until prices this week nearly touched the low figures ruling in August, 1888. What the immediate future has in store for the market, no one outside of the managers of or directors in the pool knows, nor is any one likely to know, for it is by secrecy that successful deals are run.

AN UNDULATING PUDDLING FURNACE.—A Pittsburg ironworker named Anthony Barker is the inventor of what he terms an undulating puddling furnace. As its name implies, the furnace is so constructed that an undulating motion is given to the iron during the process of boiling. When a heat is to be "balled," the bottom of the new furnace adjusts itself automatically, and the process from that out differs but little from the present method of puddling. The inventor claims that the first cost will only be a little over that of the old style, while it will turn out at least double the weight of iron with one more man. A company has been formed to manufacture and introduce the furnace, one of which is nearly in readiness for a free trial at the works of H. Lloyd & Son, Pittsburg, Pa.

Timber for Mining Purposes.

It will be remembered that some months since the Government instituted suits against certain mining companies in Nevada for cutting timber for mining and domestic purposes on public lands. By a resolution of the Senate adopted in January last, the Committee on Mines and Mining was instructed to ascertain all the facts connected with the commencement of these suits, and to inquire if interruption to mining operations had resulted. The committee has submitted its report. The report says that since 1848 the miners have made their own rules and regulations limiting the extent of mining claims, governing the right of possession and regulating the use of lumber and water for mining purposes. The legality of these rules and regulations has been affirmed by the decision of the courts.

The practice of cutting timber was continued, the report says, until 1877, when Secretary Schurz caused prosecutions to be instituted against miners in some of the Territories for cutting timber. The matter was brought to the attention of Congress, and on June 3, 1878, an Act was passed authorizing miners in the mining districts of the United States to fell and remove timber for mining and domestic purposes. The miners treated this Act as a settlement of the question and were not interfered with again for some time. In April, 1887, the District Attorney of Nevada advised the prosecution of miners in that State for using scrubby timber for mining and domestic purposes. Later the Department of the Interior sent a special agent to the State, who was authorized to make a thorough investigation of the alleged cutting. The special agent advised the institution of three suits for timber trespass. The Department subsequently authorized these to be instituted. These suits and seven others were brought in December last, and as a result the two principal mines in Eureka closed down. The conclusion of the committee is that the suits brought by the United States have been a great obstruction to the mining industry in Eastern Nevada; that they are needless and vexatious, and that the Attorney General in authorizing three of the suits must have done so under a misapprehension of the facts.

THE ATLANTA RUBBER CO., Atlanta, Ga., will hereafter look after the interests of the New York Belting & Packing Company, New York, in the Southeast. They will carry a very large stock and complete assortment of their vulcanized rubber goods. The New York Belting & Packing Company is to be congratulated in securing the services of this firm, as the New South is fast developing its manufactures and will constantly demand more and better supplies of this kind, and no one is in a better position to advance their interests in this territory than the Atlanta Rubber Company.

THE Como (Nev.) mining camp is about to awake from her winter's sleep. The Eureka Como, which closed down on December 1st last, will resume operations soon, and it is reported that the Buckeye and also the Rapidan will do some important work this summer. A four-horse wagon-load of "grub" has just gone up for a mining company without a name, who have a valuable property which they intend to begin developing at once.

IT is stated that M. M. Bovard, President of the University of Southern California, has ordered the 40-inch lens, for the great refracting telescope, of Alvan G. Clark of Cambridge, Mass. The telescope is to be constructed on Mount Wilson, and it will probably be two years before it is completed.

THE *Shasta Courier* is becoming discouraged about Lower Springs district in that county, because it has not fulfilled its promise as to paying quartz mines. Several mills have been taken there, run for a time and removed.

IT is understood that the Boston & Montana Co. has a contract secured by certified checks in Boston banks, by which the French copper syndicate secures its output of copper for two years ahead, at 15 cents per pound.

ALTHOUGH San Francisco, among the large cities of the United States, ranks eighth in the number of manufacturing establishments, it ranks first in number of establishments in proportion to population.

WALTER E. BRYANT, curator of ornithology of the California Academy of Sciences, is now making collections in Lower California. This is his second trip in the interests of science to that region.

THE Merriman Manufacturing Co. of Oakland has made an assignment.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING MARCH 19, 1889.

399,827.—GRAIN-CLEANER—Henry Bryan, Modesto, Cal.

399,973. ROTARY FAN FOR FRUIT-DRIERS—J. W. Cassidy, Petaluma, Cal.

399,841.—HORSE COLLAR—Wm. Cosbie, S. F.

399,887.—WINDMILL—G. W. Haines, Adin, Cal.

399,922.—LUNCH-HEATER—T. O'Mahony, Felton, Cal.

399,929.—CABLE RAILWAY CROSSING—G. Provost, S. F.

399,799.—FRUIT GRADER—Volney Rattan, S. F.

399,931. GANG EDGER—H. C. Robb, S. F.

399,791.—CONCENTRATOR — Frederick Sletcher, S. F.

399,708.—HORSE-CHECKING DEVICE — W. P. Smith, Renton, W. T.

399,711. — PLANING MACHINE — M. Stixrud, Seattle, W. T.

399,804.—NAIL—A. S. Wall, Oakland, Cal.

399,829—GRINDING MORTAR—G. W. White, S. F.

400,030.—REEL AND SPRINKLER — R. Wylie, Napa, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GRAIN-CLEANER.—Henry Bryan, Modesto. No. 399,827. Dated March 19, 1889. This is one of those grain-cleaners in which oppositely-vibrating screen-carrying shoes are employed. The inventor has devised a novel mechanism for imparting to said shoes the necessary vibrating or quivering motion. The object is to provide a mechanism which will give the shoes the proper rapidity of motion without having to speed up the driving machinery, and at the same time reduce the friction and wear on all parts. The rockers are curved so that the whole device works easily and with the exercise of but small power.

NAIL.—Adam S. Wall, Oakland. No. 399,804. Dated March 19, 1889. This is an improved nail which the inventor calls a "channel point" nail. The entering end of the nail or spike is divided into two points, so that a V-shaped notch is formed in the end of the spike, and from the apex or bottom of this notch the sides are grooved or channeled upon each side, extending farther up the sides of the nail. The object of this form is to allow the nail or spike to pass in easily as it is driven and without splitting the wood, and also without forcing the wood ahead of it in compressed lumps, as takes place when a square-ended nail is driven.

FRUIT-GRADER.—Volney Rattan, S. F. No. 399,779. Dated March 19, 1889. This machine is used for grading fruits of all kinds according to size. It is a hollow rotating cylinder or barrel having its periphery composed of longitudinal separated slats or bars of tapering form throughout, whereby the spaces between the slats or bars gradually increase in width from one end to the other. Combined with this are independent guide flanges secured separately to the inner surface of each slat or bar, and arranged in a spiral course throughout the length of the cylinder. There is also an exterior rotating clearing drum or roll extending along the cylinder or barrel, and in contact with its periphery for pushing back the fruit which sticks between the slats.

HORSE COLLAR.—Wm. Cosbie, S. F. No. 399,841. Dated March 19, 1889. The invention relates to the class of horse collars, and especially to those known as "short straw" or "wool" collars, the peculiarity of which lies in the fact that the leather of the entire collar is sewed up completely, and is afterward stuffed instead of having the pieces sewed up over the stuffing, as is the case with long-straw collars. This invention refers to an improvement in the top of the collar which consists in a cap piece formed on one end of the back and adapted to cover the joint on the top of the collar, and, in connection with this cap-piece, of an independent piece or strip which covers the straw just under the cap piece and serves as a continuation of the back up to the joint. The object of the invention is to provide in a short straw or wool collar a suitable cap-piece for covering and protecting the joint at the top of the collar, and forming a suitable guide or bearing for the hame-strap.

U. S. SENATE COMMITTEES.—The U. S. Senate Committee on Mines and Mining is composed of Senators Stewart, Jones (of Nevada), Mitchell, Teller, Bate, Faulkner and Hearst. On Manufactures, the committee consists of McMillan, Quay, Platt, Colquette and Blodgett. On Patents, Teller, Chace, Platt, Hiscock, Gray, Kenna and Reagan.

TIOGA DISTRICT, in Tuolumne county, just over the boundary line of Mono, has some very good claims which are soon likely to attract more attention. Senator Hearst has recently bonded a property in the district, and will, this spring, prosecute developments upon it. The ledges are large, and some of them assay high in both silver and gold, the former predominating. The percentage of sulphurets is large. There is an abundance of wood and good water-power is available. It is probable that the ores will be concentrated and shipped. Men have been working in the district for some years, but it is only now that the attention of capitalists has been called to the mines.

HANDY MIXTURE FOR A MACHINE SHOP.—It has been stated that soft soap, with half its weight in pearlash, one ounce of mixture in about one gallon of boiling water, is found of great practical value in engineers' shops, in the drip pans used for turning long articles bright in wrought iron and steel. The effect of this mode of treatment is that the work, though constantly moist, does not rust, and bright nuts are immersed in it for days till wanted, retaining their polish.

LAST week's official report from the Consolidated California and Virginia shows an improvement in both the quantity and grade of ore shipped, and it is now certain that the yield of the mine the current month will cover operating expenses and the April dividend. The average grade of ore now being extracted from the mine is as high as at any time since the development made in 1886.

JAMES R. COLLINS, the well-known millwright, died on Sunday in Oakland. For some years he has been engaged in the construction of a number of mining works of a superior character, such as the Providence mill, at Nevada City, and others at different places in the State. His last work was on the new mill of the Pittsburg Mining Co., being the contractor for doing the wood work.

THE TANNER HILL MINE.—A dispatch from Sutter Creek, Amador county, says: Tanner Hill mine, lying between the Oneida and the old Eureka or Consolidated Amador, on the mother lode, has been secured by Dr. J. L. Mayor and Jackson Dennis of this place. The people of this place look upon it as the initial step to opening one of the largest bonanzas ever developed on the lode.

AGAINST A MINING COMPANY.—Judge Lawler has rendered judgment in the case of A. Judson against the Empire Mining Company in favor of the plaintiff for $12 569 77. The suit was brought to obtain money advanced to the defendant company between Sept. 20, 1886, and Aug. 16, 1887, together with interest and $900 claimed to be due for services rendered.

WELLS, FARGO & Co. have moved into their fine new building, corner of New Montgomery and Mission streets, in this city. This building has been constructed especially for the carrying on of the express business, at an expense of $225,000. It is four stories high and is built of pressed brick and terra cotta. The offices in the interior are finely fitted up.

SUTRO TUNNEL CO.—The adjourned meeting of stockholders of the Sutro Tunnel Co. was to have been on the 28th, but was again postponed for the lack of a quorum. The impression prevails among the better-informed that a quorum is not likely to be had until in July next, or soon after the time expires for the redemption of the property.

BOILER EXPLOSIONS.—The total number of boiler explosions reported in England for the year ending June 30, 1888, is 61, the number of persons killed being 31. In the United States, where the number of boilers is presumably about the same as in Great Britain, the boiler explosions in 1887 amounted to 198, the loss of life being 264.

THE Santa Fe *New Mexican* says: It is stated that the bottom has completely fallen out of the wagon-roads between Cerrillos, San Pedro, Dolores and other points in the mining districts. This state of affairs has served to delay many mining enterprises. At best the roads cannot become good before April 1st.

SILVER REEF, the sandstone silver camp of Utah, has run down badly, and miners are beginning to leave. The Christy Co. has closed down mines and mill, removed machinery from the California mines, and is doing nothing except to keep pumping at the "New" shaft.

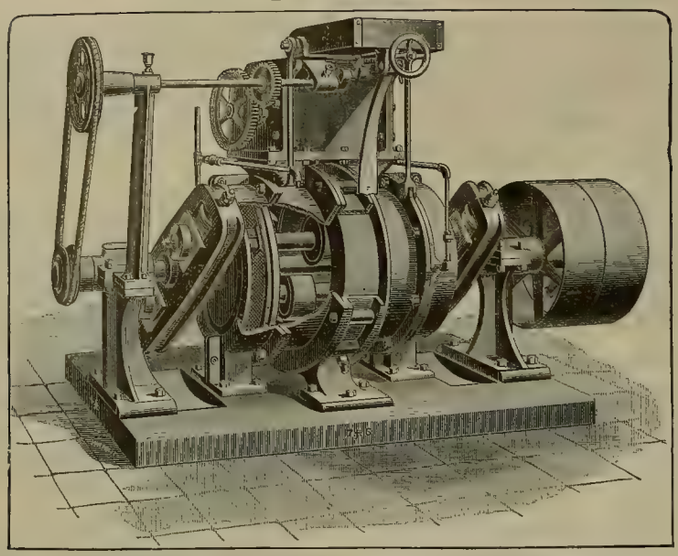
THE large clock which will grace the tower on the new *Chronicle* building, corner of Market and Kearny streets, will have the largest dials in the United States. The diameter of each dial will be 16 feet. The tower will be 203 feet above the sidewalk.

THE number of gallons of water required for a boiler per horse-power per hour may be safely estimated by adding 15 to the pressure per square inch in pounds; divide the sum by 18, and multiply the quotient by 24.

THE Mount Morgan mine, Queensland, is now paying dividends at the rate of $500,000 per month, with a probability of a continuance for a long period.

FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds has a capacity of three tons per hour of hard quartz to 40 mesh; has been thoroughly tested; we guarantee its work as represented, and we will give long time trial.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

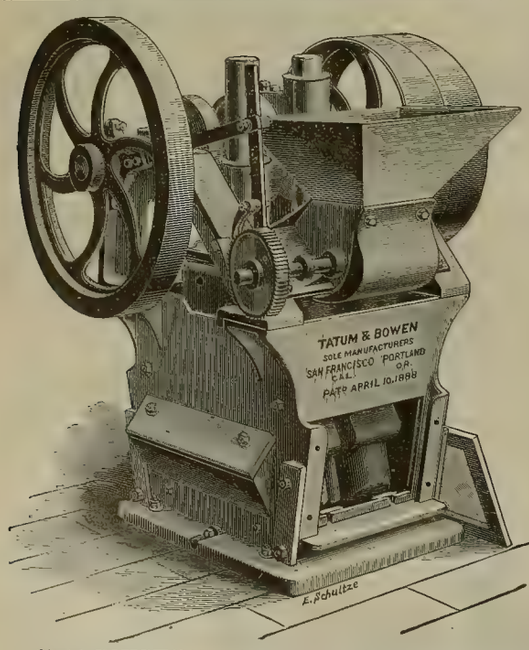
And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

FRISBEE-LUCOP MILL COMPANY,

GIDEON FRISBEE, Manager, - - - 32 First Street, San Francisco.

HOOKER & LAWRENCE, Gen'l Ag'ts. 145 Broadway, New York.



—THE—

PERFECTED DOUBLE Economic Quartz Mill.

Attached to each Mill is an effective

Automatic Ore Feeder.

THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

IMPROVED ROCK BREAKER.

Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address:

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34 and 36 FREMONT ST., SAN FRANCISCO, CAL.,

AND PORTLAND, OREGON.

MANUFACTURERS OF MINING AND SAW MILL MACHINERY.

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CORLISS, MYER'S CUT-OFF, PLAIN SIDE-VALVE.

Shafting, Pulleys, Hanger and Boxes, Etc.

Special machinery of all kinds. We have a large list of Standard Patterns, Gears, Pulleys, Boxes, etc. REPAIR WORK SOLICITED.

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A Proven Success.

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Of these Separators

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SUCCESSFUL OPERATION.

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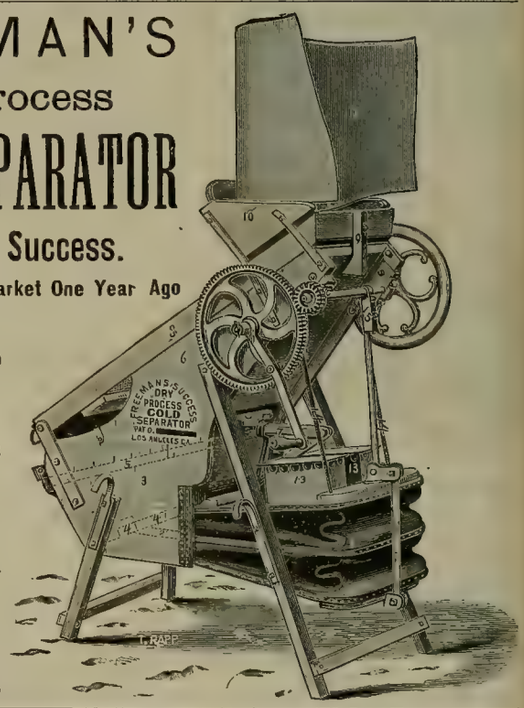

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VULCANIZED RUBBER FABRICS

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Solid Vulcanite EMERY WHEELS.

(Large Wheels made on Iron centers)

Cuts Cooler and Freer

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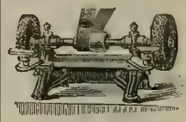

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☞Will report on the condition and value of any mining property on the Pacific Coast. Rare Chemicals made to order. Instructions given in Assaying and Practical Chemistry.

AMALGAMATING MACHINERY.

Stamp Mills for Wet or Dry Crushing. Huntington Centrifugal Quartz Mill. Drying Cylinders. Amalgamating Pans, Settlers, Agitators and Concentrators. Retorts, Bullion and Ingot Moulds, Conveyors, Elevators, Bruckners and Howell's Improved White's Roasting Furnaces, Etc.

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CONCENTRATING MACHINERY.

Blake, Dodge and Comet Crushers, Cornish Crushing and Finishing Rolls, Hartz Plunger and Collom Jigs. Frue Vanner & Embrey Concentrators, Evans', Calumet, Collom's and Rittenger's Slime Tables. Trommels, Wire Cloth and Punched Plates. Ore Sample Grinders and Heberle Mills.

IMPROVED CORLISS AND SLIDE VALVE STEAM ENGINES. ❖ BOILERS HORIZONTAL, VERTICAL ... AND SECTIONAL. ...

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Hoisting Engines, Safety Cages, Safety Hooks,

ORE CARS, WATER & ORE BUCKETS,

Air Compressors, Rock Drills, Etc.

GENERAL MILL AND MINING SUPPLIES, ETC.

Sectional Machinery FOR MULE-BACK TRANSPORTATION.

Pumping Engines and Cornish Pumping Machinery,

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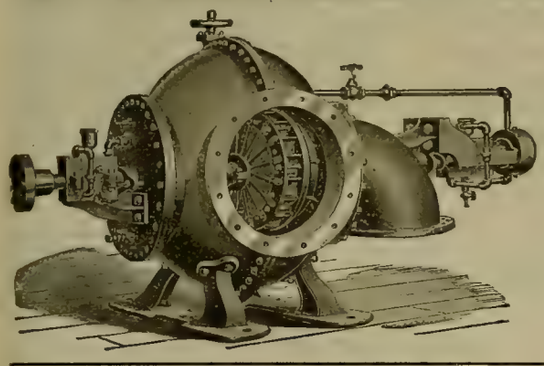

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

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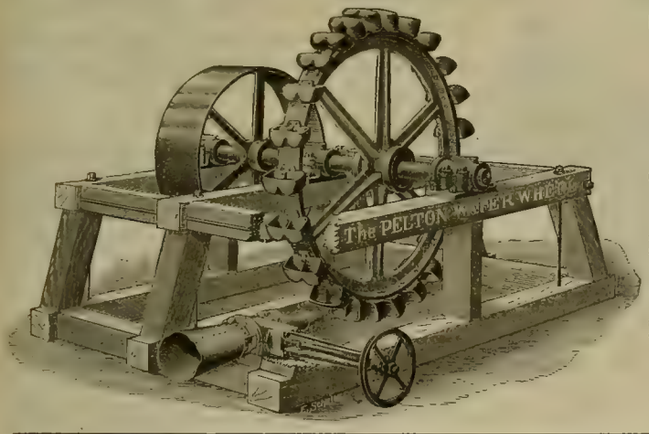

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GIVES THE

Highest Efficiency of any Wheel in the World.

A MARVEL OF ENERGY AND POWER.

Over 600 in use on the Pacific Coast alone, aggregating upwards of 50,000 Horse Power.

It is not only most economical of water, but the most simple and reliable power for Quartz Mills, Compressors, Hoisting, Pumping, or any other purpose where water power can be used.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long distances with small loss, and it is now being extensively used in this way in all parts of the country for producing both light and power.

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.
WORKING TESTS OF ORES BY ALL PROCESSES.
SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

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Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

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Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we fee confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

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Ores worked by any Process.
Ores Sampled.
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Ores Sampled and Assayed, and Tests made by my Process.
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GREAT REDUCTION!

BATTERY SCREENS.

Best and Cheapest in America.

No imitation, no deception, no planished or rotten iron used. Only genuine Russia iron in Quartz Screens. Planished iron screens at nearly half my former rates.

I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

PERFORATED SHEET METAL

For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass Zinc and other metals punched for all uses.

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MARKET REPORTS.

Local Market.

SAN FRANCISCO, March 28, 1889.

General trade shows a steady increase. While the distribution trade is said not to be, as a rule, up to that which obtained at this time in 1888, the tone appears to be healthier and the condition or situation based on a more permanent foundation. Interior merchants are not carrying large stocks of goods, seemingly preferring to buy in an assortment way until the season is further advanced so as to admit of a clearer idea of the outlook for the future. Among iron workers there is still a feeling of uncertainty, which, no doubt, is further strengthened by the action of the lumber trust in advancing the price of lumber, with still higher prices intimated. The advance in lumber, it is feared, will operate against any decided building boom.

The local money market is reported to be easy, with remittances from the interior larger than at this time in 1888. Receipts of treasure the past week by sea are as follows: Coin from Guaymas, $1300; Mexican ports, $10,735; Honolulu, $8960; British Columbia, $3821. Total, $24,816. Gold dust from Tumaco, S. A., $1020; silver bullion, $126,686 from Mexican ports. There is a continued good inquiry for exchanges on the East, which causes the rate of premium to be firmly maintained at 10 to 12½ per cent for sight, and 17½ to 20 per cent for telegraphic. The call is chiefly from importers, who have maturing bills to meet or else wish to discount their bills. The speculative markets have been rather quiet the past week, so that the call for funds for dealing in wheat options, mining and local securities has been light. But the general impression is that the present quiet presages more activity in the near future.

SILVER—The market held steady at 92⅞ to 93c up to Tuesday, when an advance of ⅛c was established, only to be followed by a reduction of ⅛c. The sales the past week were larger, owing to freer receipts from Mexican ports, and exchanges continuing strong.

MEXICAN DOLLARS—The market has shown a fair degree of activity for shipment to China, but not to the extent that obtained the preceding week. The price paid ranged from 73 to 73¼c from first hands.

QUICKSILVER—Receipts the past week were as follows: J. B. Randol, 100 flasks; C. S. Neal, 35; Parrott & Co., 33; and Haas Bros., 65. Total, 233 flasks. The market is steady, with an improving demand. There was shipped to Guaymas the past week, 100 flasks.

BORAX—Receipts the past week aggregated 752 cental, and shipments, 11 tons to Detroit, via Canadian Pacific railway. The market is steady.

LIME—Receipts the past week aggregated 2778 bbls., and shipments, 575 bbls. to Honolulu. The market is reported to be easy.

TIN—Both pig and plate are very strong for immediate delivery, owing to a good demand from up North. A large consignment of plate is due, and until that arrives, the market will hold strong. The consumption is very heavy this year.

PIG LEAD—A continued good demand is reported from the North. Local canners are not buying much yet, owing to the high price of tinplate.

PIG IRON—The market is very quiet, with both exporters and consumers apparently awaiting developments. The European markets are stiff, which counteracts the effects of a shading in freights. The low prices ruling at the East may induce shipments via Cape Horn.

COAL—Imports the past week were as follows: 2625 tons from Nanaimo; 4079 tons from Australia; 1800 tons from Tacoma; 800 tons from Coos bay; and 194 tons overland; total, 9498 tons. The market is reported to be barely steady. Large consumers are well stocked, while the others are rather disposed to follow the market than to stock up even at present low prices.

COPPER—The last steamer to New York took out 1356 lbs. The market is unsettled, and will continue in this condition until a more definite understanding is arrived at in Europe. So far, all information tends to confirm previous received advices, that a very strong combination or syndicate will be formed, so that prices will not go much, if any, over 13c at Eastern tide-water.

Eastern Metal Markets.

By Telegraph.

NEW YORK, March 28, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42⅛	93¼	$16 50	$3 67½	$21 10
Friday	42⅛	93¼	16 10	3 67½	21 05
Saturday	42 9-16	93¼	16 00	3 67½	21 20
Monday	42½	92½	14 75	3 65	21 10
Tuesday	42½	92½	14 75	3 67½	21 05
Wednesday	42 9-16	93	14 25	3 65	21 05

NEW YORK, March 28.—Quicksilver continues unsettled and weak, with slight fluctuations reported. Lead is still heavy in sympathy, to some extent, with copper. Large consumers still hold off. Tin has ruled weak, with buyers offish. Borax is without essential change. In pig iron the market appears to have a slightly steadier tone, although the sharp competition, heretofore reported, by Southern iron men is continued. The latest sales made of Southern was at $14. This low price demoralizes Pennsylvania iron men, who find that as fast as they ease off, Southern is offered at a fraction less to induce consumption.

THE SANHEDRIN MILL & LUMBER COMPANY have recently contracted with the Vulcan Iron Works for the machinery for their new sawmill to cut about 50,000 feet of lumber per day, and have also selected a 60 inch heavy "Vulcan" gang edger, a set of heavy "Vulcan" fractional screw head blocks; also, an "8x10" "Campbell" steam feed.

A JUDICIAL inquiry into the formation of the copper syndicate has been commenced at Paris.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Belcher S M Co	Nevada	37	50	Feb 19	Mar 25	Apr 12	J Crockett	327 Pine St
Con Pacific M Co	California	10	15	Feb 5	Mar 11	Apr 2	F E Luty	330 Pine St
Crocker M Co	Arizonia	6	10	Feb 25	Apr 2	Apr 24	A Waterman	309 Montgomery St
Christy M Co	Utah	1	10	Feb 20	Mar 25	Apr 15	G R Spinney	310 Pine St
Eureka Con M Co	Nevada	11	50	Mar 19	Apr 27	May 20	H P Bush	306 Pine St
Gray Eagle M Co	California	12	05	Mar 19	Apr 23	May 18	O H Bogart	327 Pine St
Grand Prize M Co	Nevada	20	30	Mar 15	Apr 20	May 13	R R Grayson	327 Pine St
Golden Prize Con M Co	Nevada	2	30	Feb 16	Mar 20	Apr 10	C D Bennett	328 Montgomery St
Lapanter Con M Co	Nevada	1	03	Feb 23	Apr 5	Apr 25	J Stadfeld Jr	309 Montgomery St
Mexican M Co	Nevada	37	25	Mar 5	Apr 10	Apr 30	C E Elliott	309 Montgomery St
Mono M Co	California	27	50	Feb 28	Apr 2	May 8	B L Burling	309 Montgomery St
North Peer G & S M Co	Arizona	5	05	Feb 25	Apr 1	Apr 24	H Deas	309 Montgomery St
New Coso M Co	California	22	30	Feb 5	Mar 14	Apr 4	J L Hunt	308 Montgomery St
Oak Con M Co	California	1	03	Feb 25	Apr 8	Apr 23	E J Ryan	330 Montgomery St
Peerless M Co	Arizona	12	25	Mar 25	Apr 26	May 21	A Waterman	309 Montgomery St
Piedmont M Co	Nevada	1	05	Jan 28	Mar 6	Apr 23	J J Scoville	309 Montgomery St
San Francisco Copper Co	California	3	10	Mar 18	Apr 23	May 21	G Ruegg	405 California St
Sierra Nevada M Co	Nevada	94	25	Mar 5	Apr 9	Apr 29	E L Parker	309 Montgomery St
Utah Con M Co	Nevada	6	25	Mar 5	Apr 10	Apr 29	A H Fish	309 Montgomery St
Western Mineral Co	California	3	2 00	Feb 21	Mar 26	Apr 16	A Cheminant	328 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Champion M Co	California	T Wetzel	522 Montgomery St	Annual	Apr 9
Live Oak Drift G M Co	California	J Morizio	328 Montgomery St	Annual	Apr 15
Russell Reduction & M Co	California	J Morizio	328 Montgomery St	Annual	Apr 22
Tioga Con M Co	California	B L Burling	309 Montgomery St	Annual	Apr 8

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	Mar 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

San Francisco Metal Market.

WHOLESALE.

THURSDAY, March 21, 1889.

ANTIMONY—	13 @	14
BORAX—Refined	7¼@	7⅝
Powdered	7¼@	7⅝
Concentrated	6¾@	7¼
COPPER—		
Bolt	26 @	27
Sheathing	26 @	—
Ingot	18 00 @	19 00
Fire Box Sheets	— @	26
IRON—Glengarnock ton	27 @	—
Eglinton, ton	26 @	—
American Soft, No, 1, ton	— @	31 00
Oregon Pig, ton	— @	30 00
Clay Lane White	— @	24 50
Shotts, No. 1	— @	28 50
Bar Iron (base price) ₱ lb	2¾@	3
Chrome iron ore, ₱ ton	00 @	10 00
LEAD—Pig	4½@	—
Bar	5 @	—
Sheet	8 @	—
Pipe	7 @	—
Shot, discount 10% on 500 bags Drop, ₱ bag.	1 45 @	—
Buck, ₱ bag	1 65 @	—
Chilled, do	1 85 @	—
STEEL—English, lb	16 @	20
Canton tool	9½@	—
Black Diamond tool	10 @	16
Pick and Hammer	8 @	10
Machinery	4 @	5
Toe Calk	4¼@	—
TINPLATE—Coke, prompt shipment	4 95 @	5 00
Coke on spot	5 50 @	5 75
Charcoal, 14x20	6 50 @	7 00
do roofing, 14x20	5 37½@	5 50
Pig tin, ₱ lb	22½@	23
QUICKSILVER—By the flask	40 50 @	41 00
Flasks, new	1 05 @	—
Flasks, old	85 @	
COKE—English, ton, spot	20 00 @	—
Do, do, to load	13 50 @	13 75

Coal.

TO LOAD.

	Per Ton.		Per Ton
Australian	$6 50 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$8 9 00	Sydney	$9 9 00
Scotch Splint	9 00	Gilman	7 00
West Hartley	10 00	Seattle	7 00
Greta	9 00	Coos Bay	6 00
Westminster Brymbo	9 00	Cannel	10 00
Nanaimo	9 00		

Mining Share Market.

The volume of business the past week in mining stocks was larger, but at lower figures up to Tuesday, when a natural reaction set in. The lower range of values brought about by cross-orders and street pointers uncovered quite a line of marginal stocks, besides frightening many of the more timid holders into selling. It is generally claimed that the pool engineered the decline so as to get more cheap stock. While there are reports of assessments to be levied, there is very little news of a reliable character from the mines. This condition of affairs, even with a report that several mining-stock magnates will soon be here, causes an uneasy, bearish feeling to obtain with outside operators. The general tenor of private information from the Comstock mines is to the effect that prospecting and developing work of a very important kind is going on in several of the mines, but how long before "the powers that be" are prepared to make a favorable showing is, as yet, an unsolved problem. The work going on is still toward the West or Red lode, and as distance is gained in that direction, the more certain becomes the belief in its richness. Although there is an abundance of water, yet no more stamps are dropping.

Confirmation of the improvement in the mines mentioned in our last week's report has been received at headquarters. This week private advices report still further improvements, but particulars are not given.

An assessment was levied the past week on Peerless and also on Bodie.

The ore yield of the Comstock mines during the week ended March 23d aggregated 5553 tons, divided as follows: Consolidated California and Virginia, 2717 tons, battery sample assays showing a value of $35.10 per ton; Savage, 505 tons, assaying $21.37; Hale and Norcross, 625 tons, assaying $28.06; Confidence, 658 tons, assaying $27.07; Crown Point, 808 tons, Overman, 301 tons, Justice and Alta, 500 tons, Gould and Curry, 65 tons, assaying $19.28. The bullion yield of the above was about $140,000.

THE Reese River *Reveille* thinks that while it may be all right to build a dam across the Carson river to store up water for the quartz-mills, it does not like the idea of taking the money for the purpose from the School Fund.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 7.		WEEK ENDING Mar. 14.		WEEK ENDING Mar. 21.		WEEK ENDING Mar. 25.	
Alpha	1.90	2.30	1.75	1.90	1.80	2.15	1.75	1.90
Alta	1.90	2.10	1.80	1.90	2.00	2.15	1.95	2.10
Andes	.90	1.00	.85	.90	.90	.95	.80	.90
Argenta	....	.10	....	....	....	....	....	....
Belcher	3.10	3.65	3.75	3.00	2.80	3.25	2.75	3.30
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	4.35	5¼	4.05	4.35	4.20	4.65	3.75	4.30
Bullion	.90	1.00	.85	.90	.85	.95	.75	.85
Baltimore	.20	.30	.20	.40	.40	.45	.35	.45
Belle Isle	....	....	....	....	....	....	....	.30
Bodie Con	1.35	1.55	1.25	1.30	1.45	1.50	1.25	1.35
Benton	3.00	3.50	....	3.50	....	....	3.95	4.00
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.40	.50	.30	.35	....	.35	....	.40
Con. Va. & Cal	7⅞	7.50	7.50	7.75	8.25	8.75	8¼	8.50
Challenge	4.60	5¼	4.15	4.55	4.15	4.75	3.90	4.20
Champion	....	....	....	....	....	....	....	....
Chollar	2.55	3.15	2.40	2.65	2.40	2.85	2.10	2.60
Confidence	14	16	13½	13¾	13½	14¾	12½	13½
Con. Imperial	.70	.80	.65	.85	.65	.75	.60	.65
Caledonia	....	.40	....	.35	.35	.45	.35	.40
Con. Pacific	....	....	....	.20	.15	.20	....	.20
Crown Point	5.25	6¼	5.35	5¼	4.60	4.35	4.10	4.30
Crocker	.55	.60	.35	.55	.45	.50	.45	.55
Central	....	....	....	....	....	.25	....	....
Dudley	....	....	....	....	.20	.25	.20	.30
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	2.00	....	2.00	....	2.00	1.00	1.35
Exchequer	.95	1.05	.80	.95	.80	.90	.75	.85
Grand Prize	1.00	1.10	.80	1.00	.70	.90	.65	.75
Gould & Curry	2 65	3.10	2.45	2.60	2.65	2.85	2.25	2.65
Hale & Norcross	3.85	4.40	3.70	3.90	3.70	4.00	3.65	3.95
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	....	.25	....	....	.30	.40	....	....
Justice	1.60	1.75	1.45	1 60	1.50	1.65	1.25	1.55
Kentuck	2.15	2.30	1.85	2.00	1.80	2.00	....	....
Lady Wash	.35	.40	.30	.35	.35	.40	....	.35
Martin White	....	....	....	....	....	....	....	....
Mono	....	.85	.55	.60	.75	.80	.60	.73
Mexican	3.50	4.10	3.35	3 65	3.60	3.95	3.05	3.70
Mt. Diablo	....	....	....	....	....	2.00	....	2.25
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.40	1.45	1.00	1.25	1.00	1.05	1.10	1.15
North Belle Isle	2.55	2.65	2.55	2.70	2.55	2.60	....	....
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.90	3.00	2.95	3.10	2.90	3.05	2.75	2.85
North G. & C	....	....	....	....	....	....	....	....
Occidental	1 50	1.70	1.35	1.50	1.35	1.45	1.25	1.30
Ophir	5.25	6.00	5¼	5.50	5¼	6.50	5.00	5¼
Overman	1.40	1.50	.30	1.40	1.40	1.50	1.25	1.40
Potosi	2.30	2.70	2.15	2.25	2.15	2.35	1.85	2.30
Peerless	.65	.80	.45	.65	.40	.60	.45	.65
Peer	....	.35	.25	.35	....	....	.30	.35
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.90	3.30	2.75	3.00	2.75	3.00	2.50	2 80
S. B. & M	3.05	3 20	2.70	2.95	2.75	3.05	2.60	2.95
Sierra Nevada	3.15	3.65	2.85	3.10	3.00	3.30	2.60	3.00
Silver Hill	.65	.75	.65	.70	.60	.70	....	....
Silver King	....	....	....	.90	....	....	....	....
Scorpion	.55	.60	.50	.55	....	.50	.50	.55
Syndicate	....	....	....	....	....	.10	....	....
Union Con	3.60	4.05	3.50	3.70	3.70	3.90	3.10	3.70
Utah	1.30	1.45	1.20	1.25	1.25	1.35	.90	1.20
Yellow Jacket	4.40	4.90	3.75	4.25	3.80	4.10	3.30	4.05

Sales at San Francisco Stock Exchange.

THURSDAY, Mar. 28.

300	Alta	600	Mexican .40
250	Belcher .25	100	Mono .65c
100	B. & Belcher .90	250	Navajo .10
500	Bodie .15	100	Occidental Con .20
500	Bullion .80c	100	Overman .25
100	Chollar .30	50	Ophir .5 25
200	Con Va & Cal .84	350	Peerless .45c
295	Crown Point .4 25	100	Potosi .95
100	Crocker .45c	300	Savage .2.70
100	Confidence .12 50	50	Scorpion .45c
70	Con. Imperial .65c	100	S. B. & M .2.70
100	Eureka Con .7/c	50	Sierra Nevada .2.65
200	Exchequer .70c	150	Solid Silver .55c
120	Gould & Curry .2.30	200	Utah .1.00
200	Hale & Nor .3.80	150	Union .3.30
300	Justice .1.30	350	W Comstock .30c
100	Lady Wash .40c	70	Yellow Jacket .3.60

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New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

CALIFORNIA CASKET CO., March 25. Object, to manufacture and sell all kinds of undertakers' goods. Capital stock, $300,000. Directors—Wm. P. and C. H. Morgan, George P. Thurston, James F. Pierce and John F. Finley.

CARBON PAINT CO., March 26. Object, to manufacture and sell carbon paint. Directors—A. L. Minson, James Stratton, A. T. Heyden, R. W. Andrews and E. L. Collins.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Navajo, March 26, $8000; Cons. Cal. and Virginia, 26, $72,240; Moulton, 16, $26,880; Alice, 16, $24,336; Lexington, 16, $21,596; Blue Bird, 16, $37,040; Hanauer, 19, $5300; Hanauer, 20, $2000; 23 $11,000; Navajo, 23, $8000; Savage, 23, $3700.

Testing and Working Silver Ores

An illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroehnke's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

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Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated:

General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulæ Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated and Expressed in Formulæ and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water Over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow Through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water Through Short Tubes and Compound Tubes; Flow of Water Through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend—Circular and Angular; Flow Through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

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ASSESSMENT NOTICE.

Gray Eagle Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Placer County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 19th day of March 1889, an assessment, No. 12, of Five Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Room 9, No. 327 Pine Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23d day of April, 1889, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 14th day of May, 1889, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

O. H. BOGART, Secretary.

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THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Leller, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No 1, 32 ft.; No. 2, 9½ ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

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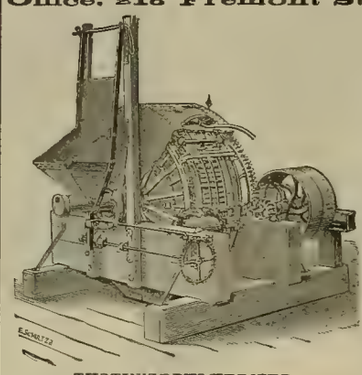
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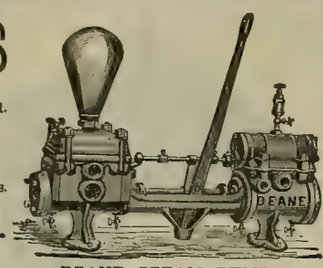

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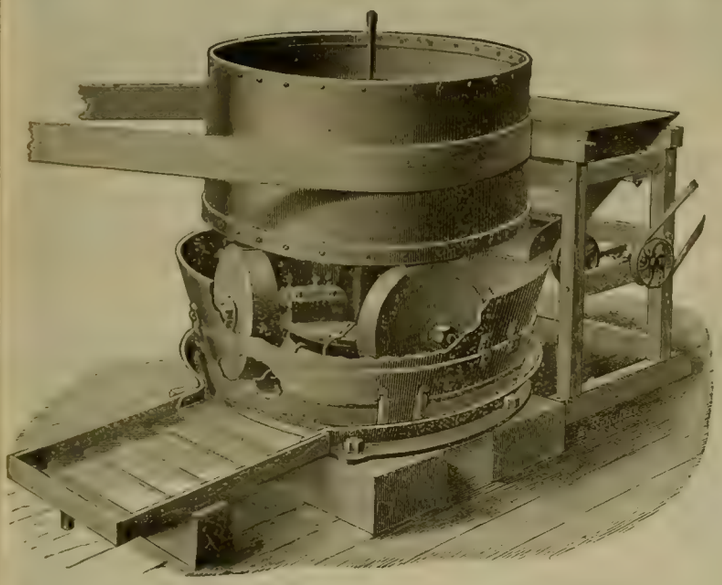

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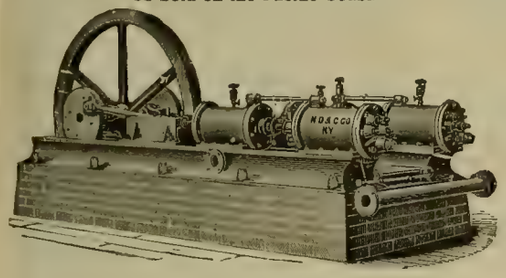

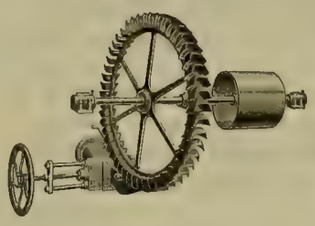

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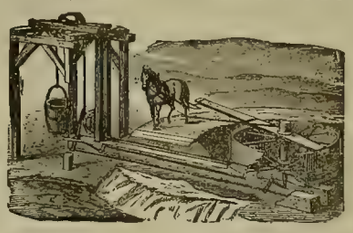

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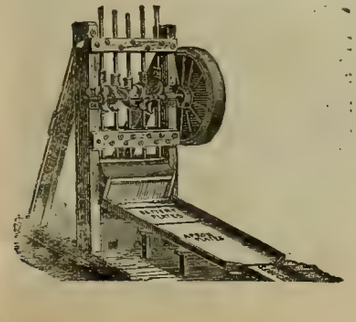

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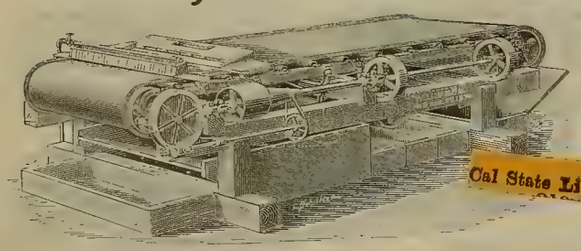

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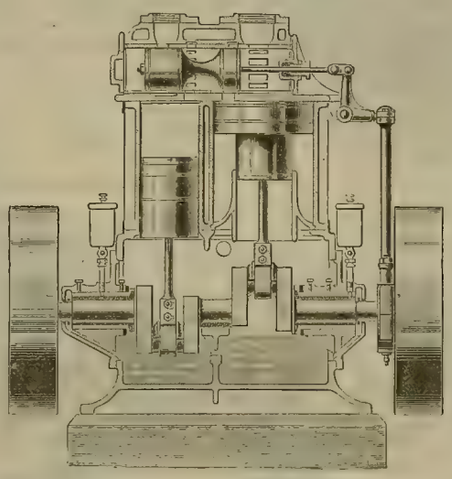

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MINING AND SCIENTIFIC PRESS.

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VOLUME LVIII. Number 14.

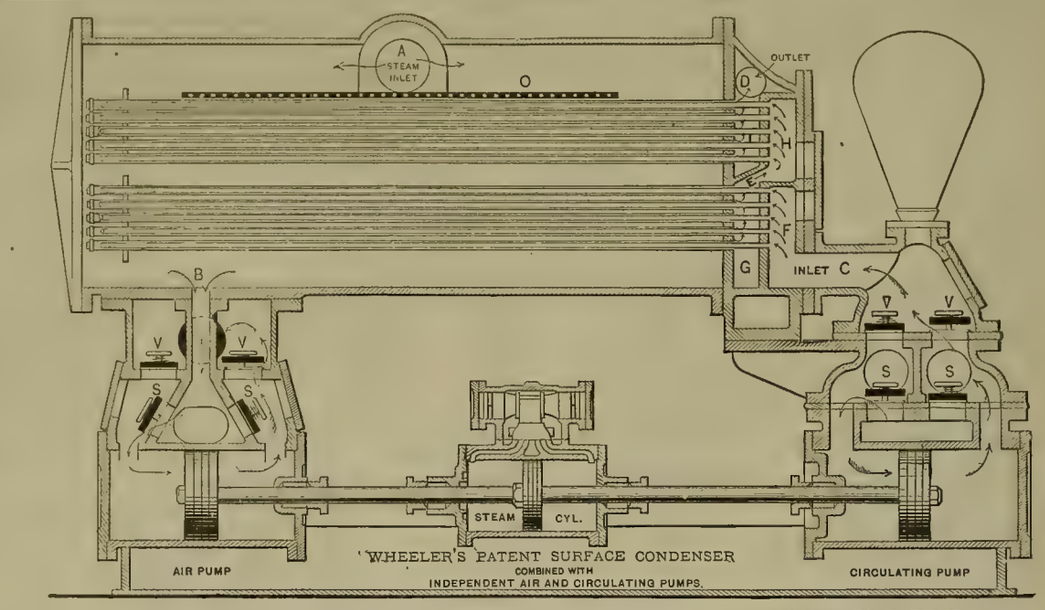
Wheeler's Improved Surface Condenser.

The accompanying cuts illustrate the combination of the Wheeler surface condenser with independent system of air and circulating pumps. The condenser is mounted on the latter, thus saving floor space, which is of considerable importance in engine-rooms that are crowded with machinery, such as are found on many steam vessels and in numerous factories located in crowded towns and cities. In this design the condenser is firmly bolted down on the pumps, the latter serving as a foundation, thereby saving expense of piping between the pumps and the condenser. As shown by the sectional view, the water-pump delivers the circulating water through the nozzle *C*, directly into the lower section of tubes in the condenser. From thence the water flows by the passageway *E* into the chamber *H*, passing through the upper group of tubes, and finally discharging at the outlet nozzle *D*, as shown by the arrows. The exhaust steam entering at the nozzle *A*, comes in contact with the scattering plate *O*, thereby distributing uniformly over the cooling surface of the tubes. The water of condensation gravitates to the bottom of the condenser, and flows directly to the air-pump by the annular passage *B*, the air-pump discharging the water through the outlet nozzle at the side of the cylinder. Both air and circulating pumps are operated by a direct-acting steam cylinder in the usual way.

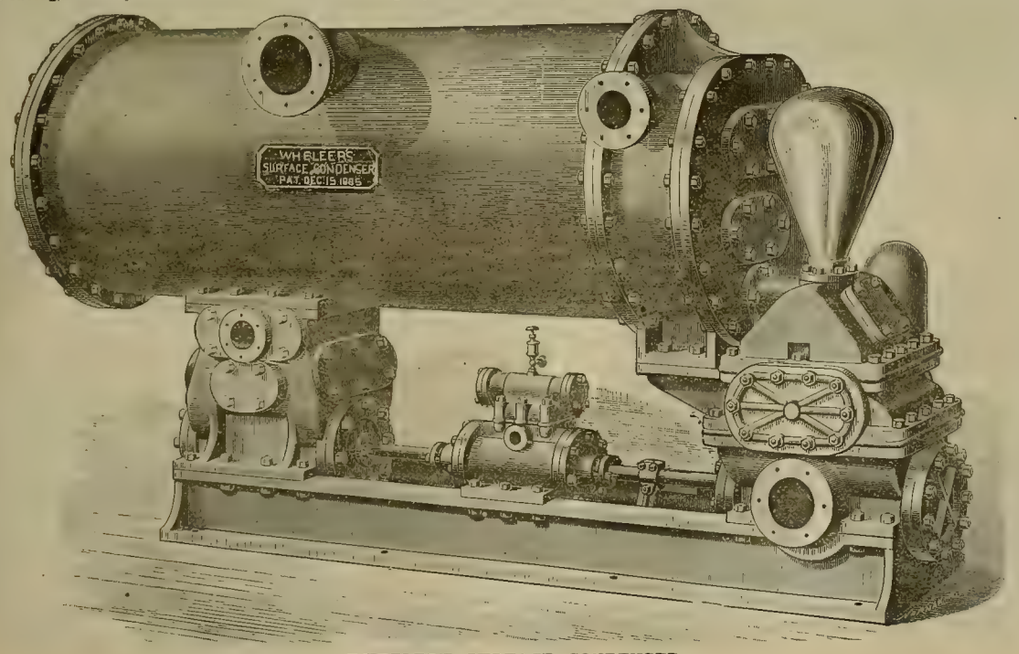
In our issue of Jan. 30, 1886, we gave a sectional view of this improved surface condenser, showing more of the details of construction. It may be well to state here, however, that the arrangement is one providing very thoroughly for the expansion and contraction of the tubes, and this without the use of tube packings of wood, paper, or similar materials. In fact, there are no ferules, washers or packings of any kind employed. The tubes are seamless brass tubing, carefully tinned inside and outside. The tubes are arranged in pairs, the smaller tube inside of the larger. The latter is thickened at one end, on which a deep thread is chased. This end of the tube is screwed into a head of brass, and on the other end of the tube is screwed a cap, as shown. One end of the small tube is also drawn thick and a thread chased on same. This tube is also screwed into a head of brass. The tubes can be easily taken out and thoroughly cleaned, as their form and the manner of fastening permit of this being readily done.

The tightly screwed fastenings for tubes also permits the use of circulating water under pressure, which is often the case with stationary engines where the supply is from a head of considerable hight. In other words, there are no tube packings of any kind to be forced out or loosened by pressure of the circulating water.

The circulation of water is very thorough, and consequently the smallest amount of cooling-water is required. This feature gives a marked saving in the power necessary for circulating pump. The condensers are made with bodies of both circular and rectangular shape. The larger sizes are usually of the latter design.



SURFACE CONDENSER COMBINED WITH INDEPENDENT AIR AND CIRCULATING PUMP.



WHEELER'S SURFACE CONDENSER.

The patentee and proprietor of these improved condensers is Mr. Frederick M. Wheeler, 93 and 95 Liberty street, New York.

Manganese Ore.

There does not appear to be very much money in manganese mining, though some 1500 tons were mined in this State last year. The principal producing States are Virginia, Georgia, Arkansas and North Carolina, which produced in 1887—the latest available statistics—34,524 tons, worth $333,844, or $9.67 per ton.

The average value of the ores of the several States varied in that year from $2 in North Carolina to $12.79 in Virginia, the Arkansas value being $5 a ton, and Georgia value $5.74. The range of values in Virginia was from $4.13 to $20; in Georgia from $2.50 to $6.50, while in Arkansas the uniform price of $5 was given as the value of the ore. These values are free on board carts or cars at the mines. Where ore is sold delivered on cars at localities distant from the mines, the cost of carting the ore to cars or to the locality is to be deducted from the f. o. b. price.

Virginia produces most of the manganese ore mined in this country, its production in 1877 being 19,835 tons out of the total 34,524. This ore comes from the Crimora mine.

It is estimated from the best data obtainable that the production of manganiferous iron ores containing silver in the Rocky mountain regions in 1872 was some 60,000 tons, valued at $10 per ton. These ores are not utilized for their manganese directly, but for their silver, the manganese they contain adding to their value because of its fluxing qualities.

Manganese is mined in quantities in Nova Scotia, Belgium, Cuba and Great Britain.

The ore mined in this State last year brought about $20 a ton in San Francisco.

Boston suffered next to Paris in the copper crash. The stocks held in the Hub shrunk just $28,000,000.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Raining Rocks.

Meteoric Stones and Rural Philosophy.

EDITORS PRESS:—Probably the year was A. D. 1858—or along there somewhere—when I took a ride with a high-toned peddler of dry goods and notions in the counties of Muskingum and Guernsey of the State of Ohio. The season was summer, or at least the weather was warm. This peripatetic merchant was a man prone to display, and his wagon was an artistic evolvement of the wainwright's mysteries; the run gears were delicate and beautiful to look upon, yet strong and tough as the celebrated white-oak, ash and hickory woods of that country could warrant; the bed, or box, was constructed with a system of shelving inclosed in a painted shell of clear poplar lumber, highly polished, and in shape like an oblong square, one-roomed house, one story high, with a roof on it pitching gently right and left, from side to side; and all the woodwork of this wagon was painted a bright red, except the delicate blue penciling on the wood of the wheels and the bright glossy black on the ironwork. Above this wagon-box at the front was a black leather top, like a buggy-top, covering the seat. The outside of this painted shell could be let down at each side and at the tail, resting upon suspender chains from the frame of the shelving, and when let down, either one or all three of these parts could be used as counters on which to display, and from which to sell, goods, wares or merchandise. In front of this mercantile vehicle trotted or pranced four jet black horses.

[NOTE.—This description of an ancient peddling-wagon is for posterity; to show to the later-born and unborn readers of the PRESS (and may they be thousands upon thousands, Selah.) that their ancestors, "away back in the States," were no slouches in the peddling line when the grizzly bear on the California State shield was only a cub.]

Well, as I was about to say, I was journeying with the peddler, riding on the comfortable seat of the wagon aforesaid, and heading for the town of Cambridge, when, suddenly and without warning, a missile (afterward found to be a black stone about an inch and a half irregularly square) struck the highly polished roof of the wagon-box behind us. "Whoa!" exclaimed the merchant, as he stopped his team with an instantaneous twist of the reins around the brake-lever, and off he went down under the wagon, where he employed himself for a moment in crawling under the forward axle-tree, so as to unhook the traces of the wheel horses. I, of course, without exactly knowing why, had promptly followed the merchant, and as we both sat, sort of flat, down underneath the wagon, I asked: "What's the matter? What's up?"

"Nothing up," says he, "but something down. I can stand most any kind of a shower; but when it rains rocks, I want to get on the underside of something hard."

There was a kind of whizzing roar in the air when the thing struck the wagon roof, and also a wide scattered plumping, or, maybe, it was a pattering, all about; but the phenomenon only lasted about half a minute of time.

Hearing no more disturbance in the air, we crawled out and up, after re-hooking on the wheel horses, and went on our way, in no wise, so far as we could see, damaged other than a shattered hole in the roof of the wagon-box—a hole which looked to have been shot there by a large ball from a small cannon or a big shotgun. I asked the merchant why not stop and examine into the matter; but he said he wanted to get out of a place where it rained rocks, and he drove right along until we came to the small settlement where he expected to remain over night and "trade with the natives." Upon examination he found the little black rock where it had fallen into a pile of woolen comforters—a kind of knit neck wearing goods—and although the black stone was, at the finding of it, cool enough, it was evident that it was warm, if not hot, when it lodged there; for it had roasted the woolens right next to its surface as if they had been scorched by a sad-iron, a little too hot for family use.

That evening at the little cross-roads village the merchant had quite an audience to listen to his story, examine the black stone, and buy small articles of various merchandise. And at night, after supper, in the public room of the half-tavern half-farmhouse, we had an immense conversation on the subject of meteors, falling stars, shooting stars, etc., and one elderly person related the story of the shower of falling stars—in 1833 I think he said it took place.

Well, we had a very interesting time at that half-tavern that night. I have never heard so much variety of strictly original scientific astronomical opinion in all my life. They were nearly all willing to believe our story about the shower of stones, because most of them had heard the roaring noise at the time we spoke of. They were old-fashioned Western farmers and laborers, none of whom had what they called "book larnin'," and nearly all of them said they had "heered that nize," and one of them "sort o' thort he seed sumfin most like to er fli spec' atwuen him an' the sun, but wa'ant shore what it *could* be tell he heered about this yer rock a-hittin' the peddlin' wagon."

But as to where that stone could come from, that was the "main pint afore that ordience." Several of the cereal Solons thought "hit must er come from the moon." But "wher wer the moon at that time er day?" To which last question the merchant—the traveling merchant—ventured to remark that it didn't matter where the moon might happen to be that day, at that hour, because if that stone came out of the moon and the moon being millions of miles distant from the earth, then that stone must have started on its journey several years ago. To this last statement the crowd responded:

"Gosh!"

And then we all retired for the night.

Next morning, after a little more trading in dry goods, we strung out the black horses and wended, and, along toward evening, we arrived at the town of Cambridge, and there our story of the falling stones dwindled into smallness, because they had there a black stone of over sixty pounds in weight which had fallen hot, down from the upper air, about the hour that we dodged from the shower of stones.

This meteoric stone—the sixty-pounder—was exhibited for some time as a curiosity, and finally found permanent lodgment in some scientific museum—the name of which museum I could remember years ago, but not now.

The moral of this sketch is that when rocks are raining it is no cowardice to seek shelter.

J. W. GALLY.

Watsonville, Cal., 1889.

California River and Harbor Commission.

P. A. Humbert, one of the Examining Commissioners on Rivers and Harbors, in conversation with a reporter, thus outlines the work of the Commission:

"We intend going to work immediately, and we confidently believe that our labors will be of great benefit to the State. There has been adverse criticism on that section of the Act under which the Commission was appointed which authorizes us to employ such persons at such compensation as we may deem proper as surveyors or assistants in any of the work; and the prediction has been made that we would squander the people's money. That wording is very broad, I admit. As it stands, if the people will trust us, they will find that we will not take advantage of them. The Commissioners appointed by the Governor are State Engineer W. H. Hall, Charles Reed of Yolo county and myself. The character and experience of the gentlemen composing the Commission should be some guarantee that the work will be honestly and economically done. I am confident that the expenditure of $25,000 or $30,000, under our direction, will lead to the appropriation of from $250,000 to $500,000 by Congress next winter for the improvement of our rivers.

"Such appropriations have been made heretofore, but the money was to be expended under the direction of the regular army engineers, and we could not show these officers that it would be expended judiciously. They would say, 'What is the use of the Government spending $200,000 in dredging the Sacramento river this summer when the high water next spring will fill it up with slickens again?' And we could only answer, 'There is none.'

"Now our duty, quoting the Act under which we hold our appointments, is to determine what steps are necessary for the rectification and improvement of such rivers (the Sacramento and others) and streams, and make or cause to be made all such necessary and proper surveys, examinations, maps, designs, drawings, estimates, specifications and exhibits as will enable the Congress of the United States to clearly understand the condition of such rivers and the cost and expense of properly rectifying and improving the same.

"Now you see what we are to do. We are to make a study of the Sacramento river and show Congress and those army engineers how the money of the United States can be spent to advantage in its rectification and improvement. The State has spent from $300,000 to $400,000 for a study of an irrigation scheme. The maps and plans which were made for this purpose are now in the State Engineer's office at Sacramento, and in them we have the basis of our work. They show the soundings, which are necessary to an understanding of the subject, and it is because we have them that our work will be comparatively inexpensive.

"There was no appropriation made for our work by the Legislature, but we are satisfied that the Sacramento river people will advance all the money that we will require, and trust to the next Legislature to reimburse them.

"It is our intention to begin work immediately. We will call a meeting of the river men and lay the matter before them. Then we will take a trip up the river, with Hall's plans, and determine what ought to be done."

ALASKA BOUNDARY AND GOLD FIELDS.—The recent discovery of gold near "Forty-mile Creek," Alaska, has moved the Government to fit out an expedition to ascertain the true boundary line between that country and British Columbia. There will be four parties of ten men each, under the command of J. T. McGrath, J. H. Turner, J. J. Gilvert and J. F. Pratt respectively. The commanders of the different parties are all trained engineers in the employ of the Geodetic Survey, and in addition each party will have a physician and naturalist in attendance. The expedition will start in June, and it is expected to remain away 18 months.

Notes on Leaching Silver Ores.

NUMBER I.

[Written for the MINING AND SCIENTIFIC PRESS by C. H. AARON.]

Ottokar Hoffmann, M. E., has been enjoying an enviable opportunity, a result of which is a series of able, interesting and instructive articles on lixiviation in the *Engineering and Mining Journal* of Feb. 9th, *et seq.*, in the present year. An English company bought the San Francisco Del Oro mine in Parral, Mexico, the ores of which had been worked to a certain depth with profit, but at last became so difficult that no one could be found able to treat them. The company engaged the services of Mr. Hoffmann and wisely gave him not only a mill with a Stetefeldt and a Howell furnace, but also *carte blanche* to put up anything he might require for the purpose of experimenting. Mr. Hoffmann has made good use of his opportunity to judge from his articles, and has generously given the public the benefit of his experience.

This shows one of the benefits of a patent law which, by protecting inventors, makes it an object to somebody to urge the adoption of an improvement. The Russell patents have led to more discussion of and attracted more attention to the subject of silver leaching than anything else that has occurred for some years, and Mr. Hoffmann's articles bear internal evidence that some of his investigations were suggested by that discussion and by the claims of the advocates of that process; at the same time he has his own patented method to present to the world, which detracts not from the merit of his articles.

Mr. Hoffmann states that the Russell process at the "Cusi" mill in Mexico was a failure, and that better results with larger profits have followed the return to the ordinary system. He attributes the failure of the Russell process to imperfect roasting of the ore, and very properly observes that it is always better to roast as well as possible than to rely on any "extra solution" for the rectification of the results of neglect. These articles also show that the Stetefeldt furnace is not adapted to the roasting of the ore of the San Francisco del Oro mine, which contains large proportions of zinc blende and galena in a calcareous gangue, with a small proportion of pyrites. Not only does the Stetefeldt furnace fail in roasting the ore, but also completely spoils it for further treatment in another furnace, by melting it to globules, even when a very low degree of heat was used, and with or without salt. A Howell furnace gave somewhat better results, although it did not chloridize very well, yet it did not spoil the ore for further treatment in a reverberatory furnace, and a furnace of this class was therefore connected with the ore chamber of the Howell in such a manner that the ore could be transferred to it from the chamber at stated intervals and the roasting completed. Two per cent of salt was crushed in the battery with the ore, and two per cent was added in the reverberatory. In this way, with careful management of the heat, fair results were obtained. Mr. Hoffmann says: "If the roasting is properly conducted, the blue flame of the ignited pyrites can be observed in the back part of the cylinder. Next to it, and reaching beyond the middle of the cylinder, the ore assumes a higher temperature, forming a belt of bright-red heat. The part of the furnace next to the fire and nearly one third of the whole length has to look dark. The furnace is mostly heated by the combustion of the sulphides and receives but little supply from the fireplace and from the reverberatory. In fact, the ore while in the cylinder should be left as much as possible to roast in its own heat. This is a very important condition to maintain. The object is to convert as much as possible of the galena and zinc blende into sulphates and oxides before generating chlorine, and to avoid until then as much as possible the decomposition of the iron salts. * * An excess of heat is invariably connected with an excessive loss of silver by volatilization and by a low chlorination. Galena and zinc-blende roast quicker and better in a low than in a high heat. When the ore leaves the cylinder and drops into the pit, it should be of a very dull red heat, while the color, after cooling, should be dark yellow-brown.

"When the properly prepared ore enters the reverberatory furnace the salt is added and the temperature increased. It commences to fume, and swells without forming more lumps than an ordinary ore. In the beginning strong fumes of sulphurous acid emit, but soon cease, and chlorine appears."

The capacity of the cylinder, 24 feet long, and the connected reverberatory was only 8½ tons of ore in 24 hours, owing to the refractory character of the ore.

The assorted ore contained:

	Per cent.
Zinc	25.50
Lead	11.56
Iron	6.50
Manganese	0.53
Cadmium	0.30
Antimony	0.52
Copper	1.02
Alumina	3.65
Calcium carbonate	8.00
Sulphur	21.01
Silver	0.12
Gold	trace
Gangue, insoluble	19.41
Total	98.12

A little nickel is given in the analysis of a sample of unsorted ore.

It was found that coarse crushing would not answer for this ore, a 40-mesh sieve giving better results than a 20-mesh, while the difference in the quantity crushed per day by 20 stamps was only 7½ per cent in favor of the coarse screen.

Speaking of crushing-rolls, as compared with stamps, Mr. Hoffmann says: "Rolls produce a pulp more uniform in size, and a much larger percentage of it corresponds in size with the size of the meshes of the revolving screen. Now I found that in order to chloridize well the Del Oro ore had to be crushed through battery screen No. 40, which furnished a pulp, of which only 9½ per cent was coarser than in sieve No. 90. * * * Such fine crushing is necessary for certain ores, and it is, therefore, not prudent to recommend or adopt rolls regardless of the nature of the ore."

The last remark is simply common sense; it will not do to generalize from particular cases, and much mischief has been caused by the adoption of machines and methods under conditions to which they were not adapted. In the Del Oro ore the greater part of the silver is in the blende; blende does not decrepitate in the roasting and the larger portion of it remains in the form of sulphate, not being chloridized unless a very large proportion of salt is used; it is, therefore, important that the silver mineral which is inclosed by the particles of blende shall be exposed by fine crushing. Where blende merely accompanies, not incloses, the silver mineral, the case is different, and coarser crushing may answer. With galena inclosing silver sulphide the case is again different; it decrepitates in the heat, which answers the same purpose as finer crushing. The same reasoning applies if we suppose the silver mineral to be combined instead of simply inclosed in the other, but this is perhaps doubtful; silver glance can be separated from argentiferous galena by grinding with potassium disulphate, which converts the galena to sulphate with evolution of H^2S.

Mr. Hoffmann calls attention to the fact that the proportion of soluble silver is often increased by the action of the base-metal chlorides during the washing of the roasted ore, especially when copper is present; or by allowing the ore to remain some time in a moist state, when that is allowable before the leaching. In the present instance the ore is not moistened prior to leaching, because of the caustic lime which it contains, but it is dumped while still hot into the leaching-vat containing some water, and a better result is obtained if that water is charged with bluestone and salt in the proportion to make cupric chloride; the gain in silver solubility in badly roasted charges is as much as 34 per cent.

The Sprague Electric Railway.

The following is an extract from a letter from F. W. Nickerson of Boston to A. A. Nickerson of San Francisco, referring to electric railways: "The overhead system of electric railways is very successful here in the East, and is in every way cheaper to run and build. Make this suggestion to the company. I think they will knock out cable roads, elevated, horses, etc. They can run them 12 and 15 miles an hour and stop them in a short distance; can carry two cars as well as one, and run almost noiselessly. They are even a fair success with the underground wires, but are not up to standard, compared to overhead ones."

This letter is from the city where the Sprague Electric Motor Co. has one of its most important roads. This company has made wonderful progress in equipping mines as well as railways with electricity in the last year and a half. The mining plants at Aspen, Colorado, are not sole examples.

It is to be hoped that Mr. J. L. Jayne, 328 Montgomery street, in this city, who is the agent here of the company, can, through his familiarity with the subject and designs in his office, show our people the advantages of electric transmission.

The following paragraph, from the St. Joseph *Daily Gazette*, is of interest in this connection: "It should be a matter of pride to the citizens of St. Joseph that they are possessed of this electric railway, for, to say nothing of the material benefits accrued to the citizens by the increased service of the road, it is a very good advertising medium for our city. Nearly every day some gentlemen are in St. Joseph from some other city to investigate the Sprague system, and they come from all quarters of the United States. Yesterday a gentleman from Portland, Or., was in the city for that purpose, and several days ago one from San Francisco on the same errand."

CŒUR D'ALENE MINES.—The expected prosperity of every district of the South Fork and the growing interest taken in all parts of Cœur d'Alene makes this favored section indeed the land of promise. Most interesting developments have been recently made in some of our best mines, and prospecting work continues, proving and opening encouraging extensions to the great ore bodies already known to exist. All operations in mining are most systematically carried on and no desire exists to establish a fictitious reputation, but every effort is made to keep all transactions connected with our mining interests within the realms of common sense. We are at the opening of what cannot fail to prove a most profitable mining season. We are in the heart of a great and growing country, and there is not a more progressive community to be found in the Northwest than the resolute miners of Cœur d'Alene.—*Wardner News.*

Mossbrae Falls.

We present on this page a photo-facsimile of a scene of rare natural beauty and of exceptional interest in the peculiar methods of Nature's work which it embodies. The scene is situated in the Mt. Shasta region and lies very near the Upper Soda Springs. The observer will say at first glance that it is a waterfall, and such of course it is, and yet not what is commonly implied by the term, for one would search in vain upon the summit of the bluff for the stream which is usually the parent of the waterfall. Waterfalls without apparent source are common in the Shasta region. Their sources, their methods and their beauties are charmingly described by John Muir in one of the later parts of his "Picturesque California" as follows:

"Only a very small portion of the water derived from the melting ice and snow of Shasta flows down its flanks on the surface. Probably 99 per cent of it is at once absorbed and drained away beneath the porous lava folds of the mountain to gush forth, filtered and pure, in the form of immense springs, so large, some of them, that they give birth to rivers that start on their journey beneath the sun, full grown and perfect without any childhood.

"This flat current, issuing from horizontal seams in the face of the wall of the river gorge, in one unbroken sheet flows in a lacework of plashing, upleaping spray over bowlders that are clad in green, silky algæ and water-mosses to meet the smaller part of the river, which takes its rise higher up. Joining the river at right angles to its course, it at once swells its volume to three times its size above the spring. The vivid green of the bowlders beneath the water is very striking, and colors the entire stream, with the exception of the portions broken into foam. The color is chiefly due to a species of algæ which seems common to springs of this sort."

Such grand springs are frequent in the Shasta region. Sometimes one hears their sounds long distances. Sometimes he comes upon them almost unawares. Speaking of one in particular, Mr. Muir says: "The Big Spring of the Sacramento is about a mile and a half above Sissons, issuing from the base of a drift-covered hill. It is lined with algæ and mosses, and shaded with alder, willow and thorn bushes, which give it a fine setting. Its waters apparently unaffected by flood or drouth, heat or cold, fall at once into white rapids with a rush and dash as if glad to escape from the darkness to begin their wild course down to the plain."

These beautiful descriptive lines by Mr. Muir will add to the interest of our engraving, and will give an intimation perhaps of the treasures of the Shasta region and of our other mountain districts. Railways and improved carriage-roads are making these places more accessible. Our agriculturists should not allow these resorts to be enjoyed alone by foreign tourists and city campers. The proposed excursion of Californians to attend the meeting of the Oregon State Grange, if carried out, will lead many to acquaintance with the Shasta region. In nearly all parts of the State there are romantic spots which can be easily reached by wagon, to which the family can be taken for a restful outing this summer. Let them all be enjoyed. With a good outfit of team and wagon and camp equipage, a family can cheaply enjoy an excursion, covering many miles of distance.

MOSSBRAE FALLS, NEAR UPPER SODA SPRINGS, IN THE MT. SHASTA REGION OF CALIFORNIA.

CEMENT GRAVEL.—The Placerville *Observer* says: Mr. S. K. Snodgrass of New York was in this city and vicinity during the past week, looking after mining interests. Mr. Snodgrass is the representative of a machine for the working of cement gravel, for which great results are claimed. This machine is not intended as a crusher, but to dissolve the cement, cleaning the cobble-stones, leaving the gold free and easy to amalgamate. We hope this gentleman may find a favorable place to put up one or more of these machines. It is represented that they will work 150 tons per day, with about four-horse power.

MINERAL WAX.—The first carload of mineral wax, a substitute for beeswax, and which will be largely used by electricians, recently arrived in New York. It is called ozocerite, and is found about 414 miles east of Salt Lake City, where there is the only source of supply yet known, except in Galicia, Austria. Ozocerite contains from 85@95 per cent of pure wax. Its color varies from a light yellow to dark brown or black. It requires from 160 to 190° Fahrenheit to melt it, and it is claimed to be the best insulator known. It possesses the greatest resistance to an electrical substance and is acid proof. It has been used by blacking manufacturers and in the manufacture of sealing wax. When it is refined it is called ceresin, and can be used just as beeswax is used. It costs just one-third as much as beeswax. Candles and dolls can be made with it.

MT. WILSON OBSERVATORY.—The Harvard 13 inch telescope has been delivered on Mt. Wilson. A temporary observatory building is to be erected at once, and the work of photographing the northern heavens begun. The office of the United States Signal Service will be moved to Mt. Wilson. At a meeting held at the Carlton hotel, M. M. Bovard, President of the University of Southern California, stated to a prominent citizen of Pasadena that he expected the city to build a wagon-road to the summit of the mountain, and donate real estate for an endowment fund to pay the running expenses of the great observatory to the amount of $100,000.

REWARDS FOR INVENTORS.—The Committee on Science and the Arts of the Franklin Institute of the State of Pennsylvania has been empowered to award or to recommend the award of medals for meritorious discoveries and inventions which tend to the progress of the arts and manufactures. These medals are the Elliott Cresson medal (gold), which was founded by the legacy of Elliott Cresson of Philadelphia and the John Scott legacy premium and medal ($20 and a medal of copper). They will be awarded to ingenious men and women who make useful inventions, or for some discovery in the arts and sciences, or for some new process in combination of materials in manufactures, or for ingenuity, skill or perfection in workmanship. Upon request from interested parties made to the secretary of the Franklin Institute, full information will be sent respecting the manner of making application for the investigation of inventions and discoveries, and the Committee on Science and the Arts will receive and give consideration to reports upon discoveries and inventions which may be sent to it.

Clay Selvage.

The Virginia (Nev.) *Enterprise* says: In mining litigation the formation of the clay selvage found upon the footwall of a vein, or floor of the formation, is often debated. Days are often spent in the examination of witnesses to prove that the clay selvage found in the ground in dispute is the genuine boundary-wall of a vein, while the opposing side may strenuously contend that it is nothing but the result of the seepage of surface-water through cracks in the diorite formation. The action of the water on the diorite carries particles of the rock and deposits it on any wall or floor that will hold it, forming a clay selvage.

"It is very easy to tell this character of clay from the genuine deposit of clay which is made in the formation of a vein," said a well-known mining man yesterday. "I have learned to distinguish it by experience, and I defy any one to put me to the test. If it is gritty, it is formed by the action of the surface-water; if it is soft to the mouth as dough, it is the genuine article, and was formed by the action of steam or vapor rising from the depths and carrying in solution atoms of the country rock through which it passed, and as the vapor ascended to the surface and cooled off, it gradually precipitated its contents."

THE SAN PEDRO WILL RUN.—The report that the celebrated San Pedro (N. M.) copper mine would close down on the first is emphatically denied by the management. The rumor was first started by persons who have evil designs upon the present management, who secured the property from the prior owners after a long siege of litigation in the courts of the Territory and the U. S. Supreme Court. The company is constantly increasing its force, and is sinking an immense well to secure water to start up another furnace. Over 500 miners work on the big copper mine.

THE city of Oakland is endeavoring to obtain from the Government about 70 acres of the north arm of the harbor to create a flushing basin for the great intercepting sewer which is to be built along the whole water-front and out into the bay.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ZEILE.—Amador *Ledger*, March 30: The sinking of the Zeile shaft was finished this week. The shaft is now 1160 feet deep. The lowest level is 1075 feet, with 85 feet of sump below. From 25 to 30 stamps of the mill are kept running. By the 1st of May the 40 stamps will all be running. The French company that have bonded the cement gravel claim at Volcano have struck the pay channel. While the cement is no doubt rich, still the question is whether it can be made to pay by a company after paying $10,000 for the property, and spending an equal amount in the erection of a stamp-mill. The cement is of the hardest description, far worse to get out than the hardest kind of quartz. It cannot be blasted, but has to be picked out. Operations have been commenced on the Morley or Wetzlar claim in Hunt's gulch. The shaft of the Alpi is now down nearly 40 feet. The water is no longer difficult to manage. The ledge commences to turn to the east. The Amador gold mine paid off last Friday, on the return of the superintendent from San Francisco. It is reported that A. P. Minear, who is in London, is confident of making a sale of the property to an English syndicate.

Calaveras.

THE SWANK QUARTZ MINE.—*Prospect*, March 29: The following in regard to the Swank mine is interesting, as it shows there is plenty of gold in Calaveras if it can only be located. The immediate footwall appears to be a porphyritic slate. All of the indications connected with this vein, and the vein itself, give promise of its being a rival of the Sheep Ranch mine, in the near future. The Swank quartz vein is in a belt of rich mineral-looking blue or manganese slate, which is two or three miles wide, and no doubt the careful prospector will find that there is more than one rich quartz vein in this belt that will prove to be the equal of the one recently discovered by the Swank brothers. The discovery of this rich quartz vein and many others in Calaveras county during the 80's is proof most positive that the quartz mines of our county are hardly prospected yet.

Contra Costa.

THE INDEPENDENCE TO START UP.—Martinez *Gazette*, March 30: For some months it has been a known fact that steps were being taken by Mr. James Rankin to put the old Independence shaft at Somersville in working order, but the obstacles in the way were great, and it has been deemed best by those concerned to keep the matter as quiet as possible; but nevertheless the work of placing machinery, erecting a hoisting works, and other details have been going steadily along, until the mine is almost ready to start up. Last week steam was gotten up as a trial of the new machinery, which had been set up by Hamilton & Clair, and the trial proved satisfactory beyond expectation. It is now some 13 years since the mine was worked, and to say that the sight of steam and the sound of machinery at the old shaft was welcome to the coal miners of Somersville is wholly unnecessary. The shaft is down some 700 feet, 500 of which depth is supposed to be filled with water, which will have to be pumped out before the work of taking out coal can be commenced. A splendid vein of good coal is known to lie at the bottom of this mine, and when the water is once removed can be taken out very easily and in very large quantities. This vein is known as the Clark vein, and is said to be the best known in the Mt. Diablo district. It is expected that the mine will be freed from water in less than two months time, when the work of cutting coal will be commenced.

Fresno.

GRUB GULCH. — Mariposa *Gazette*, March 30: Last week we visited the lively little mining camp of Grub Gulch in Fresno county. We found the place fairly bubbling over with life and prosperity. Grub Gulch has some very valuable mines, and the five mills at the Josephine and Haley mines are daily proving that there is plenty of gold yet in Fresno's hills. There are numerous rich veins all through the mountains and gulches, and paying strikes are constantly being made.

Inyo.

NO GO.—*Register*, March 29: Messrs. Boland & Gorman, lessees of the Union mine at Cerro Gordo, have had notification that the Reno reduction works will not receive any more of the dry flue dust concentrates, which was being taken from the dump of the old Beaudry furnace. The efforts of these gentlemen to get the silver out of this stuff have been hard and costly, and the present result is a little hard again.

SOLITARY. — The Reilly mill, Slate range, is watched by Wibbelt, a lone old guardian. J. D. Channel's comparatively new mill at Wild Rose is destitute of population and supervision of even one man. Coleman's big borax works in Death valley has, during the past winter season, had occasionally two, but now has only one sweltering individual to guard its collapsed greatness. Jerry Fitzgerald wrestles alone with the horn silver ores of Lee district.

CERRO GORDO.—Geo. Weirt, with his two partners in the lease of the famous Ygnacio at Cerro Gordo, is doing well. They are working an 18-inch streak of yellow chlorides, which assay 200 ounces of silver per ton, and in itself is an entirely new feature to those familiar with the property in "auld lang syne." Hawley, the owner, gets the enormous rental of 25 per cent of the profits.

Los Angeles.

A STRIKE IN THE MIDDLE RANGE.—Pasadena *Union*, March 29: There is a rumor on the street this morning that another rich find has been made on the Wilson trail. Ed Durfee left this morning for his mines in the Placerita canyon near Newhall. Charles Marsh came in this morning from the Silver Reef country with a quantity of fine-looking ore, which came from some place in the Blackhawk range. It contains considerable lead and iron and doubtless considerable of the more precious metal. Some very rich float rock was being displayed on the street this morning. Free gold is becoming plentiful. Johnnie Mills feels elated over the new finds in which he is interested. The placer miners are still panning out the yellow metal at various places along the foothills. Mines must take the place of real estate to give our business life a new impetus.

THE QUARTZ-MILL.—Los Angeles *Herald*, March 27: Edward Dunham and Stanford Johnson, who are about to erect the quartz-mill in Newhall district, have returned from their trip up north. Mr. Dunham showed a *Herald* man yesterday a dispatch from the agent at Newhall, stating that the machinery for the mill was on the ground, and would all be in position inside of 20 days. A 30-stamp mill, the largest of the Huntington make, is to be erected about 12 miles above Newhall, in the San Francisco canyon. This will induce a great deal of prospecting, and as that part of the country is undoubtedly rich in mineral, some satisfactory results are expected.

Mariposa.

RIBBON ROCK.—Mariposa *Gazette*, March 30: C. A. Schlageter showed us some samples of rock from his mine last Tuesday, which shows the excellent quality of the vein. The rock is what is known as ribbon or layer-rock, and shows gold in every seam or crevice. It is the best kind of milling ore, for although it does not show the gold in big nuggets, the precious metal is distributed thickly all through it and will mill to big advantage. They have not gone in very far yet, but the vein widens as they proceed, and beyond doubt they have a good mine.

Napa.

VALUE OF THAT BULLION.—*Calistogian*, March 27: We have been asked several times the value of the bullion shipped from here a few days ago, and produced at the Palisade mine. We cannot state the value, though we probably could have learned the figures, but not for publication. The bullion contained more or less gold, and was probably worth $8000. This is merely a guess, as the amount of gold in it we do not know. The gold may have increased the bullion's value a thousand or two more. The owners of the mine are not a corporation. They transact their business as a company engaged in any other work do. They are not inclined to tell the secrets of their work more than any other company; but they are making money and are entirely satisfied. They have got a mine that will keep them busy many years.

A DIVIDEND.—There are many mines that afford a fine profit for the owners, as does the Palisade gold and silver mine near Calistoga; but stock mining companies in California that pay dividends are comparatively few. Among these is found one in Napa county, viz., the Napa Consolidated quicksilver mine in the Oat Hill mining district, which is successfully superintended by B. M. Newcomb. The company has paid numerous dividends, and April 1st next it will pay another—$10,000, or 10 cents per share on its capital stock. The mine continues to look promising.

Nevada.

MINE ATTACHED.— *Tidings*, March 30: A Wheatland rancher named D. N. Jones attached the Golden Jacket mine at Cabbage Patch, near Spenceville, last Thursday. Jones claims to be a creditor to the extent of $1200, for material, labor, etc. There is $20,000 worth of machinery on the mine, which is owned principally by the Farmers' Union of Livermore. We understand that negotiations for the sale of the mine have been pending, the property being looked upon as promising by practical miners. The Livermore Grangers were financially crippled in providing the machinery.

AN INSOLVENT MINING CO.—*Tidings*, April 3: In the Superior Court this afternoon an order was made on petition of the stockholders of the company, adjudicating the Green Mountain Consolidated Mining Co. of Grass Valley to be insolvent. The liabilities are placed at $12,213.43, and the assets comprise the company's mine, $1300 in ore and bullion, and a hoisting and pumping plant. There is a mortgage of $400 on the machinery, however. The majority of the items of indebtedness are for labor, and range from $2139.75 to $3. The creditors named number 71.

Placer.

DUTCH FLAT.—Cor. Placer *Republican*, March 30: A movement is on foot to prospect for drift mines here, and a paper is being circulated to see if enough money can be raised. The plan is to sink a shaft in the ravine below town on the shallowest part of the supposed channel, and prospect it thoroughly.

Plumas.

BUTTERFLY DISTRICT.—Plumas *National*, March 30: We are indebted to D. M. Hambly for the following mining news: Thompson, Smith & Co., in the Butterfly district, at present are not working many men underground, but getting ready for spring work. They have one of the best prospects in this county, both in quartz and gravel. They have started a new shaft on the quartz and are down about 40 feet. Free gold can be seen in the quartz as it is raised to the surface. Another prospecting company in the same neighborhood has struck very rich prospects, both in quartz and gravel, which they are developing quite satisfactorily. Orr, Bushman & Co. are under headway in developing their mine, with very flattering results as to the paying qualities of their plant. Music & Sholfer take their time to clean up, but it is always there just the same. John Higgins has just commenced to ground-sluice, since the rain.

Shasta.

NOTES.—Shasta *Democrat*, March 29: The Calumet mill will start up about the first week in April. We are told that negotiations are pending for the sale of the Gladstone mine on Cline gulch. The Calumet company is putting in a low-pressure Knight water-wheel for running their new plant. The new mill and furnace of the Calumet company is about completed. The new plant is located 400 feet south of their 24-stamp mill, and is intended for working their sulphurets and richer ore. Last Friday five bars of bullion from the Lost Confidence mine were brought down and shipped to the Argo smelting works. The proportion of gold in the bullion has increased of late 20 per cent, so we are informed. Cummings & Osborne, owners of the Gladstone mine on Cline gulch, brought down an $8000 gold brick last Saturday. This is the cleanup from plates and battery for a 30-days' run, and a handsome one it is. The Cline Gulch mines will undoubtedly develop into another Deadwood. Last week Fred Ten Eycke sold the old Black Rock claim, situated between Spring creek and Boulder creek, to James Salla of the Lost Confidence mine, for $1000. Fred relocated the claim the first of this year, it having formerly been owned and prospected by Bud Levens of Oakland, Jim Campbell and Lee Fader of this city.

FROM KENNET.—A large crowd of men is kept busy at the Uncle Sam mine repairing damages done by the late rainstorm. The Clipper Mining Co. is only working a small force at present. A new five-stamp mill will be erected on this fine mine this spring. The Snyder mine is not being worked at present, but operations will be resumed shortly. The Shasta Bell Mining Co., D. B. Grant manager, is running tunnels, and the prospects are that some good mines will be opened by this company in the near future.

THE SIERRA BUTTES MINING CO., to which concern Jack Conant disposed of his Uncle Sam mine for $150,000, is making rapid headway constructing a wagon-road from Kennet to the Squaw Creek mines. When the road is finished, the number of stamps in the company's mill will be doubled, and before the summer is over it is understood there will be 80 stamps pounding away on the rich ore of the Uncle Sam mine.

Sierra.

AT THE SIERRA BUTTES MINE.—Sierra *Tribune*, March 29: Last Monday 40 men who were working in the Sierra Buttes mine were drafted by the company. Twenty stamps were "hung up" at the 60-stamp mill below town. It is said that there is likely to be several more men discharged in a short time. This is very unfortunate for Sierra City, but a mine cannot be expected to run 250 men forever. The Sierra Buttes is probably the oldest mine on this coast, it having been worked already over 30 years. But by no means does the discharging of a few men show that the mine is not good for five years more anyway. There are 160 men on the pay-roll now. Twenty stamps are pounding away at the mill daily up at No. 6, while there are 40 stamps running at the lower mill. Among the 40 men discharged only two are married, the rest being single men. It is said that 20 stamps will soon be added to the mill on the hill, making it a 40-stamp mill.

POCKET.—*Mountain Messenger*, March 30: M. Harp found a quartz pocket, last week, on the Chips' side of Kanaka creek, and pounded out $600 with a hand mortar.

MORE STAMPS.—Messrs. Onstott, Hoskins and Mosher came up from Nevada City last Monday, to the Red Chief mine on Kanaka creek, near Alleghany, to put 20 more stamps in the company's mill, which already has 20 stamps.

TUNNEL.—Mammoth Springs' tunnel, above Forest City, is in 1500 feet. The rock is soft picking, and gravel expected at about 500 feet ahead.

Santa Barbara.

BEACH MINING.—Lompoc *Record*, March 30: A company, with W. S. McKay at the head, has been formed to work the beach mines on a grand scale. Steam-power will be used to raise the water of Bear creek to the flume, and it is expected to put through from 50 to 75 tons of sand per day. Mr. Heller has gone to S. F. to procure the latest machinery and processes for saving fine gold. We shall watch the operation of this company and note results each week. The parties so far, working with the crudest methods, have taken out several pounds of dust and shipped it to San Francisco. Sufficient inducement is given those working the mines for the past month to justify, in their judgment, quite an expenditure to see what can be accomplished on a large scale.

Tulare.

PLACERS.—Tulare *Times*, March 28: Supervisor James Barton returned from the Rattlesnake creek mines, 25 miles east of this city, on Tuesday evening and brought down some samples of gold ore now being mined there, for assay. The lead has been traced for three miles, and 13 claims have been located, only a few of which are being worked at present. He says all the earth in that section contains more or less gold, and if there was water handy, from $2.50 to $5 per day could be made at placer mining. But there is no water to be had at a reasonable distance from the mines except during the rainy season. Many old miners have visited the district and all speak favorably of the developments in the quartz leads.

Tuolumne.

NEW ALBANY.—Tuolumne *Independent*, March 30: The rich shoot of ore struck in the New Albany, some two months ago, still continues, and enough of this bonanza rock is now in sight to feed a 10-stamp mill for a year. The vein is opened 100 feet from surface, and shows a pay shoot of 150 feet. They are now crosscutting 300 feet from the former crosscutting.

GOLDEN GATE.—It is the intention soon, so Mr. Long informs us, to put up chlorination works at the Golden Gate; not only to treat their own sulphurets, but also of capacity for custom work. This will be a great convenience for our mining friends, as they are compelled to send them below, at large expense.

PROSPECTING.—*Independent*, March 30: Prospecting promises to develop into a perfect boom this spring. The gold taken from the celebrated Bonanza has been heralded far and near, and already feverish miners are drifting into this section in search of pockets. Tuolumne gold is no myth—it is a true El Dorado—and people are beginning to find it out.

THE Tom Whitto quartz mine, Jacksonville district, would turn out a bonanza for a strong company. The vein is 150 feet in width, the ore prospecting from $3 to $7 per ton, with places much richer. It has been splendidly developed for the past six years, and is now in good condition to show its great value.

BUCHANAN.—In the Buchanan mine, the ore is showing up rich from the lower levels, and the mine is looking well, the owners being well satisfied with Supt. S. B. Moore. Fifty men are employed.

GOOD ORE.—The Eureka quartz mine, at Summersville, is turning out some very good ore, and the outlook is very promising.

NEVADA.

Washoe District.

INDUSTRIOUS PROSPECTORS.—Virginia *Enterprise*, March 30: Virginia is filled with idle men; but they are not all positively idle. The old miners and prospectors who have been with us many years, while waiting for steady employment, engage their knowledge and experience meanwhile at prospecting in the hills to the north, west and south of the great lode. They take a little prospecting pick, with hammer attached, and with a light lunch and pipe and tobacco, they roam the hills, carefully inspecting float and chipping off pieces of rock here and there as thousands have done before.

HALE & NORCROSS.—On the 400 level have commenced stoping ore from the south drift from joint west crosscut on our north boundary. The ore is of good quality. On the 500 level the south drift is now advanced 200 feet and has reached our south boundary. The north and south upraises have been advanced 10 and 15 feet respectively, and continue in excellent ore. On the 600 level are extracting the usual quantity of fair grade ore from the several stopes. On the 1300 level west crosscut No. 1 has passed through 12 feet of old fillings, and have commenced extracting ore from the old stopes. During the week have hoisted 810 tons of ore and have shipped to the Nevada mill 817½ tons, and have milled 784 tons; average battery assay, $25.09.

CHALLENGE.—The north drift on 1200 level has been advanced during the week 16 feet; total distance, 46 feet. The face shows vein material. The joint Challenge-Confidence east crosscut on the 1300 level is now out 17 feet, 12 feet having been added during the week; the face shows vein material. The joint Confidence-Challenge east crosscut from the north drift on the 300 level is out 30 feet, 13 feet having been made. The crosscut passed through four feet of fair ore and the face is now in vein material. The same level is out 80 feet, 12 feet having been made during the week. The face shows barren quartz.

SAVAGE.—On the 400 level are stoping ore from No. 1 and No. 2 southwest crosscuts; the ore is narrow but of good grade. From the north drift on this level are extracting ore from the old stopes. On the 500 level the upraise from No. 3 west crosscut is now advanced 75 feet; the face is in low-grade quartz. From the south drift on this level are extracting ore from the old stopes, also from No. 3 east crosscut, 600 level. During the week have hoisted 619 tons of ore, have shipped to the Rock Point mill 527 tons, and have milled 505 tons; average battery assay, $22.

ALTA.—The mill running steadily from ore on the 800 level and stopes above the 825 and 955 levels. Are upraising in fair milling ore on the 925 level in a body from 10 to 11 feet wide. The upraise on the 725 level is up 370 feet. Crosscutting will commence 30 feet further up to connect with the workings on the Keystone ledge. Thorough crosscutting and prospecting will also be done above that point.

BELCHER.—The 200 east crosscut is in 98 feet and the face in quartz and porphyry. The 200 west is in 77 feet, the face in quartz and porphyry with bunches of ore of fair assays. The 100 east is in 100 feet, face all porphyry.

OVERMAN.—Extracted 272 tons of ore; shipped to the Vivian mill 318 tons. Have done considerable repairing in the main drift, timbering, relaying track and turntables. Stopes in mine yielding the usual quantity of ore.

CHOLLAR AND POTOSI.—The regular work of exploration is progressing. Are now crushing only 30 tons of ore daily, by reason of the Hale & Norcross using 30 of the 40 stamps in operation at the Nevada mill.

CONFIDENCE.—Have shipped during the week to the Brunswick mill 653 tons of ore, the average samples of which show a value of $31.12 per ton.

JUSTICE.—Crosscutting on the 500 level and extracting about 30 tons of ore daily of the average value of $21 per ton.

CROWN POINT.—Continue taking out ore, and have shipped to the mill during the week 912 tons and milled 875 tons.

BALTIMORE.—Prospecting on the 338 level to the northward and saving up some good ore for reduction.

CON. IMPERIAL.—Some necessary repairs to the main north lateral drift are still being carried on.

BULLION.—No change to report in the work below the 500 level.

ANDES.—Drifting northward on the 175 level.

Eureka District.

PROSPECTING.—*Sentinel*, March 30: Prospecting in the outside mines of this district, it is said, will be very lively this summer. Eureka is not dead yet. All the teams hereabouts will now be employed in hauling ore from the mines to the furnaces for some time to come. Messrs. Langton, Allen and Shine have a lease of the Oregonian mine. They have struck a fine streak of very rich ore in it and are making money. It is now an assured fact that the smelting companies will commence buying ores next Monday. This is good news for the miners and the balance of our people.

Hawthorne District.

THE NEW BOUNDARY.—Walker Lake *Bulletin*, April 3: The boundary lines of Hawthorne mining district are: Commencing at Kincaid; thence running south to Modoc Springs; thence southerly to Excelsior Flat; thence southwesterly to Antelope Springs; thence northerly to the 105-mile post on the C. & C. R. R.; thence along the line of said road to the place of beginning.

Sylvania District.

A SALE.—Esmeralda *News*, March 30: Andy Fife, who has been experting mines in the southern part of the county in the interest of Walter E. Dean of New York, has purchased a group of mines in Sylvania mining district. The price paid was $25,000. The ore in the mines purchased carries a high percentage of lead, and is rich in silver. Mr. Fife and the purchaser are now at the mines, and work will be commenced thereon immediately. Capital is something that has been lacking in the southern end of the county, and now that it has been forthcoming, big things are expected. The people in that section are jubilant over the prospects.

Tuscarora District.

FOUND TREASURE.—Tuscarora *Times-Review* March 29: Preparations are being made to put in a tank at the 200-foot station.

COMMONWEALTH.—150-foot level: No. 3 winze has been sunk and timbered 2 feet. The bottom

still in very rich ore; will not do any more work in the winze until connection is made from 225-foot level. The No 2 east lateral winze has been connected with 225-foot level, and drifts started north and south, showing good ore both ways.

NORTH BELLE ISLE.—North drift, 300-foot level, extended 8 feet. The water has been very strong for the last few days, causing some delay. Air boxes have been put in, which materially assists the ventilation. Will start hauling ore to the Union mill on the 30th inst. The stopes throughout the mine are looking well.

NEVADA QUEEN.—Tramway to the mill is about completed, ore bins finished and the mill will start Monday morning. At the concentrator everything is running nicely; average assay for the week $17 08 per ton, working to 83 per cent. The stopes are about as last reported, yielding 200 tons for the week.

GRAND PRIZE.—300-foot level: East drift from north crosscut extended 20 feet in low-grade ore. West drift from north crosscut extended 18 feet, face shows some improvement. South drift extended 12 feet. The vein continues strong, but the ore is low grade.

NAVADO.—The stope from No. 5 upraise looks well and is turning out some fine ore. The stopes throughout the mine are looking well and the usual quantity of ore has been sent to the mill.

BELLE ISLE.—West crosscut, 250-foot level, extended 18 feet and the face is in light-colored porphyry.

ARIZONA.

TOO MUCH WATER. — Cor. Prescott *Courier*, March 28: Last Saturday night the water burst in at the face of the tunnel, belonging to the United Verde Copper Co., about 900 feet from the mouth, and run their men out, filling the tunnel with sulphurets and sediment, and running down the gulch from six to eight feet high, carrying log rocks and an anvil with it. It caused a cave from the surface, carrying down dirt, slag, slag-pots and wood, and cracked the earth back as far as the company's smelter. The smelter started last Wednesday, and has been running quite successfully under the superintendency of J. L. Thompson. The stream which flowed from the water-strike filled a canyon 40 feet wide to a hight of 10 feet as it rushed Verde-ward.

CARBONATE ORE.—G. W. Hull and H. C. Blackford have struck a body of carbonate ores, about 700 feet west of the United Verde Copper Co.'s works, which bids fair to be one of the best mines of the camp. It is called the Lucky Boy mine. They contemplate shipping from five to ten tons of ore in about three weeks for a test. E. H. Witherell will start his teams to hauling coke and matte this week.

COLORADO.

REVIVAL.—Elk Mountain *Pilot*, March 30: We are on the eve of a substantial mining revival. Last year there was a great deal of talk about what was going to be done, and in the end very little was done. This year we have strained an ear in every direction to find out what new enterprise would be started, and while we have heard but little, it all seems to sound like business. In another month we expect to record some cheering news in the way of mine development. Earnest inquiry is being made after mining claims that have been idle for years, showing that the owners have not entirely forgotten them. With the present state of weather we are bound to have the earliest season ever known in this country, and there is nothing to prevent any of the mines from commencing work at once. S. C. Robinson at Pittsburg will take advantage of the season and start his concentrator next week. He completed a ten-ton concentrator last fall, to run by water-power, expecting to run all summer. We do not know or hear of any other properties in Poverty gulch that are going to be worked, although such mines as the Excelsior, Jacob Straeder, Hawkeye, and several others we could name ought to be worked. They have got the mineral, and it is not taken out.

DAKOTA.

FLOAT.—Black Hills *Pioneer*, March 30: The report sent out early last week from Big Sandy, Mont., giving an account of gold excitement in the Sweet Grass hills and that such large numbers were flocking to the new fields as to seriously threaten a famine, was made out of whole cloth. The Sweet Grass placers have been worked for a number of years, and while considerable gold has been and is being taken out, there has been no unusual rush to the hills since 1878. The hills are located on the recently opened Piegan reservation, and while they are believed to be rich in minerals of all sorts, they have never been thoroughly prospected. The Seabury-Calkins is now working a force on ore of excellent quality. Shipments to Omaha have been made at intervals, and will continue regularly for the future. Good reports continue from the Spanish R. The recent strike, before noticed, has proven fully as important as was expected.

IDAHO.

PLACER MINING.—Idaho City *World*, March 30: Placer mining has been going on quietly a few miles from this place, when everybody was predicting that the season would prove a total failure, and hydraulic chiefs would have a rest until next spring. The Traverso boys have been piping about ten days. They reservoir the water and work only in the daytime. Brockmiller, Cetovitch and Reagan have been piping a week, having commenced a week ago yesterday. They are also reservoiring—hoarding up a supply of water at night and turning it loose to do its work daytime. A Chinese company has been at work for some time in a placer claim between this place and the Warm springs. The season will not be so poor, after all, as the prophetic predictions have pictured. If storms continue during the spring and early summer, which is not at all an improbability, as we have had dry weather for a year, mining will continue just the same as if the regular depth of snow had fallen during the winter.

RICH ROCK.—The 36 tons of Washington gold-bearing ore recently crushed in the Forest King mill, turned out more than the estimate given in last Friday's *World*. Before melting it was thought to be between $5000 and $6000, or something like $150 per ton. It runs up to $6193.03, making $172 per ton.

LOWER CALIFORNIA.

SANTA CLARA CAMP.—Cor. S. F. *Chronicle*, April 1: About 2000 miners are in the camp now, but they are leaving by the hundreds, and in a month there will probably be not more than 300. The placers are an admitted failure, but some prospecting for quartz ledges is being done. The best day's work for two men that I have seen was $14, taken out on a claim owned by a man named Cochrane, though several Indians have done well. There were about 25 claims here that a man could make wages on, but the greater part of them are worked out, and unless the International Co., which has a dozen or more men prospecting the hills, can get up a new excitement and get the gold-seekers farther down the peninsula, I am afraid everybody will leave in a short time, as provisions are so high that not more than half of them have money enough to stay over two or three weeks at the longest. Every day there are long lines of men with their blankets on their backs coming into Ensenada from the mines on their way back to San Diego, sadder but wiser men.

GOLD.—Cor. San Diego *Sun*, March 28: In your columns the disappointed have stated that there was a little gold at Santa Clara on the surface, but they were satisfied it had no permanency or depth. I am afraid that many who argued thus did so through the necessity of an expedient to explain their failure. Move toward any point of the compass from Mexican gulch, upon hillside or in the ravines, and you find the color of gold. Its small flakes are mixed with every grain of sand, and again it is found imbedded in the eternal rocks. One might imagine from the numberless croppings of rich ledges that Nature's central laboratory for the manufacture of fine gold was located here. But our mining novices had now given up the hunt for gold. After braving a mountain tempest of rain and hail for four days and nights, breakfasting on bread, bacon and coffee, dining on coffee, bacon and bread, and suppering on coffee, bread and bacon, they were hunting for something else. They were looking for an excuse to get back to comfortable homes. They found it in the fact that there was but little gold on the surface, and I think would have been seriously disappointed had anything occurred to make this excuse for their speedy return unavailable. As to the placer mining, it is at best a precarious method of obtaining the means of existence. The miner who picks up a fine nugget one day may be starved out before he finds the next one. Men who are well constituted to stand the severe strain upon their physical system may make a living down there for awhile, but the water will soon be gone and miners must either resort to carrying the dirt a great distance or use dry-washers. Two months from now there will probably be little placer mining done, but it will be resumed with the first rains next winter.

THE ALAMO PLACERS.—Cor. *San Diegan*, March 28: The rush for the new placers on the Alamo has diverted all new-comers, who now visit that vicinity first. Much hard work has been done there already, and gulches supposed to be worthless have been found to yield their treasures of coarse gold. The gold does not seem to run in nuggets so much as in Arroyo placer, but it is rather of a large, mealy character. Rockers are mainly used and the noise of the 300 and odd machines rattling away sounds like a gristmill. So rich is that district that hordes of Mexicans are crowding and jostling each other around the ledges in the vicinity of the springs, a mile above Tyzack's camp, and the dirt and small rock yield good results. Many are making good pay by taking rich pieces of float and pounding out the gold in a mortar, or selling the finest pieces for jewelry or cabinet specimens. Much rock from newly discovered leads is brought in, frequently showing more gold than quartz on the surface. It is peculiar that no quantity of silver ore has yet been found in this district, but fine specimens are shown from San Pablo, 20 miles south. Only one mine, the Visnagre, has been sunk to any depth, and, therefore, it is next to impossible to say whether the ledges go down or not.

MONTANA.

COPPER AT BUTTE.—*Miner*, March 30: "What is the latest news in copper?" is the question uppermost on every one's tongue now. The question is how low will it go? This question was put yesterday by a reporter to a gentleman of long experience in mining matters in the West. "How low will it go?" Well, we on the outside can hardly be asked to give a definite answer to such a question. But you can bet that it won't be allowed to drop to any ruinous figure. Why? Because Haggin, Lewisohn and other producers here will take care that it does not. There was only one course for them to come to to save themselves. They know to a pound what the real surplus on hand is. It is somewhere about 120,000 tons. They know they have to take care of this surplus. It is in the hands of the financial firms who advanced money to the syndicate on it. It has been hypothecated to them. The society of metals, otherwise the syndicate, has served the purpose of its projectors and has come to an end. The surplus is there. Haggin and the large copper producers of this country have only one course. They must take care of this surplus. That is what they have gone to Europe for. When they get there they will arrange to take this out of the hands of the people now holding it. They will, in fact, substitute themselves for the syndicate. The surplus will not be allowed to flood the market. Of course, this will entail a curtailment of production at present and the surplus will be gradually worked off. The mines of Butte can stand a reduction of price better than any other in the world, owing to the perfection of their processes here and the amount of silver in the ore. There will be no diminution in the production here. The accident at the Anaconda necessarily limits work at their mines until the burned smelter is rebuilt. But the camp will continue as prosperous as ever. Copper is not the only product here, you must remember. Look at the amount of leases going on here and the development of new mines in the neighborhood.

THE CHAMPION.—*New Northwest*, March 29: The crosscut was pushed 12 feet into ore without reaching the hanging-wall. On Saturday work was suspended on the head of the crosscut. The station, cut out ten feet high, and the crosscut, about 20 feet, had not been timbered. Rock began dropping behind the workmen, and it was deemed best to return and timber. This is now being done, the crosscut being carried through seven feet high, and timbered as they go. Supt. Ed Mills says the entire lead matter so far is mineralized and milling ore, and he expects to find rich ore on the hanging-wall.

THE HIDDEN HAND.—This is the most developed of the group of the galena silver ledges that have been discovered and worked a few miles east of Deer Lodge since last fall. It is owned by Devan, Peterson & Harries. They are now in 70 feet on the vein, which is three feet wide and has begun to pitch from nearly horizontal toward the vertical. They are taking out considerable ore, which it is believed will run $100 to $170 per ton in silver and lead.

NEW MEXICO.

DEVELOPMENT WORK.—Silver City *Enterprise*, March 29: A steam hoist will be erected on the Ruby Silver at Gold hill soon. Atwood, Baker and Campbell have located and are working an extension of the Rose mine. Dorns and Snyder, who recently located the Silver Giant at Bullard's peak, are taking out some very rich ore. One ton of ore was shipped from No. 2 of the Ben Hobson group at Bullard's peak, by H. H. Betts, which netted $343.70. The shipment of iron ore was resumed on Tuesday. There are now about 3000 tons of ore ready to be moved from the mine and depot. Eight tons of ore from the Reservation mine at Gold hill was recently worked at the Standard mill, returning $300 net in gold. Walton, Polloxfen and Mitchell have secured a 12-months' working bond on the Telegraph mines and mill and will shortly resume operations there. Wm. B. Farish was hard at work for several days this week sampling the Maud S. mine in the Mogollons. A cash offer of $40,000 was made for the Golden Giant at Pinos Altos this week and refused. D. C. Casey, who has a lease on the Silver King mine, at Bullard's peak, has made a strike of nauve silver ore.

OREGON.

BAKER COUNTY MINES. — Bedrock *Democrat*, March 27: During the past few days a large number of mine-owners from the various districts throughout Baker county have congregated in the city, and they make a very favorable report of the past winter's development work on quartz claims. Throughout the sections of Cracker creek, Sumpter, Granite and Cable cove, a greater amount of development work was done the past winter than ever before in the same length of time, and the result has been that some of the best mines of the Northwest have been opened up. With the building of a $100,000 milling-plant on the Eureka and Excelsior mines on Cracker creek at an early day, which is a positive fact, a new impetus will be given the mines of this county. Altogether the mining outlook of Baker county was never better and a more perfect assurance of prosperity was never manifest.

RICH STRIKE.—From parties down from Robinsonville, the reporter learns that a wonderful rich strike of gold ore was made the other day in the Phœnix mine, situated about one mile from Robinsonville. The ore is estimated to be worth from $5000 to $7000 per ton—so rich that the gold stands out in lumps on every piece of rock picked up. The owners of the Phœnix are Cal. Berry, Dave Shote, Chas. Collier and Lem Barnett, a quartet of old miners and prospectors who have mined in the vicinity of their present find for many years.

UTAH.

THE NEW SULPHUR FIND.—Salt Lake *Tribune*, March 29: Hank Barnes returned yesterday afternoon from his new sulphur find west of Frisco, Utah. He brought with him about a third of a ton of samples of the different grades of sulphur found in the deposit, and these range from about three-quarters up to some ninety-eight per cent pure. They are decidedly rich-looking, and if the discovery does not border on the upper crust of Tophet it is decidedly upper crust on its own merits. There is a deposit of this material of unknown vastness, but enough is in sight to promise great things.

THE TRIPOLI DEPOSITS.—The tripoli business is beginning to assume considerable proportions here. There are large deposits of this valuable material near the city, and it only needs to be put through a process of screening to prepare it for the market. One company was incorporated some time ago, and another has now appeared in the field. Their claim is located near the head of Red Butte canyon, and they intend to operate quite extensively this summer. A large quantity of the article has already been prepared and distributed in this city for trial, and jewelers and others who have used it say that it is superior to the imported.

WASHINGTON TERRITORY.

THE DISTRICTS.—Ellensburg *Capital*, March 27: In Peshasten district the miners have been doing considerable work during the past winter, and the output of gold ore has been quite encouraging. The arastra is now busily engaged in crushing ore, and the indications point to a busy season and large product. Peshasten is one of the best free-gold as well as concentrating districts in the Northwest, and with additional capital and development, would make a rich record. In the Swauk placer mines there is considerable activity displayed by the old miners and those who have recently purchased interests. There is water enough for present use, and with proper storage the supply could be made available until later in the season. The gold output this year from the Swauk will be above the average. In the Cle-Elum districts preparations continue for a livelier season than has been known there since the discovery of the first mines. The gold, silver, copper and iron mines are all in process of development. From the Conconully mines reports of extensive strikes and new finds are of daily occurrence. The development work of the past winter has helped these mines materially, and has been the means of creating confidence and causing a number of sales at good prices. Ore from the Conconully will be seeking a market this year, and the output will be something worth considering.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & CO.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING MARCH 26, 1889.

400,157.—ROCK-CRUSHER—Geo. E. Ames, S. F.
400,034.—CABLE-TUBE PROTECTOR — H. F. Ascheck, S. F.
400,201.—SEPARATOR—Finch & Cross, S. F.
400,401. — PISTON WATER-METER — Frederick Gutzkow, S. F.
400,216.—CONCENTRATOR—J. A. Johnson, S. F.
400,220.—HARROW AND CULTIVATOR — S. W. Kilpatrick, Gilroy, Cal.
400,114.—AMALGAMATOR—N. L. Raber, Corvallis, Ogn.
400,372. — LAMP-SHADE PROTECTOR — G. A. Tank, S. F.
400,155.—WELL-CRIB—W. H. Williscraft, Juniper, A. T.
400,083.—FENCING—E. Hawes, Sacramento, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ROCK CRUSHER.—Geo. E. Ames, S. F. No. 400,157. Dated March 26, 1889. This is one of that class of rock-breakers in which a movable or vibrating jaw operates against an opposing fixed jaw, the rock being crushed between the two. The object of the invention is to increase the capacity and strength of the machine, to reduce its weight and provide simple and reliable means for effecting the several adjustments.

CONCENTRATOR.—Joseph A. Johnson, S. F. No. 400,216. Dated March 26, 1889. This is a machine for concentrating ores, in which both a coarse and fine pulp appear. It consists of a longitudinally vibrating iron table, the surface of which is divided into narrow channels from end to end, each channel having a series of depressions or basins, and, in combination with this, of a series of reciprocating rakes or scrapers, which act to carry the heavy material toward the upper end where it is discharged.

PISTON WATER METER.—F. Gutzkow, S. F. No. 400,401. Dated March 26, 1889. This is one of that class of meters known as piston-meters, and the object is to construct a cheap and accurate meter, the employment of hydraulic pressure exclusively for the actuation of its parts and reversing the stroke by means of a peculiar mechanism. The whole operation of reversing the movements of the valves and of the piston within the meter is effected by the pressure of the water, and the independent movements of the valves prevent any stoppages or dead points. The piston is cushioned at each end of the stroke either by imprisoning a small quantity of water between the piston and the end of the cylinder as the piston covers the ingress point or by means of a projection which enters a corresponding recess in the end of the cylinder.

TUBE OR TUNNEL PROTECTOR FOR CABLE ROADS.—Henry F. Ascheck, S. F. No. 400,034. Dated March 26, 1889. This invention consists in a plate pivoted or hinged within the tube of a cable road and to one side thereof, said plate traversing or crossing the vertical plane of the grip-slot and resting against the other side of the tube, whereby, when at rest, it covers the top or neck of the tube, but is adapted to be moved by the passing grip without interfering with its travel. The invention further consists in the construction and arrangement of a continuous series of said plates, their connection and limiting devices. The object is to protect the tube from snow, dust, dirt, sand and other debris which usually finds its way through the open grip-slot into the tube.

SEPARATOR.—John M. Finch, Crockett, Contra Costa Co., and John R. Cross, S. F. No. 400,201. Dated March 26, 1889. This invention relates to that class of machines for separating materials according to their specific gravity by the application of a current of air; and it consists essentially in a shell or casing having within it a rotating cylinder freely operating, whereby a rotary current or body of air is created, and accompanies the same, an inlet for the feed of the material arranged to deliver it within the sphere of the rotary current or body of air, and independent outlets for the separated materials. In this machine, there being no accession of air, there is no discharge of air. The air within the shell is therefore utilized constantly, and there being no fresh air admitted, the air which is within is needed to make up the full rotary current, none being discharged and the materials thus separated, each portion passes off without any accompanying air, and consequently without dust. The air within is constantly clearing itself of the material and can be used over and over again.

MECHANICAL PROGRESS.

WROUGHT-IRON PIPE MANUFACTURE.—There are 24 wrought-iron pipe works in the United States—one in Massachusetts, two in New York, fourteen in Pennsylvania (of which six are in Pittsburg), one in Delaware, one in West Virginia, two in Ohio and three in Illinois. Owing to the depression which has existed in this trade so long, quite a number of the works throughout the country are idle, but we believe that all that are located here are in operation, and have lately secured a good deal of work, so that they are now fairly busy and prices have been advanced two or three times during the last few weeks. The growth of this industry has been remarkable during recent years, and it now consumes a very respectable proportion of the iron produced. This kind of pipe is now used for purposes not dreamed of a year ago, and the promise is that it will occupy a still wider field. Originally made for conveying water, steam, gas, oil, etc., it is now also used in the construction of cars, for railing, fencing—in short, for purposes "too tedious to mention." The business of making wrought-iron pipe was very profitable, but so many works have been erected during the last few years that margins are extremely small; indeed, during the past summer manufacturers said that some kinds of sizes of pipe were sold at a positive loss. The discovery and utilization of natural gas gave a tremendous impetus to the industry, and was also the chief cause of the erection of several new works and the consequent over-production, but for several months past there has not been so much demand from the natural gas companies, and this has been, perhaps, the chief cause of the severe depression.

IRON AND STEEL IN SHIP-BUILDING.—The English correspondent of the *American Manufacturer* says that the controversy which is indicated in this heading is not after all ancient history to the degree that some persons would imagine. The comparative ease with which steel corrodes together, with its costliness, has lately exercised considerable influence in the temporarily re-establishing iron in favor in some quarters as a ship building material. The committee of officials at Lloyd's Registry have found it advisable to modify their rules upon the matter because of recent developments. They accordingly issued for 1889 a series of new rules for steel vessels, amended rules for iron vessels, which, "striking a balance," may be said to favor iron considerably more than the Registry's previous regulations have done. Of course, anything that lessens the difference between the thickness of iron and steel plates—as the rules do—must, while the prices of the two materials are so far apart, contribute considerably to the increased adoption of iron. Therefore, iron manufacturers are just now deriving a good deal of encouragement from the rules to which I have referred. How long the favor re-accorded to iron will last, is, however, in view of continued steel progress, a very doubtful matter.

IRON RAILWAY TIES NOT A SUCCESS.—The Pittsburg *Dispatch* states that the Pennsylvania Railroad Company has given up the experiment of substituting iron railway crossties for the wooden ties now in use. The iron ones in use on the middle division and in the Philadelphia yards will be taken up and will probably be sent back to England, whence they came. The iron ties have been in use almost a year, but owing to their not having the elasticity necessary for the "giving" of the rails, they have not proven a success. Another reason to prevent their general use is the cost. As long as wooden ties can be purchased at about one-third the cost of iron ties, the former will continue to be used. An iron tie cannot be made to weigh much less than the present wooden tie, or about 250 pounds. The life of a wooden tie is from 9 to 12 years. Where the ground is well drained, some of the best white oak ties will last longer than that time. They cost about 50 cents each, and are made at nearly every sawmill in the country. It is estimated that, when put down, packed, lined, etc., they will cost about $1.10 each. This includes labor and everything. A second-class tie will cost about 44 cents delivered on board the purchasers' cars.

DESTROYING MACHINERY.—It is a fact that more machinery is destroyed through ignorance and carelessness than by use. Men who are very careful, and even miserly, in their money matters are often the ones who lose most by bad management and carelessness in regard to the use of their machinery. Indeed, in many cases the premature breaking down of well-made machinery is directly traceable to the miserly instincts of the owner, and his unwillingness to employ and pay a competent person to care for and operate it. Of all penny-wise and pound-foolish policies, this kind is the least excusable. It often brings undeserved blame and discredit upon the honest manufacturer, which is not compensated by the additional profit he may derive from replacing the worn-out machines with new ones.—*Southern Lumberman.*

COMPOUND ARMOR VS. STEEL PLATES.—The long-continued experiments which have been conducted on board the Nettle, at Portsmouth, with the view of determining the respective merits of compound armor and of solid steel armor as a protection for battleships, have just been brought to a close. Only two Sheffield manufacturers sent in compound samples for competition, but the number of steel plates forwarded for trial amounted to eight, from as many makers, being two less than were expected. The ten-inch plates were attacked by steel and Palliser projectiles, at a range of 30 feet, and although two of the solid steel armor plates at least underwent the crucial ordeal with satisfactory results, the superiority remained with the steel-faced armor now adopted in the navy.

STEEL SPIKES.—A New Castle (Pa.) dispatch says that a series of experiments were tried at the Etna Iron Works on January 7th, in the manufacture of steel railroad spikes. The object is to make a finished article by rolling the bar so that its width will be the length of a spike, and in such a shape that the spikes may be cut from it with shears, pretty much as a cut nail is made, except that the head is formed in the rolling process. The first test was made by running through some steel rails that had been slowly heated for 2½ hours. The result was fairly successful, and it is thought that a few changes in the rolls will make the operation entirely satisfactory. Should the scheme be successful, it will work a revolution in the cost and manner of making railroad spikes.

AMERICAN STOVES IN EUROPE.—American stoves are so far superior to those in common use in large parts of Europe that manufacturers here might reasonably expect to find markets abroad sufficiently ample to absorb all their possible surplus. But a difficulty exists in the inferior coal consumed on the continent. Not long ago a Pittsburg manufacturer shipped a lot of stoves to Germany, and, being informed that they failed to give satisfaction, learned after investigation that the coal used produced many clinkers and slag. The better grades of coal were too expensive for general consumption. A variety of artificial substitutes can be had, but as a rule economy is consulted rather than comfort.

STEEL CARS are fast coming into use. A large manufactory of such cars will soon be put in operation for their manufacture in Chicago under a California patent. The first steel postal car ever constructed has just been finished at the railway shops at New Albany by the American Fire-Proof Steel Car Company. It is built of plates of steel, lined with asbestos, and is admirably braced by means of steel rods running the entire length of the car, the rods being fastened by an ingenious device into the steel posts. The floors are of steel, as are the platforms and steps, and there is no wood whatever about the car except the timbers of the trucks.

HOW TO DRILL HARD STEEL.—Having to put a pivot in a pinion-wheel, on attempting to drill, I found no drill that I could make would cut it. I thought of trying the same lubricator as for cutting or drilling glass, viz., turpentine, and to my great surprise I found the same drills cut freely and enabled me to get over the difficulty. In a long experience and with many men, I never heard of it being used before, and if not generally known, if tried I am sure will remove a difficulty that I know has existed with many repairers.—*Manufacturing Jeweler.*

CALIFORNIA IRON.—The Pine-Street Railway Company of this city has earned the gratitude of the iron manufacturers of the State by promising to use California iron in the construction of the new cable railway on Pine street. California-made wheels are in use upon the Geary-street road, and are found to be just as good as the Eastern article. A committee of the iron trade has or will wait upon the Directors of the Hibernia Bank and request them to specify in all contracts for iron work that it must be made in this State.

LOCOMOTIVE-BUILDING IN RUSSIA.—According to a correspondent of *Industries*, the Russian Minister of Railways proposes asking for a credit of 9,300,000 roubles for the purchase of 300 locomotives. Each engine, according to these figures, will cost over $23,000. The engines are all to be built in Russia.

HOLLOW STEEL INGOTS are being made in Sweden by casting steel in molds hung on trunnions, allowing the sides to chill to the required thickness and pouring out the steel still liquid in the center. These hollow ingots go to England, where they are drawn out cold to tubing.

TO WHITEN BRASS.—Small articles of brass or copper may be whitened by boiling them in a solution of three-fourths of one pound cream of tartar, two quarts of water, and one pound of grain tin or any pure tin finely divided. The tin dissolves in the cream of tartar and is again precipitated on the brass or copper.

DR. WILLIAM GARRARD, the first manufacturer of tool steel in the United States, died of old age at his home in Fallston, Pa., on Monday, March 18th, aged 86 years. He first engaged in the steel business at Cincinnati, Ohio, in 1840.

DRILL POINTS heated to a cherry-red and tempered by being driven into a bar of lead, will bore through the hardest steel or plate glass without perceptibly blunting.

SCIENTIFIC PROGRESS.

Recent Changes at Niagara Falls.

There have been recently two very heavy falls of rock at Niagara Falls. At first a mass of rock fell from the Horseshoe falls, and 24 hours later another mass was precipitated into the abyss below, with a noise so closely resembling that of an earthquake as to alarm the residents of the neighborhood. The result of the displacement is a change in the shape of the fall. Formerly the Canadian portion of the fall could be described as a horseshoe; but the breaking away of rocks in the center some years ago made it V-shaped. Now that a further displacement has occurred, the fall has returned to its old condition. It is, of course, generally known that the Falls of Niagara are gradually moving to the south. The deep cut through the solid rock marks the course they have taken in their backward movement. It is a wonderful excavation, a chasm dug out by the sheer force of water. Not less astonishing has been the removal of the debris. The rock has been thoroughly pulverized, and has been swept out of the river to be distributed in Lake Ontario. Once it was thought that in the wearing-away process the falls would reach Lake Erie, and there degenerate into a series of rapids. But the theory has been set aside by one which retains the cataract, although the latter will be the shadow of its present self, and much reduced in size. The latest idea is that the falls will recede two miles and then remain stationary, their hight at that point being 80 feet, instead of 164, as at present. The supposition is supported by an argument which appears reasonable. The present site is a limestone formation, some 80 or 90 feet thick, with a shaly foundation. As the shale is washed away the limestone breaks off, and the falls take a step backward. But the end of the shaly deposit will be reached two miles from the present falls, and then the rushing water will have more than it can do to wash away the solid precipice over which it will be projected. It would be a waste of time to attempt to estimate the number of centuries that will elapse before Niagara Falls have found their permanent site.

CHEMICAL ACTION OF A MAGNET.—The chemical action of a magnet has been described by H. A. Rowland and L Bell in the *Journal of the Chemical Society*. Two iron rods are imbedded in insulating material, the point of one and the side of the other being laid bare by removing the insulation. The rods are placed in a beaker between the poles of an electro-magnet, and connected with a galvanometer. They are acted on by various reagents. When perpendicular to the lines of force, no current is produced. When parallel, a current is produced, the sharp-pointed rod forming the negative element; soon afterward reversal takes place. The direction of the current is independent of that in the magnet. Similar but much weaker effects are produced with nickel and cobalt. The action is greatest with substances which, like nitric acid, attack the iron without evolution of hydrogen. The reversal can be annulled by preventing motion in the liquid by means of gelatine or sand. The electro-motive force varies from 0.0001 to 0.02 volt. The evolved hydrogen probably acts mechanically in reducing the current. The protection of the pointed end from the reagents is due to the increased energy required to remove the iron in opposition to magnetic attraction. No differential action is observed with plane surfaces, but where a point occurs, protection ensues, and the elevation increases in size.

CLOUD MEASUREMENTS.—Some very important work in the measurement of clouds is now performed at the University of Upsala, Sweden, which has attracted much attention among meteorologists. When opportunity offers, the hight of clouds is determined thrice by simultaneous observations at two telephonically connected stations about a mile apart; the angles of conspicuous points are carefully noted by means of specially adapted instruments, thus affording data of a much more satisfactory character for fixing distances than have been obtained by the photographic method. Clouds have in this way been measured at the great hight of nearly 44,000 feet, and the immense velocity of 112 miles an hour has been ascertained in the case of a cloud 28,000 feet high. One of the most interesting results which has been developed by these measurements is the fact that clouds are quite regularly distributed in three layers, the mean summer levels at this point of observation showing the suggestive data: Low clouds—stratus, cumulus, cumulonimbas, 2000 to 6000 feet; middle clouds—stratus cirrus, 12,000 to 15,000 feet; high clouds—cirrus, cirro-stratus, cirro cumulus, 20,000 to 27,000 feet.

A NEW PRINCIPLE FOR KEEPING PLANTS through the winter without artificial heat was recently shown at Regent's Park, London, with the plants grown in them last winter. The essence of the invention is that all light and heat shall previously pass through a shallow layer of water. The water is found to exercise great control over temperature, protecting plants entirely from frost in winter and from excessive direct heat in summer. The application involves no difficulty. In the case of a garden frame, a sliding "water-light," about three inches deep, is made to fit over the frame containing the plants; the only difference from a glass light being that it holds water and is always placed in a flat position. The depth of water generally kept in the tank is about two inches in winter and summer, and half the depth in spring and autumn.

LIFE MAY CANNOT SEE.—Not only are the ultimate divisions of matter vastly beyond man's powers of assisted vision, but even living animals are known of such smallness that the most powerful microscopes fail to reveal them. According to Dr. Royston Pigott, the bacilli (rod-shaped bacteria) of typhoid fever are filaments only 1-500 of an inch long and 1-125,000 of an inch thick. Such germs are gigantic, however, in comparison with some of the micrococci (spherical bacteria) seen in putrid meat infusions. These are usually from 1-25,000 to 1-30,000 of an inch in thickness, and are sometimes inconceivably more minute. The smallest of the micrococci are discoverable in decomposing cod's head, the organisms on bursting from their parental sac being utterly too small to be recognized by any instrument. It is estimated that at birth they must measure considerably less than one-millionth of an inch, and they can only be discovered after some hours of growth. Yet when first visible their forms comprehend the special apparatus of their fuller organized life.

CURIOUS ILLUSION.—A curious illusion of vision has been made the subject of investigation by a French scientist, the result of which, it is thought, may account for the apparent oscillations or swinging of stars sometimes observed; that is, on the eye looking constantly, for a considerable period of time, at a small, feebly lighted body, itself being in complete darkness, the body appears to oscillate or to describe certain curves. A study of this phenomenon has led to the conclusion that it is of the subjective order, appearing to be, in fact, of the same nature as the movement of a star observed when a person leans his hand against a wall and fixes his eye upon the star, the star appearing to be agitated in its place and to oscillate rapidly. In order that the motion be noticed, there should be no moon and the sky should be clear.

SIZE AND MOVEMENTS OF TORNADOES.—Prof. J. P. Finley gives the width of the path of destruction in tornadoes, as determined from the records of 88 years, at from 10 to 10,560 feet, the average being 1369 feet. The length of the tornado track varies from 300 yards to about 200 miles, the average being 24.79 miles. The velocity of progression of the tornado cloud varies from 7 to 100 miles an hour, the average being 44 11 miles. These extremes may often occur in different portions of the track of a single tornado. The shortest time occupied by the tornado-cloud in passing a given point varies from "an instant" to about 20 minutes, the average being 74 seconds.

LIFE OF INSECTS.—It is well known that Sir John Lubbock has shown how long insects may live when kept out of harm's way. The greatest age yet attained by any insect, so far as is known, is that reached by a queen ant (*Formica fusca*), which lived in his care until August 8, 1888, when she must have been nearly 15 years old. Another queen of the same species died at the advanced age of over 13 years. He has now a queen of another kind of ant (*Lasius niger*), which is more than nine years old "and still lays fertile eggs, which produce female ants."

WHY FIRES BURN BRIGHTLY IN WINTER.—There are several reasons why a fire burns so brightly in frosty weather. First, the air being cold is denser, and the heated air and gases from the fire are comparatively more buoyant, consequently there is a greater draught. Then the air, being denser, contains more oxygen in an equal volume, and that gas being quickly supplied, the combustion is fiercer and more perfect. In frosty weather, too, the atmosphere is comparatively free from moisture, which of course has a tendency to intensify a fire.

LOST COMETS.—According to Prof. Kirkwood's researches, 7 of the 20 known comets of short period have disappeared, either by breaking into fragments or by the transformation of the orbit by the influence of Jupiter. He has heretofore given reasons for concluding that two of the short period comets were asteroids drawn from their orbits by Jupiter's attraction, and he now advances evidence tending to show that the entire 20 were originally small planets.

THE AURORA BOREALIS.—Before the Royal Society, London, Norman Lockyer recently read a paper on the spectra of the aurora borealis and of the lightning flash. He attributes the aurora borealis to minute particles of dust floating in the highest regions of the atmosphere, which dust he supposes to be produced by the fall of meteors.

THE AMERICAN ASSOCIATION for the Advancement of Science is to meet at Toronto, Can., Aug. 27th, and the expectation is that the occasion will attract a large number of visitors. The session will probably close on the 4th of September.

A CULTIVATED DANDELION.—It is said that a florist at Lancaster, Pa., has so improved the dandelion that he has produced specimens ten inches in diameter.

Good Health.

Paralysis Becoming More and More Common.—There is a disease which is certainly becoming more common every day, writes Dr. W. A. Hammond to the Pittsburg *Dispatch*, and from which recovery is so rare that many physicians most capable of judging doubt if it ever takes place, and that is general paralysis, or general paresis, as it is sometimes called. While probably not resulting from any particular occupation, as such, it may be caused by any employment which is above the mental capacity of the individual, or which involves great anxiety or in which there are reverses or disappointment. It is especially prevalent among those who are engaged in financial speculations or in some business requiring inventive powers or a degree of knowledge which the person does not possess. It is a most terrible outcome of the struggle for wealth and position in which the whole civilized world seems to be now engaged. Those who are satisfied with their lot in life or who, if not contented, have no hope of improving their condition, and hence make no effort in that direction, are never affected with this disease. I doubt if a single case occurred among the slaves of the South, while since their freedom it has made its appearance among them and their descendants. There are both mental and physical symptoms in general paralysis, and while the approach of the disease is generally insidious, its presence is indicated by certain phenomena which are unmistakable in their significance. Chief among these is what the French call *delire de grandeur*, the delirium of grandeur. The patient, for instance, imagines that he is the richest or the most powerful, or the strongest or the handsomest man in all the world.

Emotional Prodigality.—Something has been wisely said of late about the danger of over-pressure in our schools. The time spent in study that ought to be spent in outdoor play or in exercise in gymnasia is worse than wasted. But the over pressure of intellectual work would not be so bad were it not for the emotional prodigality of many children both at home and at school. Teachers are spurred to strain pupils to the utmost that they may meet the coming tests for promotion. The healthy, spontaneous emotions that make it the delight of childhood to learn are crushed, and factitious emotions of fear and dread are substituted. At home the emotional excitement is often greater than at school. Prizes, the expectations of parents, piano practice, company, parties, dances, petting and reproofs are the stimuli, culminating often in late hours spent in preparing a half-dozen lessons for the next day. The tasks at school, hard as they are, often are less injurious to children than the emotional dissipation at home. Again, the storm and stress of emotional activity that often occurs at adolescence is liable to cause an alarming waste of energy; and there is danger that habits will then be formed of allowing the emotions to evaporate or to expend themselves in unessential, pedantic and morbid activities. Whoever revels in emotion and squanders nervous energy at one period of life will lack the needed support for intellectual activity at another period.—*From "Economy in Intellectual Work" in Scribner's Magazine.*

Climate and Distribution of Cancer.—In concluding a series of papers on the geographical distribution of cancerous diseases in the British Isles, A. H. Haviland says (*Lancet*, March 10, 1888): "I maintain that those who would give themselves the best chance of avoiding those local conditions which are coincident with a high death-rate from cancer should study well the distribution of this disease in England. There is abundant evidence there to show that cancer does not thrive in high, dry localities, where the soil is kept sweet by the absence of floods, and the nature of the rocks which either underlie it or form its principal constituents; and that it does thrive and become very fatal where floods prevail, where their emanations are sheltered and intensified, where vegetation is killed and decomposed, and where, after the floods have passed away, a rank herbage springs up, composed of sour grass and bitter plants, which scour and otherwise disease the horses, cattle and sheep that feed upon them. Much has to be done, much has been pointed out, and if the 22 high mortality and the 16 low mortality districts were well studied in connection with the various factors which we have seen to be coincident with high or low death-rates, I believe that much would be added, much would be corrected, and much revealed that we little think of now."

The Axe Cure for Colds.—"I can tell a cold the moment it gets a grip on me," said an old farmer of my acquaintance, "and I have cured them lots of times without spending a cent for medicine. The minute I feel it coming, I hunt up my axe and start for the woods. The toughest old stump I can come across will suit me best, and if I can manage to work myself in a sweat I know I'm as well as cured. A few minutes after, the thing begins to loosen on my lungs, and then I can cough it out in short order." Arm-exercise would, indeed, seem to act as the promptest specific in such cases, and dumb-bell practice misses its purpose more frequently only on account of the circumstance that muscular efforts with practical purpose can be kept up much longer than crank-work gymnastics. Swinging a heavy axe is really much harder work than Indian club exercise, but the visible results of the effort, the flying chips and widening splits, appear to act as a mental stimulus in preventing fatigue.—*American Rural Home.*

The Best Mode of Preparing Beef Tea for the Sick.—Take one pound of lean beef cut into small pieces. Put into a jar without a drop of water; cover tightly, and set in a pot of cold water. Heat gradually to a boil and continue this steadily for three or four hours, until the meat is like white rags and the juice all drawn out. Season with salt to taste, and when cold, skim. The patient will often prefer this ice cold to hot.

Comparative Fatality of Drinking Men. In all the Prussian hospitals during the year 1878-79, there died from the ranks of the drinkers 19 per cent, while from the entire number of patients there was only a mortality of 10 per cent. Of those afflicted with pneumonia, 53 per cent of the drinkers died, while only 18 per cent of the other pneumonia patients died.

Suicides.—It is said that Saxony furnishes the largest percentage of suicides of any civilized State. The number last year was 1104, or one to about every 3000 of the population. In 1881 the total number was 1248.

A New Remedy for Mumps.—It is said that the Lewiston (Me.) druggists keep large quantities of tow for sale. It is in great demand as a remedy for mumps. It is worn around the neck of the patient.

To Avoid Consumption.—Will Carleton attributes his escape from early death by consumption to daily and persistent inflation of the lungs with fresh air. He is now 42 years old.

No Alcoholic Stimulants.—The homeopathic hospital in Philadelphia was successful in restoring patients from typhoid fever last year without the use of alcoholic stimulants.

The Morphine Craze is growing. A Portland, Me., manufacturer has made and sold 25,000 hypodermic needles since 1886.

Useful Information.

How to Save Sagging Plastering.—The ceiling must be first pressed back into place. To do this, take two pieces of scantling, long enough to reach over the defective part. Nail upon them laths about two or three inches apart. Place this framework, lath side up, against the plastering above them. With other pieces of scantling, reaching from this framework to the floor, support and lift it up against the ceiling, driving wedges under the floor end of the supporting scantling, which will bring the ceiling in place and keep it there. To prepare the nails: Put them in a vise. With a hack-saw, saw slots in their heads like a screw (only slightly, but so that a sharp screwdriver will hold in the groove), then with the screwdriver turn the nail to the right and then to the left, gently pushing it first through the plastering, then into the lath above, still pushing and gently turning. The head of the nail can be screwed into the plaster flush, so as to make a neat job, and hardly be noticeable on the floor beneath. The nails hold very firmly. Once in every six, eight or ten inches square for a nail will be usually sufficient. If the plaster is very porous and shaky, small copper washers may be used on the nails, but it must be very far gone to need them. Driving nails in with a hammer would destroy the whole fabric. Take down your lath framework, and there you have your piece of ceiling as firm and nice as it ever was.—*Scientific American.*

The Wood-Oil Industry of Sweden seems to be rapidly growing into considerable importance. The French scientific journal *La Nature* states that the extraction of oil from wood in Sweden is becoming year by year a more important industry. Those parts of the trees which have hitherto been regarded as useless, such as the stumps and roots, are no longer left in the forest to rot, but are subjected to various methods of treatment, by which not only wood oil, but also turpentine, creosote, acid of vinegar, charcoal and tar are obtained from them. The oil as it is now usually extracted cannot be burnt in ordinary lamps, for it smokes too much. But it may be used in special lamps, which are not dissimilar to the usual photogen lamps. The latter can easily be adapted to wood oil, and when the oil is mixed with a certain quantity of photogen it may be consumed in ordinary lamps. It costs about 3d. per pint, it does not explode and lasts 25 times longer than photogen. When intended for lighting it is extracted wholly from pines and firs. Thirty factories in Sweden make its extraction part of their business and the production is now considerable.

The Fist and the Foot.—A youth who went into a Buffalo store and asked for socks, not knowing the proper size, was told to hold out his hand. The customer held out his hand and doubled up his fist as directed. The clerk took a sock from a box, wrapped the foot around the fist and guaranteed a perfect fit. "I am just as sure it will fit you as though I had measured your foot," said he, "as the distance around the fist is always the length of the foot."

How Coffee Came to be Used.—It is somewhat singular to trace the manner in which arose the use of the common beverage of coffee. At the time Columbus discovered America it had never been known or used. It grew only in Arabia and Upper Ethiopia. The discovery of its use is ascribed to the Superior of a monastery in Arabia, who, desirous of preventing the monks from sleeping at their nocturnal service, made them drink the infusion of coffee upon the reports of shepherds, who observed that their flocks were more lively after browsing on the fruit of the plant. Its reputation spread through the adjacent countries, and in 200 years it reached Paris. A single plant, brought here in 1714, became the parent stock of all French coffee plantations in the West Indies. The Dutch introduced it into Java and the East Indies. The extent of the consumption can scarcely be realized. The United States alone annually consume it at the cost, at its landing, of from $15,000,000 to $16,000,000.

Floated by Means of Dead Cattle.—It has been said that every work of invention has its parallel in nature. But it would not be anticipated that the method of raising sunken steamers by forcing air into casks which have been secured to them would find such a parallel. Yet such has been the case on the Ohio river, where the steamer Robert B. Carson sank near Evansville, Ind., drowning 30 head of cattle that were confined on the lower deck. Efforts to pump the vessel out were not successful, and the boat was abandoned. A few days later, however, it was found to be floating, the fact that the putrefying carcasses of the cattle had become inflated by the gases generated in putrefaction, and their combined buoyance was sufficient to raise the steamer again.—*Scientific American.*

To Prepare Shellac for Use.—Shellac can be dissolved in alcohol and kept in a liquid form, in a close-stopped bottle, to prevent evaporation. To use it, it is only necessary to apply it where necessary by the pointed end of pegwood, or small camel's-hair brush, and gently heat over a lamp, when it will quickly solidify; or, it may be used as received from a drug store. A good way to do when setting pallet jewels, ruby pins, etc., is to heat a piece over the lamp and draw it out to a long, slender thread, then break the end in small particles of suitable size for cementing the jewel. By this means the shellac can be placed just where it is needed, and it will not run over the pallets or table roller.

Beet Root Sugar in Nebraska.—Nebraska, it is said, will enter this year upon the manufacture of beet-root sugar on a scale of some magnitude. Those who will engage in the culture are mostly Germans who have been skilled in the raising of the sugar beet in the old country, and a large sum has been subscribed to secure the production of the beet sugar in the market. It is said that the soil is adapted to the cultivation of beets and the climate favorable, but this can be claimed only after the experiment has been fully tried.

Acids in Lubricating Oils may be detected by analysis in a laboratory, or by putting the sample to be tested in a clear glass bottle with copper wire running down through the cork, air-tight. Stand the whole in a sunny place for two or three weeks, and then, on removal, if verdigris or green rust appears on the copper, an acid is in the oil.

The Telephone Investment.—The Bell Telephone Company is looking ahead, and proposes to expend $50,000,000 additional before the expiration of its patent and contract with the Western Union in 1893. After that time the company will have the finest telephone and telegraph system in the world.

Reducing Working Hours.—Edward Atkinson says that in the last 50 years factory work has been reduced from twelve or more to ten hours per day; in the building trades from eleven or twelve to nine or ten hours.

Onyx.—The Mexican marble, which we know as Mexican onyx, is not onyx at all. Onyx is an agate consisting of parallel layers of chalcedony. Marble is a carbonate of lime.

Lignum-Vitæ has been successfully used for blocks on piston cross-heads, and is said to be superior to metal for that purpose, requiring less oil and never heating.

An Alloy.—Compounded in ten parts aluminum and ninety parts copper, that simple alloy gives the best bell metal and the finest gun metal in the world.

A Muscular Potentate.—The Czar of Russia recently picked up 700 pounds of steel in a Petershoff gun factory. The workers cheered heartily.

Paint Stains that are dry and old may be removed from cotton or woolen goods with chloroform. First cover the spot with olive oil or butter.

Pump and Piston.—The ordinary speed to run a pump is 100 feet of piston per minute.

Forest Commissioner Miller.

Referring to the Governor's appointment of Joaquin Miller as a member of the State Board of Forestry, the *Alta* says:

It is excellent in all its bearings. The new Commissioner is a man of world-wide fame, and this linking of his name with California is to the State's credit. But aside from this, he has a profound knowledge of forestry. It is that kind of knowledge which can be gained only by the most affectionate and appreciate conversation with Nature. His lore was learned in the forests primeval, and its lessons have been sharpened by travel and observation in many lands where civilization and the forests have declined and decayed together. The late Gov. Bartlett, appreciating his merits, appointed him to represent the State at the last National Forestry Congress, and his paper read to that body was not only a most delightful literary performance, but a keen, practical discussion of the subject. It has been translated and published in Europe, where its conclusions are accepted by individuals and official bodies specially interested in the preservation of forests. In his own original way Joaquin Miller will convert the functions of the Commission to practical uses immensely beneficial to the State. In his lofty homestead in the Contra Costa mountains he has, with his own hands, toilfully assembled the useful and ornamental members of a forest family of trees, whose umbrage will, in after days, be made classic by his memory. His work with spade and pick has already written on the far-rising slopes a poem in trees, which will be read by thousands who look upon it from the bay in the future years, when what he has wrought there will be among the places of refined pilgrimage which add to the attractions of San Francisco.

Timber on Government Land.—A rule of the Department made on the 28th day of April, 1888, by the Commissioner of the General Land Office, and approved May 12, 1888, by the Secretary of the Interior and Attorney-General of the United States, and which is now in force, reads as follows: "Homestead or pre-emption claimants who have made bona fide settlements upon public lands, and who are living upon, cultivating and improving the same in accordance with law and the rules and regulations of this Department, with the intention of acquiring title thereof, are permitted to cut and remove, or cause to be cut and removed, from the portion thereof to be cleared for cultivation, so much timber as is actually necessary for that purpose or for buildings, fences and other improvements on the land entered. In clearing for cultivation, should there be a surplus of timber over what is needed for the purposes above specified, the entryman may sell or dispose of such surplus; but it is not allowable to denude the land of its timber for the purpose of sale or speculation before the title has been conveyed to him by patent. The abandonment of a settlement claim after the timber has been removed is presumptive evidence that the claim was made for the primary purpose of obtaining timber."

The Floating Logs and the Ocean Currents.—Mr. Leary, of big raft fame, may console himself for the loss of the great raft that broke up off the New England coast with the knowledge that the logs are not floating in vain. They are still making their way eastward and southward in large numbers, and when sighted by vessels their exact position is noted and a memorandum sent to the Hydrographic office in Washington. Already many of these reports have been received and compared, and the result is a chart, that could not have been obtained in any other way, showing the courses of various ocean currents.

The United States Fish Commission has expended $140,000 during the past year on this coast in constructing hatcheries, collecting eggs for distribution, etc. The superintendent, Livingston Stone, reports that 1,500,000 salmon eggs were taken from the McCloud river hatchery. The greater number of these were hatched and placed in the streams again.

Honduras Mines.—The famous group of silver mines at Opoteca, at present owned by Capt. F. M. Imboden, are about to be worked on a large scale. In the last century the above mines were worked by the Spanish Crown to a large extent, producing for years large amounts of silver. English capital will work these mines.

A whale and her suckling calf were washed up on the beach at Santa Barbara light during the recent storm, and, becoming stranded at low tide, could not get off. The mother whale was 60 feet long and the young one eight.

Gov. Waterman has announced his intention to set aside and appoint Tuesday, April 30th, as a legal holiday, in commemoration of the organization of the Government of the United States under the Constitution.

The Anaconda people believe that the fire which caused the loss of the big reduction works was undoubtedly the work of an incendiary.

Mr. Mitchell, who has been nominated for Commissioner of Patents by the President, is a patent attorney of New Britain, Conn.

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TABLE OF CONTENTS.

EDITORIALS.—Wheeler's Improved Surface Condenser; Manganese Ore, 239. Passing Events; Surface of Mining Claims; Astronomical Society of the Pacific; Maritime Protection. 246 Crushing Lumps of Roasted Ore; The Late Arthur Nahl; Ozocerite, 247.

ILLUSTRATIONS.—Wheeler's Surface Condenser, 239. Machines for Grinding Soft Ore, 247.

CORRESPONDENCE.—Raining Rocks, 240.

MISCELLANEOUS.—California River and Harbor Commission; Notes on Leaching Silver Ores; The Sprague Electric Railway, 240. Mossbrae Falls; Clay Selvage, 241. Forest Commissioner Miller, 245

MECHANICAL PROGRESS.—Wrought Iron Pipe Manufacture; Iron and Steel in Ship Building; Iron Railway Ties Not a Success; Destroying Machinery; Compound Armor vs. Steel Plates; Steel Spikes; American Stoves in Europe; How to Drill Hard Steel; California Iron; Locomotive-Building in Russia; To Whiten Brass, 244.

SCIENTIFIC PROGRESS.—Recent Changes at Niagara Falls; Chemical Action of a Magnet; Cloud Measurements; Life Man Cannot See; Curious Illusion; Size and Movements of Tornados; Life of Insects; Why Fires Burn Brightly in Winter; Lost Comets; The Aurora Borealis; A Cultivated Dandelion, 244.

GOOD HEALTH.—Paralysis Becoming More and More Common; Emotional Prodigality; Climate and Distribution of Cancer; The Axe Cure for Colds; The Best Mode of Preparing Beef Tea for the Sick; A New Remedy for Mumps; To Avoid Consumption; No Alcoholic Stimulants, 245.

USEFUL INFORMATION.—How to Save Sagging Plastering; The Fist and the Foot; How Coffee Came to be Used; Floated by Means of Dead Cattle; To Prepare Shellac for Use; Beet-Root Sugar in Nebraska; The Telephone Invesment; Reducing Working Hours; Onyx; An Alloy, 245.

OUR LUMBER INTERESTS.—The Lumber Trade; Timber Lands in Fresno; Origin of our English Lumber Trade; Immense Franchises Involved; Giants of the Forest; The Forests of Washington Territory, 249.

MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 242-3.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 254.

Business Announcements.

[NEW THIS ISSUE.]

Miner's Candlestick—G. Werntz, Placerville, Cal.

Stenographer and Typewriter—Ella M. Carpenter.

See Advertising Columns.

Passing Events.

The Somerville coal mine at Mt. Diablo has been started up again after lying unworked for the past 13 years. The mines in that region are the most important and productive ever found in this State, though of late years the output has been comparatively limited, better coal now coming from the upper coast.

The news of the terrible hurricane in the South Pacific, during which six men-of-war were wrecked and many lives lost, has been the sensation of the week. The hurricane did great damage in many of the groups of islands, though few details of the losses have yet been received.

Letters have been received from Stanley, the explorer, who has found Emin Pasha, but who has had terrible experiences during his trip through Africa. Vast forests have been traversed during the march, and many hostile tribes met.

Several small local "gold excitements" have been started of late in the southern counties of California. The old Julian and Banner districts, in San Diego county, are again attracting attention, mainly through the richness of Governor Waterman's Stonewall mine at the foot of Cuyamaca mountain, some eight miles from Julian. These mines were discovered in 1869, but of late there has been a revival of interest and many prospectors are hunting the hillsides and mountains in hopes of finding another Stonewall.

Surface Ground of Mining Claims.

Side Lines and Boundaries.

In deciding the suit of the Found Treasure vs. North Commonwealth mines, Tuscarora district, Nev., some important points relating to the side lines of claims, and the powers of the U. S. Land Commissioner, were passed upon. Plaintiff attacks the validity of the patent—for the full quantity of the surface ground granted by it—for the reason that it appears upon the face of the patent that more surface ground was ceded than is allowed by the mining laws of Congress, and contends that this objection is also fully confirmed by the papers introduced by the defendant and the proofs offered to support the patent.

The defendant insists that the patent cannot be attacked collaterally, that the commissioner had full jurisdiction to act, and that his action is conclusive. It is undoubtedly a well-settled principle that in actions at law patents are not assailable collaterally; that the patent is conclusive as to all matters, the commissioner acting within the scope of his authority.

This was not an action at law and the patent was not collaterally impeached; but was directly in issue. On April 19, 1878, Epply made a location of 1120 feet upon a lode extending on the vein northerly and southerly each way 560 feet from the shaft. The notice designates the shaft then being sunk as the point of the ledge and the location of the claim. The following day U. S. Deputy Surveyor Tracy made a survey of the claim, and as he is required to do by law to note all workings, improvements, etc., on the claim surveyed by him, specified in his field notes of the survey, that the only workings upon the ground was a shaft with shaft-house then being sunk, 118 feet deep. A claim cannot be located under the law until a ledge or vein is discovered.

The judge concludes from all the evidence that this deep shaft referred to was the point of discovery. In none of the proceedings is any other shaft referred to at the time of location and survey. The ledge being discovered at this shaft, Epply was entitled to 300 feet of surface, on each side of the ledge, and no more. The law expressly limits the locator to 300 feet from the center of the ledge, and when explorations have not been made to determine the width of the ledge, it is a settled principle that the center of the discovery shaft shall be taken for the purposes of locating this 300 feet of surface. The witness Mr. Banfield testified that the discovery point was in a shaft 12 feet deep, then being sunk near the location point. The plat of the ground, accompanying the application for patent, and the plat in the patent as issued, does not contain any such shaft; the only points designated in these two plats is the deep shaft referred to and the point of location, distant 58 feet from this shaft. If the discovery shaft had been at the place it is now claimed to have been, it would undoubtedly have been so characterized in the plat of the claim for the patent, and as well as in the patent itself. On the 27th of November, 1883, the Commissioner of the Land Department refused to grant the application for a patent, as applied for, for the reason that the shaft as designated in the application, and on the plat accompanying, the shaft mentioned and located was the discovery shaft, and the distance from it to the southerly line was more surface than they were entitled to receive. At this time the plaintiff was in possession of and working the claim, and within the southerly line, possibly, as the defendant claimed this line to be at the trial. Upon receiving this notification, the defendant sent to the land office direct, without filing in the land office at Eureka, affidavit that the discovery was at or near the location point. The commissioner thereupon caused the patent to issue. The vein in contention is not the one located, but a side one that defendant claims by virtue of the top or apex of the same being within its side lines as patented. The question is presented, whether the commissioner had power to issue a patent granting 300 feet on either side from the location point, or whether he was restricted to cede that quantity on either side of the center of the ledge actually located. The law, as has been stated, expressly limits the amount of surface to 300 feet on each side of the center of the ledge located; he had no authority or right to grant more than the law allows, and any disregard of this restriction renders his action, to such excess, as unauthorized, inoperative and void. The patent having been issued for 300 feet from the location point, instead of 300 feet from the center of the ledge located and claimed, as indicated at the shaft, on the diagram, contained in the patent, and the quantity of surface ground granted by the patent being 358 feet southerly from the ledge at the shaft, the patent is void and inoperative as to the excess of 58 feet. This removes all cause for contention between the parties as to the vein or lode in dispute.

The Judge says in conclusion: "Many witnesses were examined on either side, whose statements were quite conflicting in some respects as to vein formation, but I deem it unnecessary to review the testimony, as I conclude, for the reasons stated, and from all the proofs in the case, that the top or apex of the vein in dispute is in the Found Treasure claim, and not in that of the defendant." A decree will be entered for the plaintiff as prayed for.

Astronomical Society of the Pacific.

A meeting of the new Astronomical Society of the Pacific was held on Saturday evening last, Prof. E. S. Holden in the chair.

On motion the following applicants were admitted to membership: J. M. Selfridge, Wm. Alvord, A. O. Leuschner, Wm. F. Herrick, E. M. Bixby, H. T. Compton, C. F. Montealegre, Miss Rosa O'Halloran, W. Letts Oliver, E. B. Jordan, James G. Jones, Eugene Frost, C. Mitchell Grant, Prof. J. T. Wallace, T. P. Andrews, H. W. Harkness, C. F. Crocker, Henry Kahn and A. W. Ross, Jr.

A committee consisting of Messrs. Runyon, Soule and Tyler was appointed to nominate a board of 11 directors and a Committee on Publication.

The Committee on Nominations reported in favor of the following-named gentlemen as directors: E. J. Molera, Charles Burckhalter, J. M. Schaeberle, William Alvord, W. H. Lowden, W. C. Gibbs, Wm. M. Pierson, Dr. Wm. Boericke, Professor Frank Soule and C. Mitchell Grant.

The action of the committee was indorsed by unanimous vote.

Dr. W. A. Dewey, A. G. Treat and F. R. Ziel were elected a Committee on Publication.

The treasurer reported the receipts to date as $125.

A paper "On the Work of an Astronomical Society" was read by Prof. Holden. We shall shortly publish this in the PRESS.

After the regular meeting had adjourned the following officers were chosen by the Board of Directors:

Prof. E. S. Holden, President; Wm. M. Pierson, W. H. Lowden and Frank Soule, First, Second and Third Vice-Presidents; Charles Burckhalter and J. M. Schaeberle, Secretaries; and E. J. Molera, Treasurer. The Bank of California was designated as the custodian of the society's funds.

After appointing W. C. Gibbs and W. M. Pierson a Committee on Finance and electing Wm. Alvord a life member, the board adjourned.

The next meeting of the society will be held at the Lick Observatory, Mt. Hamilton, the last Saturday in May.

In addition to those elected at this meeting the society has the following members: E. J. Molera, A. P. Redington, Geo. W. Reed, C. L. Goddard, O. V. Lange, F. H. McConnell, S. C. Partridge, W. H. Lowden, E. W. Runyon, Wm. Boericke, W. A. Dewey, F. R. Ziel, Wm. M. Pierson, Chase Gitchell, Geo. Tasheira, V. J. A. Rey, A. J. Treat, J. H. Johnson, S. C. Passavant, W. B. Tyler, Wm. Irelan, C. Burckhalter, Ed. Gray, W. C. Gibbs, C. P. Grimwood, E. S. Holden, S. W. Burnham, J. M. Schaeberle, J. E. Keeler, E. E. Barnard, C. B. Hill, J. R. Jarboe, P. R. Jarboe, John Le Conte, I. Stringham, F. Soule, T. Guy Phelps, Arthur Rodgers, Wm. Norris, C. Webb Howard.

THE Mexican Government is reported to have realized over $50,000 in customs duties on goods taken to the Santa Clara mines, to say nothing of denouncement and other fees.

Maritime Protection.

The Samoan question has most undoubtedly awakened us to a keen realization of the unprotected condition of our country, which must result in an enlargement of the navy and the building for coast defense of free-board vessels of the Monitor system which proved so successful in our late civil war. The United States do not require a standing army, for the militia of each State and Territory is a large army within itself, and can be relied upon to put into the field at short notice several hundred thousand drilled men, which can be followed in an emergency with equally as many, if not more, citizen soldiers on the first call to arms. It is on the water that our country is sadly deficient, which has been made more plainly evident during the past three months.

The Parliament of Great Britain has just voted a large sum of money to the improvement and enlargement of her navy, which has been followed in a like manner by Germany and Russia, while each European nation has given liberal encouragement to the building of steamships capable of conversion into fast-sailing cruisers. It is the movements in the latter direction that must cause the heavy-armored ships of war to give place to the finest and fastest vessels constructors will be capable of building. This promised revolution in the building of war vessels has been brought about by the improved guns. And still the cry is for more formidable ship armament. It is not very long since an 80-ton gun was a monster; but this soon gave place to the 90-ton, which has been followed in turn by the 100 and 110 ton guns. The latter, it was concluded, were about as large as safety would admit of, but now these are threatened to be succeeded by guns of 150 tons, and even 200-ton guns are not at all unlikely to prove a success. Such guns no existing armored ship can withstand, and as for that, it is claimed that none can be built to successfully resist; therefore the greater necessity for speed and easy movement. The question naturally arises, with changed vessels of war, will not the armament also undergo a change? To this it is only reasonable to answer in the affirmative. The guns will probably change in the direction of less caliber and higher relative power, just as is being done with small arms for the infantry, as expressed by an exchange, to increase the range and secure a flatter trajectory with extended danger zone. At the same time, heavy armaments, dynamite guns, torpedoes and kindred warlike appliances, all will have their appropriate places. To provide plants on a scale commensurate with the demands of modern warfare must for years engage the attention and tax the best energies of all leading commercial powers, and the United States cannot afford to pose as an indifferent observer of events.

THE MARYLAND MINE.—We hear that in all probability a rich English syndicate will make all necessary development on the Maryland claims, Grass Valley. An expert in their employ is said to be in New York on his way to California to examine the mine. The Maryland adjoins the famous Idaho, and is believed by many to be equally rich, while it has a large amount of unworked ground. The mine would have been thoroughly worked long since, had its owners had sufficient capital. Grass Valley is the leading gold-mining district on this coast, and the Maryland may yet add greatly to its fame.

TRAINS commenced running to Tacoma on Monday, on the new coal road of the Central Pacific Improvement Co., from the coal mines of that company at Carbonado, 30 miles from Tacoma. A new road six miles long has been constructed from the mines to the main stem of the Northern Pacific, and a double track laid all the way to Tacoma, in order to bring a greater output there for vessels loading for San Francisco.

THE LICK TELESCOPE.—At the request of the University Regents, W. R. Warner, of the firm of Warner & Swasey of Cleveland, Ohio, manufacturers of the machinery and mountings of the Lick telescope, has been at Mt. Hamilton for the past week inspecting the adjustments of the instrument. He will probably make some minor changes and improvements in the machinery.

Crushing Lumps of Roasted Ore.

The extraction in trough-lixiviation is not produced by filtration; and the silver as well as the base-metal chlorides contained in the lumps of the roasted ore will not be extracted if the lumps are allowed to enter the trough together with the finer portion of the ore. In order to obtain good results it is necessary first to mash the lumps. An agitator will not perform the work rapidly enough, and some quick grinding machine has to be employed for this purpose. Figs. 1 and 2 show the construction of the *Kegelmuhle*, which is very effective on soft material, and is used in Europe for grinding coal. It is copied from Rittenger, with some slight alterations, which Mr. Ottokar Hoffmann made to adapt it to trough-lixiviation.

Fig. 1

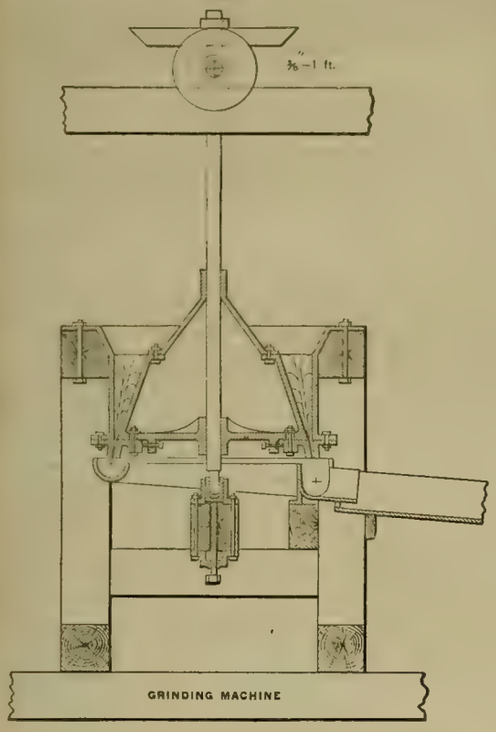
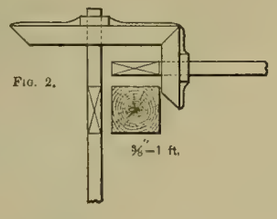


Fig. 2.



Vertical Section Through Upper Part of Fig. 1.

Fig. 3.

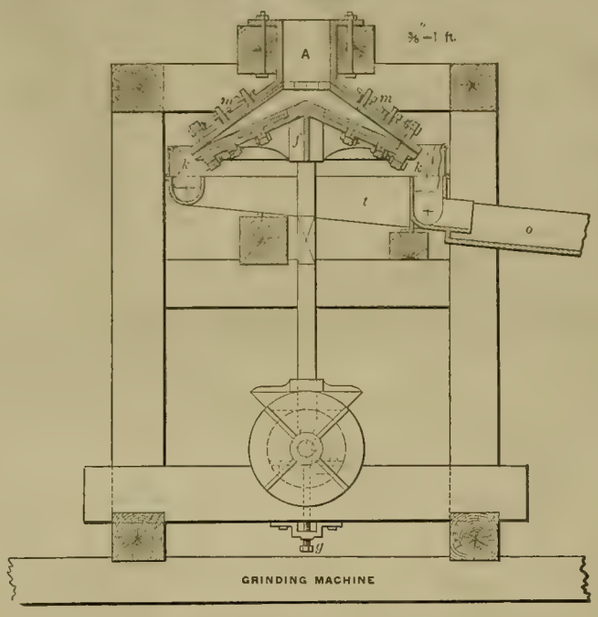
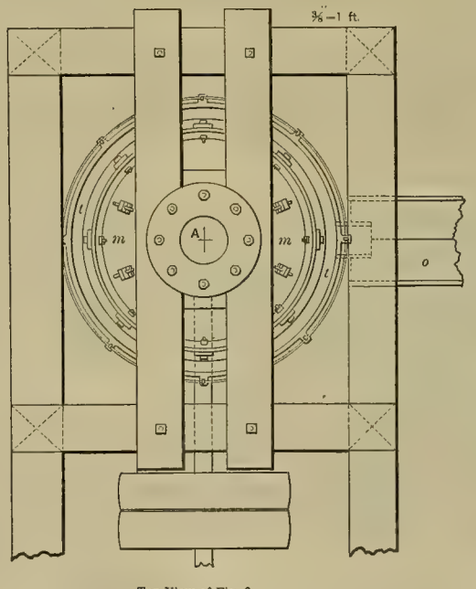


Fig. 4.



Top View of Fig. 3.

Fig. 5.

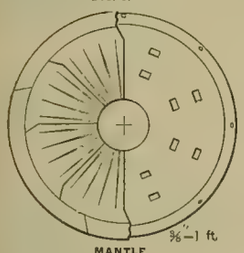
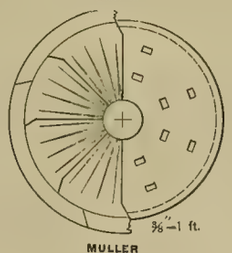


Fig. 6.



MACHINES FOR GRINDING SOFT ORE.

Figs. 3, 4. 5 and 6 represent another grinding machine for soft material, which is Mr. Hoffmann's own device. It is based on the principle of the *Kegelmuhle*. The mantle *m* is also stationary, but instead of being cylindrical is cone-shaped. The muller *f*, a flatter cone than the mantle, is inserted from below, and can be lowered or raised by the screw *g* for the purpose of regulating the fineness to which the lumps are intended to be mashed. Mantle and muller are provided with exchangeable shoes and dies. This mill has a larger working capacity than the *Kegelmuhle*, because the centrifugal force created by the rotation of the muller will greatly assist the discharge of the pulp, while in the *Kegelmuhle*, with an almost vertical discharge, the centrifugal force has no beneficial effect, but on the contrary acts against the full discharge of the pulp. Toward the center, shoes and dies are provided with teeth, while toward the periphery their surface is smooth.

The teeth cut the larger lumps, the smaller ones are mashed by the smooth part of the cones. Water and ore are charged through *A*, while the circular cast-iron trough *t* receives the pulp and conveys it to the base metal leach-trough *o*. The canvas strip *k* prevents the pulp from flying over the rim of the trough. The main portion of the roasted ore will be fine enough to pass through the mill without being affected, and only a small part will have to be mashed. For this reason, and on account of the softness of the wet material, large quantities of ore can be put through in 24 hours with but very little wear of the machine, which, in itself, is of simple and cheap construction.

Los Angeles Gold.—A dispatch from Los Angeles says: "The gold-hunting excitement is still maintained in this section. At present there seems to be an attempt to boom Monrovia by means similar to those used to induce immigration to Santa Clara. A mile and a half east of Monrovia are these gulches. These were visited to-day by a press representative who found nearly 200 men at work with picks and shovels. While there a dozen pans were washed, but the reporter could not detect the slightest sign of color, nor even a microscopic nugget.

Electrical Society.—The California Electrical Society held its regular monthly meeting on Monday. The evening was devoted to the "Relations of Experiences in Electrical Matters" by several of the members, in the course of which many facts of interest were elicited. W. O. Quimby spoke upon the introduction of the telegraph and the effort of the Mechanics' Institute of San Francisco to procure the telephone from Prof. Bell for exhibition in this city in 1877, and also the introduction of the electric light in Calif in 1882. F. M. Speed urged the necessity for concentration of effort in electrical specialties, and argued that diffused effort defeated success. President Keith related his experience in installing the first electric-light plant at the Madison Square Gardens, New York, in 1879, and said that it then took about 100-horse power to run 16 lights, which now can be operated by improved dynamos with less than 16 horse power.

A Silver mine has been located nine miles south of Bagdad, on the Atlantic & Pacific road, and six miles east from Daggett. The ore is four feet below the surface and yields 2600 ounces silver to the ton. The assays made show that it is one of the richest silver mines in California. Crowds are going to the mines. The excitement in San Bernardino is general and is increasing.

Lake County people are urging the Southern Pacific Company to build a line into Lake county from Rutherford, on its Calistoga branch, via Chiles and Pope valleys.

The Late Arthur Nahl.

Arthur Nahl, well known all over the State as a pioneer Californian artist, died suddenly of heart disease on the ferry-boat, while on his way to his home in Alameda on Monday last. He came to America from Hesse-Cassel 40 years ago, and has resided most of this time in San Francisco. Mr. Nahl sketched and painted many scenes of early California life, and drew for the magazines and pictorials of pioneer San Francisco, numbers of illustrations of scenes and incidents of those times. He excelled in animal and figure painting, and of late years has devoted his brush mainly to portraiture, in which he was very successful. His rare gallery, embracing a number of paintings by the "Old Masters," among which were portraits of Mr. Nahl's kinsmen who were notable artists for several generations, is one that for years has attracted attention through private exhibition to many of our art-loving people. He leaves a remarkable gallery.

Mr. Nahl was always very fond of athletics, and he and his brother had a small gymnasium at their home, on Telegraph hill, long before there were any public institutions of the kind in this city. The interest shown in this induced him to take steps to organize a club, and the Olympic club was the result, he having been the founder of that flourishing institution. For many years he was a leading member, though of late he has taken no active part.

Mr. Nahl had a host of warm friends. He was a good man and citizen, an able artist, industrious and steady, earning the respect of all with whom he came in contact. It is rare to see one hold so well-known a leading position for so long. Every one spoke well of him and his work. His name is linked with the history and development of California. Such men are rarely met, and their places, once vacant, are seldom filled. Mr. Nahl leaves a widow and six children. He has resided in Alameda for 20 years, living in a handsome home which his industry had provided for his family.

Ozocerite.

Ozocerite is a peculiar mineral wax, a good deposit of which was found in Utah several years since, the only one of the kind thus far discovered in the United States. In another column is given an item which was published in the Eastern States, to the effect that it is only found elsewhere at Galicia, Austria. This is incorrect, for there are large deposits in Russia, where it has been utilized for making ties on the Transcaspian railroad. Notwithstanding the high temperature, which reached 140° F., the ties retain their hardness and shape. These ties are used all along the road, except at the ends and centers of the rail, where wooden ties are employed. A saving of $800 a mile is effected by use of this material.

The substance is also found at Slanik, Moldavia, and at the foot of the Carpathian mountains. The Turkish ozocerite is usually considered the best. It is like wax or spermaceti in appearance and consistency, ranging in color from an impure white to black, and is frequently brown or green. There are also deposits in Austria. Though the deposits in Utah have been known since 1877, it is only this year that active steps have been taken to utilize the product, a company having been formed for the purpose.

Manuel Eyre vs. Mining Companies.—Judge Hunt has overruled the demurrer of the defendants in the eight actions brought by Manuel Eyre against the directors of eight mining companies to recover $1000 damages in each case for failure to post in the offices of the respective companies the amount of receipts and disbursements thereof, as required by law. Ten days were given to defendants in which to file answers in each case. Now the matters must be tried upon merits.

Academy of Sciences.—At the meeting of the Academy of Sciences Monday, H. R. Taylor contributed a stone sinker, evidently of Indian manufacture, which was found in a shell-mound near Alameda. As there was no regular paper prepared for the evening, Frederick Goetzkow gave an informal talk on automatic water-meters. The meter recently patented by him is described in another column of this number of the Press.

Coast Industrial Notes.

A $25,000 PLANING-MILL is being erected at West Berkeley.

THE Alvarado Beet-Sugar Refinery has been sold for $150,000 to the Alameda Sugar Co.

A COMPANY to manufacture terra cotta and pressed brick has been organized at Vallejo.

THE Coronado hotel, San Diego, is to use the Avery gas patents, to supply the hotel with gas.

THE Pacific Granite Co. has been organized in San Diego, to work the granite quarry in Temecula canyon.

OWING to the great use of the twine binder in harvesting, the consumption of hemp and similar fibers has increased 25 per cent during the last year.

THE California Tallow Works have a growing industry in charge. Large quantities are consumed here, and there is a considerable export to Central America and elsewhere.

THE San Francisco Wave-Power Co. has been authorized by the supervisors to use 20,000 square feet of the city cemetery for the purpose of constructing reservoirs therein.

BY the burning of the great Anaconda copper smelter at Butte, Mon., about 1200 men are thrown out of employment at the Anaconda, while at Butte 800 miners are paid off.

HENRY BEST of Sutter county has ordered a steam-plowing apparatus, which is expected to plow 75 acres in 24 hours, at a cost of $25 for all expenses. The cost of the outfit is $4500.

THE mills of the San Diego Iron Works at Roseville turned out their first product March 25th in the shape of galvanized-iron wire cloth. The wire and nail departments will be opened soon.

AT the end of March the Pacific Coast Steamship Company discharged 16 painters, calkers and carpenters. The reduction in the force is due to dull times and a consequent falling off in the carrying trade.

AN English paper states that the modern labor-saving machinery introduced into foundries and machine shops has resulted in 50 men producing as many castings as were formerly turned out by 200 men.

THE plans for the new passenger depot, to be erected at Third and Townsend streets, are now completed, and work is to be begun immediately. The building will be two stories high, and will cost about $25,000.

COLLECTOR HAGER has issued a warning to all persons engaged in fishing in Alaskan waters not to construct dams or other obstructions in the rivers there. He has done this in accordance with instructions from Washington.

PREPARATIONS are being made here for establishing half a dozen new salmon canneries along the Alaska coast during the coming season. It is not thought that there will be any important additions to the Columbia or Sacramento river canneries.

RECENT additions to the many harness factories of this city have increased the number to 35. These shops employ about 500 men and boys, and will turn out about $1,500,000 worth of manufactures this year if trade continues to increase at the present rate.

THE planing-mills, box factories and iron foundries are among the busiest of the local industrial works. Boiler-making for coast steam craft has been a prominent feature of the iron trade here for a few months past, and it will be carried on extensively this season.

E. J. BRICKELL and W. H. Kruger, the well-known capitalists composing the Truckee Lumber Company, are going to engage extensively in the ice business. They own 18,000 acres of land in the heart of the ice belt, containing locations for over 50 good ice ponds.

THE proclamation issued by President Harrison against unlawful sealing expeditions is causing much excitement among the independent sealers. It is certain that the United States revenue cutters will make seizures of all vessels illegally sealing in the Behring sea.

ORDERS have been received at the Mare Island navy-yard to proceed with work upon the new stone dock, the last Congress having appropriated $80,000 to complete the structure, which has been 17 years in course of construction and has cost upward of $2,000,000.

MR. W. K. GIRD has found a deposit of bituminous rock on the Chino ranch, San Bernardino county. The deposit is in Brea canyon, in close proximity to the surveyed line of the narrow-gauge railroad, which will at once be extended to the scene of this important find.

THE steam schooner Selmo was launched from Dickey Bros.' yard recently. She is a 70-ton vessel and was built for the Pacific Steam Whaling Company. The engines for the new vessel will be placed by the Union Iron Works, and it is expected that she will attain a rate of speed of 11 knots an hour.

THE rolling-mills of the Judson Works opened Monday, and everything is now running smoothly. All of the men who were a short time ago thrown out of employment by the sudden closing of the mills have been taken back, and are now engaged in their old places, at their former wages.

THE Victoria Lumber and Manufacturing Company, composed of one president from Victoria, B. C., and three lumbermen of Hudson, Wis., with a capital of $1,000,000, is securing a special Act of incorporation. The company will erect mills at Esquimalt, Chemainus and Connox for local and export trade.

THE Sanbedrin Mill & Lumber Company have recently contracted with the Vulcan Iron Works for the machinery for their new sawmill, to cut about 50,000 feet of lumber per day; and have also selected a 60 inch heavy "Vulcan" gang edger, a set of heavy "Vulcan" fractional screw head blocks; also an 8x10 "Campbell" steam feed.

THE silver bars made at the Selby Lead & Smelting Co.'s works are 12 inches long, 5 inches wide and 4½ inches deep, averaging from .998 to .999 in fineness, valued at about $1250 per bar. Something like 21,400 of these have been produced in 3½ years, the number in gold being about 2135, measuring 8 inches long, 4 inches wide and 4 inches deep, averaging about $22,000 in each.

ONE of the local box manufacturers who has made a success in the fruit-box line will soon add a large shop with new machinery to his works. The outlook for the season in this line is very bright, and there will soon be great activity. There are about 500 men now employed in making boxes in this city, taking the year right through, and over 15,000,000 feet of lumber are used in this way.

THE 100,000 fur seals, as taken by the Alaska Commercial Co., bring nearly $2,000,000 each year, and for this privilege the fee to the United States Government is the small sum of $296,286.82—being the exact average amount paid by the Alaska Commercial Co., and to be paid by them each year, as claimed by the Alaska Commercial Co., during the 20 years of their lease.

AN Eastern manufacturer of cuffs and collars has lately been surveying the field here with a view to establishing a factory for making goods in his line. He finds there is a good opening here in one respect, as there is no regular manufactory of either collars or cuffs in San Francisco. The only drawback is that the competition of Eastern manufacturers would be very great at first.

AT a recent meeting of the Marine Engineers in this city, a subject of discussion was the schedule of wages to be paid the engineers and assistants on the Alaska fishing steamers. The wages offered by the vessel-owners are $100 per month for engineers and $80 for assistants. This did not meet the views of the union, who finally fixed $125 and $90 as the wages that should be expected. This rate is to prevail until a new schedule shall have been adopted.

THE final order in the disincorporation of the Watsonville Mill and Lumber Co. has been signed by Judge McCann, and the corporation has gone out of existence. During its life it employed hundreds of men and expended hundreds of thousands of dollars for labor and supplies. The Watsonville Mill and Lumber Co. was one of the oldest lumber companies in the county, and when its mills were cutting the Pajaro redwoods it was the largest sawmill company in Santa Cruz county.

MARTIN HOLJE has been making glue here for a number of years. He is the proprietor of the California Glue Works at Venezuela and Potomac streets. He makes from 50,000 to 100,000 pounds per month of pure hide glue. The San Francisco Glue Works are at Santa Clara and Wisconsin streets. There is another small factory in another part of the city. These factories employ about 50 and make 300 tons glue and 80,000 gallons neatsfoot oil per annum, of a value of $110,000.

THE Inyo Marble Company now split blocks of marble with gunpowder. A hole is drilled half through the block and notches are cut on each side of this in the direction in which the block is to be split. Black powder is poured loosely into the hole and the fuse inserted; a piece of wadding is then forced into the hole about a foot, leaving a considerable air space between that and the powder, and tamping placed on top of it. On firing the blast the marble block is divided as neatly as could be desired.

THE Watsonville *Pajaronian* says: But two sawmills will run in this township this year—the Rider mill, in the Game Cock canyon, and White & DeHart's mill, east of the San Jose toll road. The end of the lumbering business in this part of the county is but a few years distant, and yet 20 years ago it seemed as if the redwood forests on the Pajaro slope of the Santa Cruz mountains would outlast the oldest inhabitants. Improved mill machinery and the large demand for lumber created by railroad extensions have eaten out the Pajaro redwoods. The mills named above expect to start up before the middle of April if the weather does not prevent. At each mill there is much felled timber for the season's run.

ONE bill of importance passed by the recent Legislature, and which has since been signed by the Governor, empowers the Board of Harbor Commissioners to construct and operate creosoting works for the protection of piles used in the building of wharves belonging to the State. Thirty thousand dollars has been appropriated for this purpose, and the works will be located on State property somewhere in the northern portion of the city. The process to be used is not covered by a patent.

THE openings in the quarry of the Inyo Marble Co. allow the extraction of blocks 4000 cubic feet, in length 25 feet by 10 or 12 feet. The reduction of such solid masses to useful shape becomes a mere matter of machinery and convenience. Negotiations are under way with the Inyo (Eastside) Canal Co. for power at the "drop-off" on their line, with the view of locating works there. The railroad company have completed the new 3000-foot switch from the main track to the present works and the quarry dumps.

THE Giant Powder Company of San Francisco has just bought 180 acres of land near Clipper Gap station, Placer Co., including the Hicks tract and a portion of the Hahn ranch. Their land includes that which is traversed by the Bear river ditch where it makes a rapid descent just above the old school-building on the Applegate road. This descent will be utilized in furnishing power for their works. They expect to begin the erection of their buildings without loss of time for the manufacture of black powder, and will employ at least 50 men in their business. The Canal Co. will furnish the power for their machinery.

ON the 1st inst. there was launched at the foot of Folsom street a new steam launch for the Alaska Packing Company. She was built by the Atlas Iron Works and is a pretty little craft. Her dimensions are: Length, 25 feet, beam 8 feet, depth of hold 6 feet. She is fitted with compound engines, her high-pressure cylinder being 6½ inches, low pressure 10½ inches, with a 10-inch stroke. The new steamer is fitted with J. B. Jardine's patent condenser, which, consisting as it does of a series of metal tubes under the vessel's counter, looks something like a huge gridiron. It takes the place of the condenser usually used on steamers, and, it is claimed, saves considerable in weight, both of material and water.

OAKUM has been imported here for 40 years. The imports for 1853 were 2330 bales. For the past quarter of a century these imports have been 85,500 bales, or an average of 3400 bales per annum. The extremes have been 1100 to 9800 bales. The last-named was the quantity imported in 1866. Notwithstanding these supplies, it has been found profitable to make oakum here, and the business has been carried on many years by Samuel F. Weeks. The local product has increased from 1000 to 10,000 bales per annum. In the past quarter of a century prices have varied from $3 to $9 per bale. Current rates are $4 to $5. The local product last year was valued at $40,000.

THIS is the time of the year when people buy new furniture, and it is consequently the best season for the bedding and upholstering men. At each of the dozen factories in this city where this work is done there is a scene of activity. Fully 200 men and boys are employed in this work in San Francisco. Most of the factories are small, and in some of them only four or five people are employed, while in others the proprietor and his one boy do all of the work. In the small factories much of the upholstery work is done on old frames that are to be newly upholstered. So cheaply is work done here now that there is little chance for Eastern factories to make much headway in the field. What little work now comes to California from the East is a mere bagatelle. The business is growing rapidly, and it is estimated that the value of the manufactures here this year will reach $1,000,000.

FROM a modest beginning in 1862, the San Francisco Cordage Company has grown to be one of the largest and best equipped in the country. Improvements have been added from time to time as needed. The works of the San Francisco Cordage Co. are at South San Francisco. The grounds are ample, the buildings extensive and well constructed and the machinery first-class. The hemp is brought from the Philippine islands at the rate of about 3000 tons per annum. There are 150 to 160 employes, and the value of the product is $600,000 per annum. The business has been attended with perils common to all local industries. There has been continuous competition from Eastern factories, and the prejudice in favor of this product on the part of some, as well as the local opposition for a few years. Despite these and other untoward circumstances, the San Francisco Cordage Company has never ceased operation, except for necessary repairs. The San Francisco Cordage Co. has recently put upon the market a "new-process" rope, which is guaranteed equal to Sisal rope. This is four cents per pound cheaper than manilla, which is an important difference. The new-process rope is quoted at 13½ cents for 1¼-inch and upward, 14 cents for 12-thread, 14½ cents for 6 and 9 thread; bale-rope, 2, 3, 4, 5 and 6 thread, 13 cents.

THE 17th annual session of the California College of Pharmacy and Department of Pharmacy of the University of California commenced Monday evening, the opening exercises being held in the college building at 113 Fulton street. A large number of pupils were present, the class this year numbering between 90 and 100.

THE cruiser Charleston is still upon the dry-dock at the Union Iron Works. Several hundred men are at work putting the finishing touches to her exterior and interior. This week the propeller blades were placed in position and steam made in her boilers to test their completeness. An immense amount of work is done every day, but it will be two weeks before the trial trip can be made. She will be taken down the coast, and, on her return from the trip, will go to Mare Island to receive her armament.

T. D. MCKNIGHT, General Freight Agent of the Northern Pacific Railroad Co., says that owing to the increase in the rate on canned goods from $1 to $1.20 per hundred, the entire business in that line was being transferred from the railroad companies to sailing vessels clearing for Atlantic ports by way of the Horn. The hatches of the ship Jabez Howes were closed down on over 8000 cases of canned fruits from one prominent house in this city, and 200,000 cases are expected to follow from various sources during the present season. These shipments have heretofore been handled by rail, and represent some 500 carloads of freight. The rate by sailing vessel is now less than one-half that by rail, and extensive shippers naturally avail themselves of it. The fact of the matter is, the competition on canned goods in Eastern markets is so spirited that shippers cannot afford to pay such a high tariff.

THE bill passed by the recent Legislature compels employers to provide seats for female employes, to be used when the women and girls are not actually at work. The law went into effect on February 8th last, but since that time no steps have been taken by the firms of San Francisco, who never had seats for the girls, to comply with the law. The Labor Commissioner is sending out circulars to employers, calling their attention to the new law. The main sections of the law are as follows:

SECTION 5. Every person, firm or corporation employing females in any manufacturing, mechanical or mercantile establishment shall provide *suitable seats* for the use of females so employed, and shall permit the use of such seats by them when they are not necessarily engaged in the active duties for which they are employed.

Sec. 6. Any person or corporation violating any of the provisions of this Act shall be punished by a fine of not less than fifty nor more than one hundred dollars for each offense.

Sec. 7. It shall be the duty of the Commissioner of the Bureau of Labor Statistics to enforce the provisions of this Act.

A GLANCE at our rank among the cities of the country in those conditions which bear upon the utilizing of pipe and wire, boiler and dynamo, wonderfully hightens the parallel between this system and our profitable cable roads. San Francisco ranks in:

Population	9th
Manufacturing concerns	8th
Capital employed	10th
Hands employed	11th
Wages paid	10th
Value of product	9th
In number of establishments in proportion to population	1st
In average hands to each establishment	17th

It will be seen, then, that to supply our own wants and the needs of our commerce for its exchanges, we have already been urged to the founding of more separate manufacturing plants than any other city in the Union, in proportion to population. Added facilities mean increase in plant and product, just as the extension of our cable-road system meant an extension of population into new districts and an increase in travel.

THE Inyo *Independent* says: There are quite a number of men employed at the soda works. The new windmill for pumping the lake water into vats works quite successfully. Several large sheds are being erected for storing the soda from the weather. This enterprise has passed beyond the experimental stage and is on a firm basis. Of course, the industry is yet in its infancy and will assume much larger proportions, the fact being established that the work can be continued at a profit. When better railroad facilities are secured, extensive improvements will be made. Messrs. Conn & Trudo have located 1120 acres of borax land in Saline valley, and will work the property extensively. A wagon-road has been built to connect with the Big Pine road to Deep Spring. Considerable machinery has been shipped in and buildings are being erected. They have named the settlement Ferndale. The industry promises to be of considerable importance and will still further increase the demand for valley products. A number of men will be employed at the works, and teams will be required to haul the borax to the railroad.

OUR LUMBER INTERESTS.

The Lumber Trade.

The financial depression in the southern part of California and the comparative quiet in building circles in this city so greatly reduced the demand for lumber during the past year that the mills on Puget Sound have been compelled to stop work during a portion of the time for the past month in order to reduce the large accumulation of lumber in the mill yards. The cut has been reduced some six or seven millions of feet by this temporary shut-down. The lumber which for a year and more had been in great demand in Los Angeles and San Diego counties began to stop in this city during the latter portion of last summer in such quantities as to fill the San Francisco yards with so large a surplus as to reduce the price below any profitable rate for production. The highest point in prices was reached on the 1st of August last. Then the decline commenced, until lumber reached about the lowest price ever noted in this market. The boom initiated by the completion of the Northern Pacific railroad created a large local demand, which kept the mills running for a time; but even that extra demand soon failed to keep up with the production, so that a shut-down became a necessity.

The result of the shortened supply has been an advance in prices. February 1st prices were advanced by dealers from $12 to $14 per thousand, with cargo price at $13; and on the 14th inst. the pine-men made an advance of $2. The next day the retailers advanced $3 per thousand, and the redwood-men are also, at this present writing, contemplating an advance in their specialty. The lumbermen hold that the advance has been made because they have been unable to make a living at old prices, and that it should be advanced to $18 as soon as conditions will admit. At present, low prices must rule. It is claimed that freights are so high at the present time that California lumber is shut out from distant markets, and trade is necessarily confined to home consumers. As soon as more ships and cheaper freight can be obtained, lumber can be sent to Australia, South America, and other distant points, and prices will take a further advance.

Timber Lands in Fresno.

There will soon be a railroad from Fresno into the timber belt in the eastern portion of that county. In view of this, according to the Stockton *Mail*, many tracts of land are being taken up in the timber belt from Sonora to Fresno under the Timber Land Act. Parties from San Francisco are the principal speculators, in companies of from 25 to 30 members, and buying adjacent lands. Some 30,000 acres or more have been entered since October 1st of last year, and there have been filings on many thousands of additional acres. Entries have been made all along the line from Tuolumne to Fresno county.

The cost of the land is $2 50 an acre, and applicants can have any number of acres up to 160, but not in excess of 160. The acres must be contiguous; that is to say, the applicant cannot pick out small tracts here and there aggregating the maximum number. He is not allowed to make more than one entry, and consequently if he takes 40 acres instead of 160 it "lets him out" of the remaining 120 acres forever after.

In order to acquire timber land, the applicant must be 21 years of age or over. Unmarried women can buy the land in their own names; and married women can also purchase tracts for themselves, provided they pay for the property out of their separate possessions—in other words, if they buy it with money to which the husband has no constructive claim in law.

In acquiring these lands, applicants must go through certain forms. They must visit the tracts which they wish to purchase, inspect them, appear at the land office, have a date set for proving up and advertise for two weeks. The applicant appears on the appointed date with two witnesses, proves that the desired tracts are timber land, and pays the price of $2 50 an acre.

ORIGIN OF OUR ENGLISH LUMBER TRADE.—According to a late interview with David Evans of Humboldt county, a member of the firm of C. A. Hooper & Co., the real traffic in lumber with Great Britain began in 1885. In that year, said Mr. Evans, my company alone exported 7,000,000 feet to that country. Since that time we have averaged a little over 3,000,000 feet annually. The cause of the rise to 7,000,000 feet in 1885 and the subsequent decline to 3,000,000 feet was the Edinburgh Exposition. The demand took date from a magnificent display in the Edinburgh Exposition of 1884. Humboldt county was represented there by a large display of redwood in charge of a competent California exhibitor. The redwood was exhibited in all its various stages of manufacture and its virtues made known, which resulted in the large sale of 7,000,000 feet in 1885. Since that time the trade has been steady, but not so great as during the Exhibition year. Mr. Evans added that during the Exhibition at Edinburgh there were many of the merchants who purchased Humboldt lumber from the agent there in direct sales, and that if the London exhibition could be effected, the lumber interests of California would receive a great boom in the direction of exports to England. As the present time timber is still there indirectly and at a much higher rate, which necessarily limits the demand.

IMMENSE FRANCHISES INVOLVED.—In the case of the St. Catherines Lumber Co. vs. the Dominion Government, the British Privy Council in London has rendered a decision against the Government. The value of the license granted to the St. Catherines Lumber Company alone is placed at $5,000,000, and the titles to hundreds of thousands of square miles are upset. It is estimated that the value of the licenses involved will not fall short of $50,000,000. These leases are to cut timber, and a number of American capitalists have invested heavily in them. Claims against the Dominion Government will probably be prosecuted.

MINNEAPOLIS LUMBER MILLS in the present season, have turned out 332,928 604 feet of lumber, 106 736 150 shingles, 73,173,320 lath and 731 850 pickets. In 1887 the cut was: 220,822 974 feet of lumber, 69,565 050 shingles and 42 936,611 lath. Again in 1888 of 112,105,630 feet of lumber, 37 171,100 shingles and 30,236,708 lath. In the amount of lumber this beats the record of any previous year, except 1882, when 314 363,166 feet were cut.

GIANTS OF THE FOREST.—A British Columbia paper says: "This is the veritable land of the giants of the forest, and one of the first things that strikes strangers is the enormous size of the trees. But in spite of their exclamations of wonder, very few of them really comprehend how large the trees really are. A stick of timber was cut the other day at the Hastings mill which was 106 feet long and 24 inches square. There were sawed out of the log 12,000 feet of cedar lumber, weighing 30 tons."

THE FORESTS OF WASHINGTON TERRITORY.—The Secretary of the Interior in his recent report to Congress says that the forests of Washington Territory furnished 320,000,000 feet of lumber, 69,000,000 lath and 50,000,000 shingles during the last fiscal year, of which over two-thirds was shipped for foreign consumption. The capacity of the sawmills of that Territory he placed at 1,043,596,000 feet.

THE Santa Rosa *Republican* of March 24th says: Work on the redwood lumber-mills will not be started for some time, owing to the bad condition of the roads.

MICHIGAN LOGGING STOCK.—A careful estimate of logging stock for the coming season shows the cut will reach 140,000,000 feet of lumber.

LAST YEAR Louisiana produced 450,000,000 feet of lumber, an increase of 800 per cent since 1880.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

ASSESSMENT NOTICE.

Gray Eagle Mining Company.—Location of principal place of business San Francisco, California. Location of works, Placer County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 10th day of March 1889, an assessment, No. 12, of Five Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Room 9, No 327 Pine Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23d day of April, 1889, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 14th day of May, 1889, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

O. H. BOGART, Secretary.

OFFICE—No. 327 Pine Street, Room 9. S. F. Stock Ex. change Building, San Francisco, Cal.

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Correspondent as Agent for Smelters in London, Liverpool, New York, Boston and Baltimore.

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THE CALIFORNIA CONSOLIDATED Gold Mining Co., of Sierra City, Cal. A Select List. President, A. [illegible] Secretary, A. [illegible] Superintendent, [illegible] Property consists of [illegible] Capital Stock, [illegible] Par Value of Shares, [illegible] Dividends declared [illegible] Last Dividend No. [illegible] Amount per share, [illegible] No. 2 just before the Consolidation. Dividends declared [illegible] Amount per share, [illegible] Dividends declared [illegible] Amount per share, [illegible] Dividends declared [illegible] Amount per share, [illegible]

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MINER'S BOSS CANDLESTICK.

Can be suspended from or stuck in timber. Point detachable and folds in so candlestick can be carried in the pocket. Guard automatically extinguishes candle when short, to prevent accidents. Will be on sale at the hardware stores by July next. **GABRIEL WERNTZ, Placerville, El Dorado Co., Cal.**

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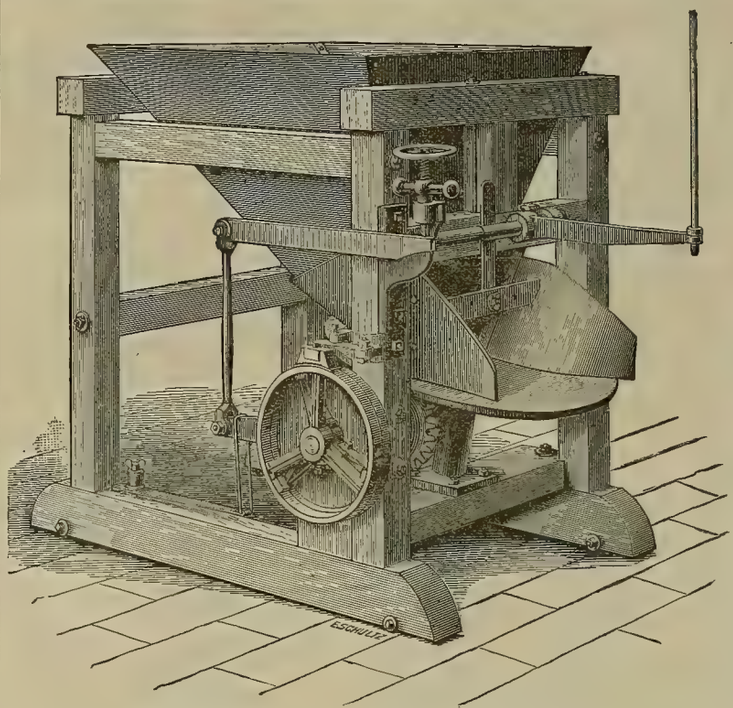

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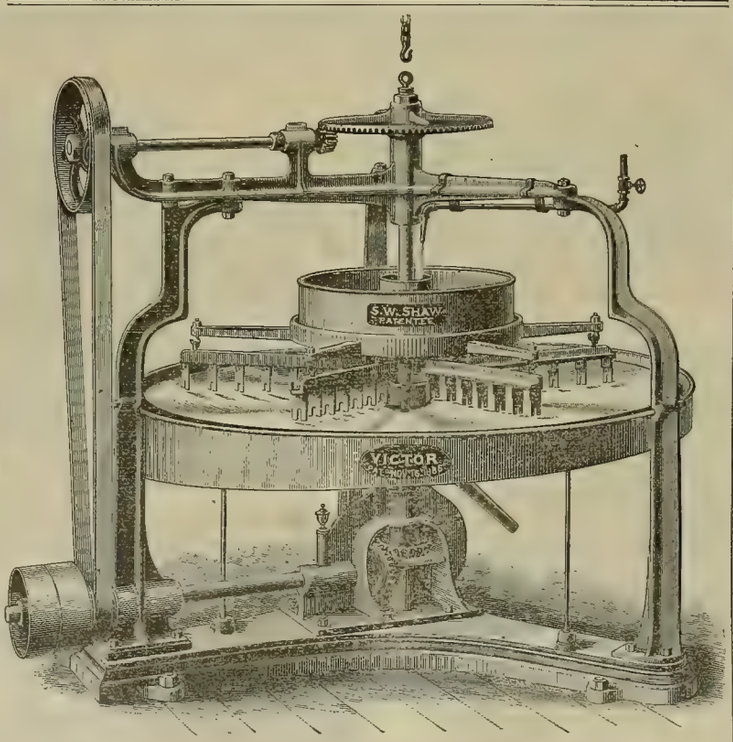

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Mine owners and millmen are invited to carefully examine the Victor before deciding upon their concentrating works. Address

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THE ROLLER ORE FEEDER

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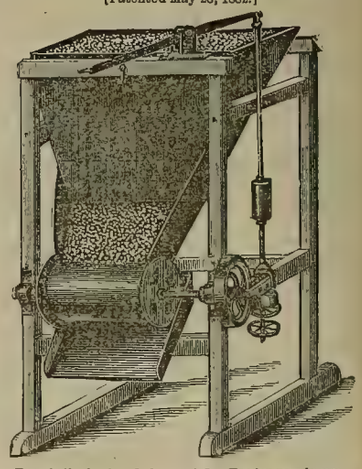

This is the best and cheapest Ore Feeder now in use.

It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

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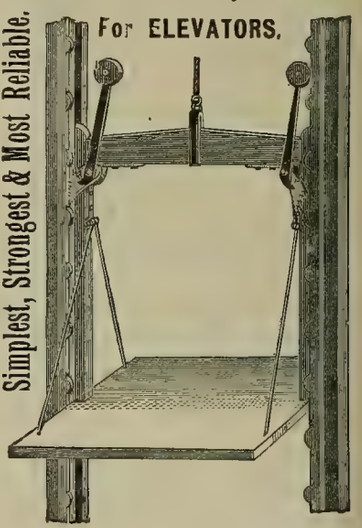

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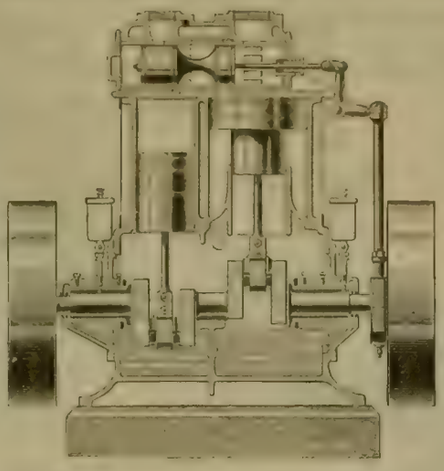

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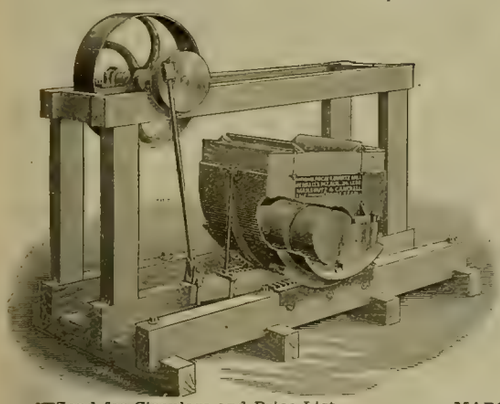

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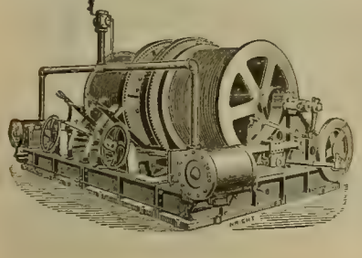

1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

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LIDGERWOOD M'F'G COMPANY,

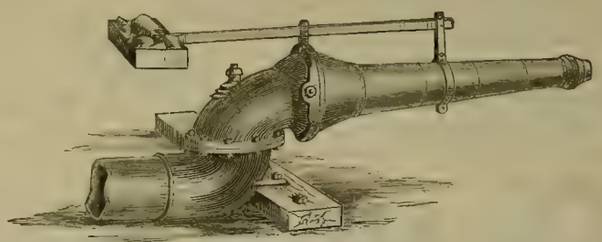
96 Liberty St., New York.

PACIFIC COAST AGENTS,

PARKE, LACY & CO., San Francisco.

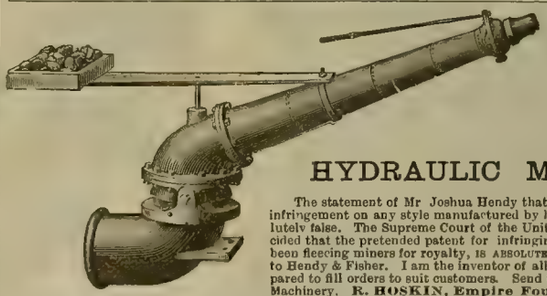
New Catalogue for 1889 now ready.

IMPROVED FORM OF HYDRAULIC GIANTS.



THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture. We guarantee purchasers of this form of Giants against all costs, expenses or damages which may arise from any adverse suits or actions at law. We are further prepared to furnish **Single-Jointed Giants** when required. Prices, discounts and Catalogues of our specialties of **Hydraulic Mining Machinery** sent on application.

JOSHUA HENDY MACHINE WORKS, 39 to 51 Fremont St., San Francisco.



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The statement of Mr Joshua Hendy that ANY STYLE of machine is an infringement on any style manufactured by him, he knows to be absolutely false. The Supreme Court of the United States on March 19th decided that the pretended patent for infringing, which he has for years been fleecing miners for royalty, IS ABSOLUTELY VOID, with costs of suit to Hendy & Fisher. I am the inventor of all styles in use, and am prepared to fill orders to suit customers. Send for list of prices of Hydraulic Machinery. **R. HOSKIN, Empire Foundry, Marysville, Cal.**

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Are you going to make any change in machinery? Are you freighting by team or packing on mules? Do you want Pulleys on Shafting already up? If so, don't fail to look into the merits of **THE DODGE PATENT INDEPENDENCE**

WOOD SEPARABLE or SPLIT PULLEYS.

They are the Lightest, Strongest, Best Balanced and most Convenient Pulleys made in the world.

Adapted to any power required. Time, trouble and money saved by using these Pulleys.

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Also **SIMONDS' SAWS** furnished to order as follows: **Inserted Point** (Mill and Edger), **Inserted Tooth, (California Pattern,) Solid, Shingle and BAND SAWS**, all sizes, **Crescent Ground Cross-Cut, etc.** Also **Planer Knives.**

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Adamantine Shoes, Dies and CRUSHER PLATES,

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Chrome Cast Steel for Rock Drills, Etc.

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Special attention given to purchase of

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ADAMANTINE SHOES AND DIES.—Guaranteed to prove better and cheaper than any others. Orders solicited, subject to above conditions.

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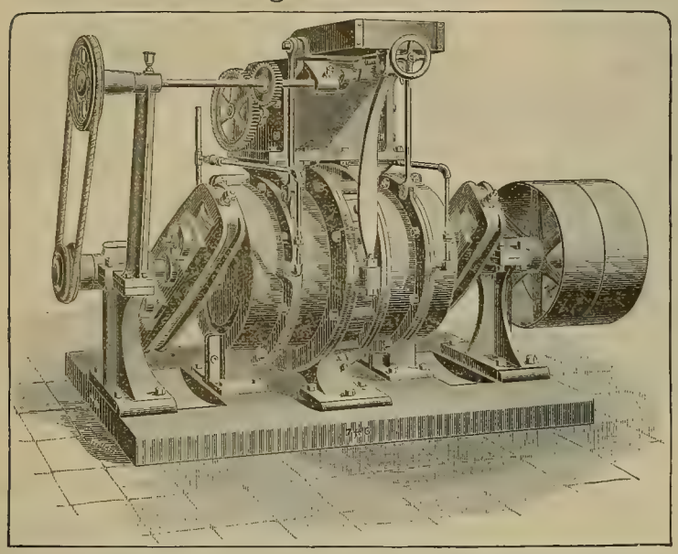
FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; has been thoroughly tested; we guarantee its work as represented, and we will give long time trial.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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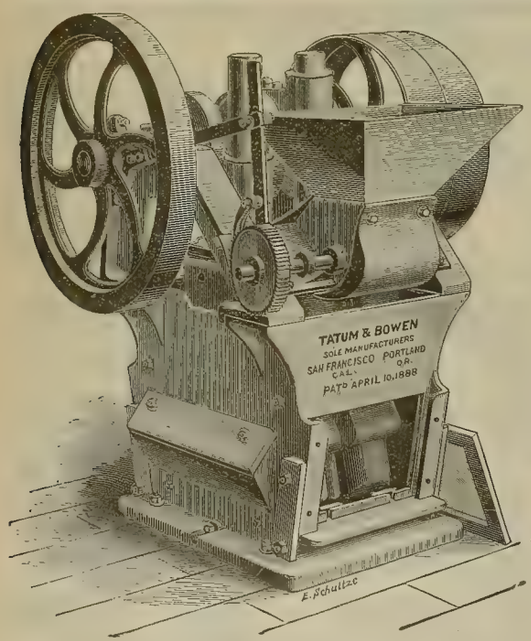

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PERFECTED DOUBLE Economic Quartz Mill.

Attached to each Mill is an effective

Automatic Ore Feeder.

THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

IMPROVED ROCK BREAKER.

Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address:

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Special machinery of all kinds. We have a large list of Standard Patterns, Gears, Pulleys, Boxes, etc. REPAIR WORK SOLICITED.

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GOLD SEPARATOR

A Proven Success.

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Of these Separators

—IN—

SUCCESSFUL OPERATION.

☞Send for descriptive Circular and Price List.

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VULCANIZED RUBBER FABRICS

Adapted to Mechanical Purposes in the United States.

Solid Vulcanite EMERY WHEELS.

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Cuts Cooler and Freer

THAN ANY OTHER WHEEL IN THE MARKET.

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For MINING PURPOSES

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Emery Vulcanite Wheel.

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ESTABLISHED 1866.

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Practical and Industrial Chemist, Assayer and Geologist,

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AMALGAMATING MACHINERY.

Stamp Mills for Wet or Dry Crushing. Huntington Centrifugal Quartz Mill. Drying Cylinders. Amalgamating Pans, Settlers. Agitators and Concentrators. Retorts, Bullion and Ingot Moulds, Conveyors, Elevators, Bruckners and Howell's Improved White's Roasting Furnaces, Etc.

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CONCENTRATING MACHINERY.

Blake, Dodge and Comet Crushers. Cornish Crushing and Finishing Rolls. Hartz Plunger and Collom Jigs. Frue Vanner & Embrey Concentrators, Evans', Calumet, Collom's and Rittenger's Slime Tables. Trommels, Wire Cloth and Punched Plates. Ore Sample Grinders and Heberle Mills.

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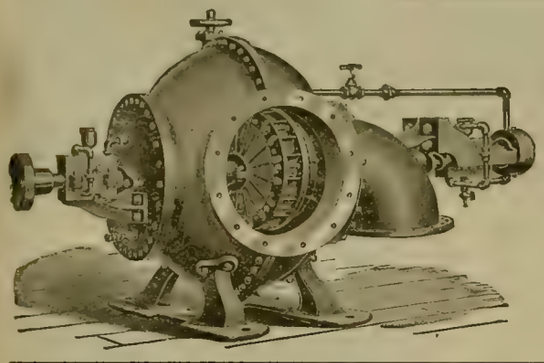

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

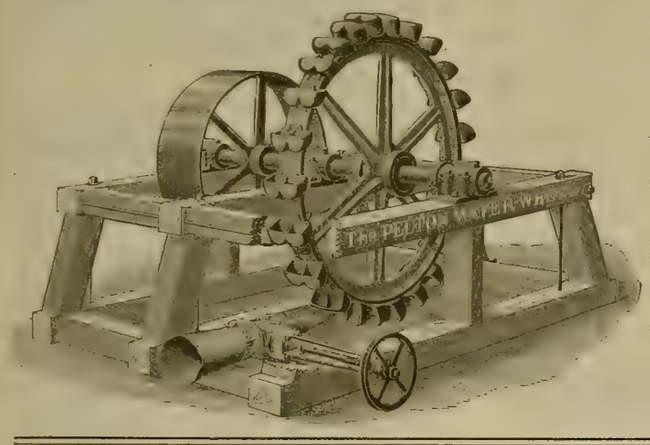
Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,
Springfield, Ohio, or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents, Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal.



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GIVES THE

Highest Efficiency of any Wheel in the World.

A MARVEL OF ENERGY AND POWER.

Over 600 in use on the Pacific Coast alone, aggregating upwards of 50,000 Horse Power.

It is not only most economical of water, but the most simple and reliable power for Quartz Mills, Compressors, Hoisting, Pumping, or any other purpose where water power can be used.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long distances with small loss, and it is now being extensively used in this way in all parts of the country for producing both light and power.

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THE PELTON WATER WHEEL CO.,
120 First Street, - - San Francisco, Cal.

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Gold Mining Properties Bought, Sold and Developed.
Propositions from principals only entertained.
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SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

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BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.
ALSO MANUFACTURERS OF
Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

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ALSO CHEMICALS, AND PHYSICAL, SCHOOL AND CHEMICAL APPARATUS.
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We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we fee confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

☞ Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

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Nevada Metallurgical Works.
NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.
C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the most suitable Process for Working Ores.
Special attention paid to Examinations of Mines; Plans and Reports furnished.

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Mining Engineers and Metallurgists

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Ores Sampled and Assayed, and Tests made by my Process.
Assaying and Analysis of Ores, Minerals and Waters.
Mines Examined and Reported on.
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GREAT REDUCTION!
BATTERY SCREENS.
Best and Cheapest in America.

No imitation, no deception, no planished or rotten iron used. Only genuine Russia iron in Quartz Screens. Planished iron screens at nearly half my former rates.

I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

PERFORATED SHEET METAL
For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass Zinc and other metals punched for all uses.

Inventor and Manufacturer of the celebrated Slot Cut burred and Slot Punched Screens.

Mining Screens a specialty, from No. 1 to 15 (fine).

Orders promptly attended to.

San Francisco Pioneer Screen Works,
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JOHN W. QUICK, Proprietor.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 500 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast—Joseph H. Dafety, 529 Commercial St., S. F.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, April 4, 1889.

The volume of goods going out on order, and also by personal buying, shows a steady increase, yet the purchases indicate a conservative course. The money market shows a growing ease, with more funds offering on the market, chiefly from outside sources. The sluggish money market, more than anything else, shows an absence of any speculative movement. Receipts of treasure the past week by sea were as follows: Silver bullion, $92,594; coin, $10,192. The internal revenue collections for this district in last month aggregated $125,875. San Francisco clearing-house exchanges in March were $67,011,264, against $65,697,735 in March, 1888, showing a slight gain for this year. The exchanges for the first quarter of 1889 were $195,113,723, against $192,529,140 for the first quarter of 1888, a gain thus far this year of $2,584,583. The coinage of the San Francisco mint last month was as follows: Double eagles, $1,120,000; eagles, $380,000; dimes, $255; total, $1,500,255.

The steamship City of Peking, hence for China, March 28th, took out the following treasure: To Hongkong, Mexican dollars, 136,632; silver bullion, $66,000; gold coin, $1462. Total, $204,094. To Hiogo, silver bullion, $136,700.

NEW YORK, April 4.—Quicksilver has ruled fairly steady. Refined borax is firm. Pig lead has met with fair sales at a slight advance; the closing is easier. Tin has moved off more freely, causing a firmer tone to obtain. Copper is quiet and indefinite. Consumers think the existing complications will give prices an advantage in the near future, while holders feel that there will be a recovery of tone. In iron there appears to be a steadier tone.

SILVER—The market in sympathy with prices abroad, weakened off up to yesterday, when a slight advance was noted. Local values now keep more in accord with New York, with perhaps at times from one-twentieth to one-tenth advance obtainable here. There are three causes assigned for the decline in silver: First, the suspension of the Comptoir d'Escompte drew out of the China market quite an important factor, whose movements had a decided bearing on silver. Second, the failure of the copper syndicate, and also the revolutionary character of the movements in France have created a feeling of uneasiness in monetary circles abroad. Third, the Indian council bills are, as usual at this time of the year, offering quite freely on the London market.

MEXICAN DOLLARS—The market has held up fairly well considering the decline in silver. The supply here is reported to be light. Quotable according to quality at 92¾ to 93¼c.

QUICKSILVER—Receipts the past week were as follows: J. B. Randol, 310 flasks; Parrott & Co., 40; Haas Bros., 110; W. B. Bradford, 54; H. M. Newhall & Co., 30; A. Abbey, 45; total, 589. The market is steadier, with inside quotations dropped. The demand has improved.

TIN—The market for pig is unchanged. For tinplate spot is very strong, as the Scottish Dales has not put in an appearance yet. The demand, pending fresh importations, is confined to actual, immediate wants. There was shipped the past week by sea to British Columbia, 59,397 pounds of tinplate.

LEAD—The market is quiet, at steady prices. The usual spring trade is reported. There was shipped by sea the past week 5045 lbs. of pig to Victoria.

BORAX—The market is quiet but steady. Receipts the past week aggregate 1874 ctls., and shipments, 55.391 lbs., made as follows: To Pittsburg, Pa., 23,609; New York, 30,211; and Mexico, 1571.

LIME—The market is without change. Receipts the past week aggregated 4463 barrels.

COPPER—Cable advices indicate a favorable settlement of the affairs of the late syndicate, and that a new one will be formed embracing elements of strength, which were lacking in the old to make a success. Until order is brought out of the present chaotic condition of the markets at the East and abroad, quotations are more or less nominal.

PIG IRON—Imports the past week were 600 tons from England. The local market is without any essential change to note. Consumers still operate only for immediate wants, while importers do not appear disposed to press the market.

COAL—Imports the past week were as follows: Overland, 110 tons; Cedar River, 2500; Renton coal, 2200; Australian, 3498; Scotch Splint, 1916; Nanaimo, 3694; Port Moody, 2200; Seattle, 6850; Departure Bay, 7200; total, 30,058 tons. The market is still easy, although some bullish brokers think low prices have been touched. A large sale of Australian from yard is reported to have been made at $6.50 a ton. Large consumers, unless offered inducements, are said to be offish about buying beyond immediate wants; indeed the most of them are reported to be well stocked.

Eastern Metal Markets.

By Telegraph.

NEW YORK, April 4, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42½	92¾	$14 75	$3 62½	$21 00
Friday	42⅝	92¾	14 50	3 65	21 05
Saturday	42½	92⅝	14 50	3 67½	21 05
Monday	42 3-16	92½	14 50	3 67½	21 10
Tuesday	42 3-16	92½	15 00	3 67½	21 15
Wednesday	42½	92⅝	14 50	3 67½	21 25

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Justice, March 29, $3900; Confidence, 29, $51,540; Crown Point, 29, $9516; Alta, 29, $30,129; Hale and Norcross, 30, $7400; Bluebird, 29, $18,816; Con. California and Virginia, 30, $75,240; Hanauer, 29, $2100; Navajo, April 3, $8000; Mt. Diablo, 4, $7830; total for March $36,348; Hanauer, 1, $2500.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, April 4, 1889.

ANTIMONY	13 @	14
BORAX—Refined	7¼@	7¾
Powdered	7¼@	7¾
Concentrated	6¾@	7¼
COPPER—		
Bolt	26 @	27
Sheathing	26 @	—
Ingot	— @	—
Fire Box Sheets	— @	26
LEAD—Pig	4½@	—
Bar	5 @	—
Sheet	8 @	—
Pipe	7 @	—
Shot, discount 10% on 500 bags Drop, ₱ bag	1 45 @	—
Buck, ₱ bag	1 65 @	—
Chilled, do	1 85 @	—
STEEL—English, lb	16 @	20
Canton tool	9¼@	—
Black Diamond tool	10 @	16
Pick and Hammer	8 @	10
Machinery	4 @	5
Toe Calk	4½@	—
TINPLATE—Coke, prompt shipment	4 75 @	4 85
Coke on spot	5 50 @	5 75
Charcoal, 14x20	6 50 @	7 00
do roofing, 14x20	5 37½@	5 50
Pig tin, ₱ lb	22½@	23
QUICKSILVER—By the flask	— @	41 00
Flasks, new	1 05 @	—
Flasks, old	85 @	—
COKE—English, ton, spot	20 00 @	—
Do, do, to load	13 50 @	13 75

	Spot.	To Load.
IRON—Glengarnock ton	27 @ —	27½@ —
Eglinton, ton	26 @ —	26½@ —
American Soft, No. 1, ton	— @ 31 00	31½@ —
Oregon Pig, ton	— @ 30 00	25 @ —
Clay Lane White	— @ 24 50	29 @ —
Shotts, No. 1	— @ 28 50	— @ —
Bar Iron (base price) ₱ lb	2¾@ 3	— @ —
Chrome iron ore, ₱ ton	00 @ 10 00	— @ —

Coal.

TO LOAD.

	Per Ton.		Per Ton.
Australian	6 50 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	7 00
Scotch Splint	9 00	Seattle	7 00
West Hartley	10 00	Coos Bay	6 00
Greta	9 00	Cannel	10 00
Westminster Brymbo	9 00	Egg, hard	16 00
Nanaimo	9 00	Cumberland, in sacks	18 50
Sydney	$ 9 00	do, bulk	17 00

Mining Share Market.

Stocks the past week were quiet, with a gradual sinking in prices, alternating with spasmodic efforts at reactions. The street is full of all kinds of rumors—all of a bearish character, while it is very hard to obtain reliable news from the mines. This condition always obtains when the pool is manipulating to get in stocks at low prices. The Crown Point Company at Virginia City only shipped in bullion last month $37,347, with the final cleanup to hear from. Potosi is shipping ore to the Nevada mill.

The following companies report having had a balance on hand April 1, 1889: Belcher, $22,024.72; Consolidated Imperial, $14,287.36; Best and Belcher, $1952.45; Lady Washington, $23,510.80; Alta, $67,131.26; Consolidated California and Virginia, $157,097.02 in cash and $75,240.94 in unsold bullion, with further shipments to arrive; Mono, $9267 97; Bodie Consolidated, $24,076.40; Occidental, $3057.76; Gould and Curry, $928.14; Hale and Norcross, $10,309.67 in available cash, and the bullion returns for March not all in; Ophir, $2310.07; Exchequer, $3350.10; Alpha, $12,660.80; Silver Hill, $5835.70; St. Louis, $3702.60; Andes, $9925.43; Syndicate, $8638.71; Found Treasure, $4.80; Crocker, $299.54; Peer, $1750.92; Locomotive, $839.03; Confidence, $79,107.14; Caledonia, $11,222.34; Overman, $19,100.83; Navajo, $27,654.12 in cash and $8000 in bullion; Independence, $1842.09; Diana, $4182.35; Standard Consolidated, $20,288.14; Silver King, $38,000; Benton Consolidated, $95,422.62; Julia, $6056.40; Bullion, $25,358.09; Scorpion, $7300. The following report an indebtedness on that date: Grand Prize, $42,767.52; Nevada Queen, $56,403.56; Commonwealth, $59,406.52; North Belle Isle, $17,373.31; North Commonwealth, $18,230.28; Del Monte, $3398.55; and Belle Isle, $4706.31.

The following companies report having had an indebtedness April 1, 1889: Crown Point, overdraft of $15,673, with bullion of the assay value of $10,294.86 in bank as a partial offset, and other shipments to come; Challenge Consolidated, $1833.28; Bulwer Consolidated, $700.74; Seg. Belcher, $14,299.28; Savage, $15,340.22; Sierra Nevada, $7934 82; Potosi, $16,812.28; Mexican, $3946.01; Chollar, $6820.65; Holmes, $3748.93; Con. New York, $3748 93; Peerless, $8330.33, with the March bullion product not yet received; Weldon, $277.03; Utah Consolidated, overdraft at bank of $4401.17.

The ore yield of the Comstock mines during the week ending March 30th aggregated 6716 tons, divided as follows; Con. California and Virginia, 2877 tons, battery sample assays showing a value of $34 90 per ton; Savage, 527 tons, assaying $22; Hale & Norcross, 817 tons, assaying $25.09; Confidence, 653 tons, assaying $31.12; Crown Point, 912 tons; Overman, 318 tons; Justice and Alta, 500 tons; Gould and Curry, 112 tons, assaying $22.12. The combined bullion yield of the above was about $150,000.

The Exchequer Mining Co., Virginia City, has levied an assessment of 25 cents per share. The Confidence Mining Co. has declared a dividend of $1 per share, and the Con. California and Virginia one of 50 cents per share.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

A. F. JEWETT—Tulare Co.
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H. G. PARSONS—Southern California.
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J. C. HOAG—San Francisco.
CHAS. F. BLACKBURN—Idaho.
FRANK S. CHAPIN—Colusa Co.
MRS. E. J. STEPHENS—Sierra Co.
R. G. HUNTON—Montana.
E. H. SCHARFFLE—Calaveras and Tuolumne Cos.
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CHAS. DUGAN—Stanislaus Co.

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COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Belcher S M Co	Nevada	37	50	Feb 19	Mar 25	Apr 12	J Crockett	327 Pine St
Bodie Con M Co	California	10	50	Mar 25	Apr 30	June 4	B L Burling	309 Montgomery St
Calaveras Blue Gravel M Co	Cal	2	05	Mar 28	Apr 30	May 27	B Burris	240 Montgomery St
Crocker M Co	Arizona	6	10	Feb 25	Apr 2	Apr 24	A Waterman	309 Montgomery St
ChristyM Co	Utah	1	10	Feb 20	Mar 25	Apr 15	G R Spinney	310 Pine St
Eureka Con M Co	Nevada	11	50	Mar 19	Apr 27	May 20	H P Bush	306 Pine St
Exchequer M Co	Nevada	27	25	Apr 2	May 7	May 28	C E Elliott	309 Montgomery St
Gray Eagle M Co	California	12	05	Mar 19	Apr 23	May 14	O H Bogart	327 Pine St
Grand Prize M Co	Nevada	20	30	Mar 15	Apr 20	May 13	R R Grayson	327 Pine St
Golden Prize Con M Co	Nevada	2	30	Feb 16	Mar 20	Apr 10	C D Bennett	328 Mon gomery St
Lapanta Con M Co	Nevada	1	03	Feb 23	Apr 5	Apr 25	J Stadfeld Jr	309 Montgomery St
Los Patos Coal, Iron & Mang Co	Cal	1	14	Mar 25	Apr 30	May 20	W O Stedfeld	309 Montgomery St
Mexican M Co	Nevada	37	25	Mar 5	Apr 10	Apr 30	C E Elliott	309 Montgomery St
Mono M Co	California	27	50	Feb 28	Apr 2	May 8	B L Burling	309 Montgomery St
North Peer G & S M Co	Arizona	5	05	Feb 25	Apr 1	Apr 24	H Deas	309 Montgomery St
Oak Con M Co	California	1	03	Feb 25	Apr 8	Apr 23	E J Ryan	230 Montgomery St
Peerless M Co	Arizona	12	25	Mar 25	Apr 26	May 21	A Waterman	309 Montgomery St
Piedmont M Co	Nevada	1	05	Jan 28	Mar 5	Apr 23	J F Scoville	309 Montgomery St
San Francisco Copper Co	California	3	10	Mar 18	Apr 23	May 21	G Ruegg	405 California St
Sierra Nevada M Co	Nevada	94	25	Mar 5	Apr 9	Apr 29	E L Parker	309 Montgomery St
Taylor M & M Co	California	17	3 00	Mar 20	May 1	May 18	A E Ball	Mechants Ex
Utah Con M Co	Nevada	6	25	Mar 5	Apr 10	Apr 29	A H Fish	309 Montgomery St
Western Mineral Co	California	3	2 00	Feb 21	Mar 20	Apr 16	A Chemiouat	328 Montgomery St
Yellow Jacket M Co	Nevada	48	50	Mar 28	May 1	June 1	W H Blauvelt	Gold Hill

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Bulwer Con M Co	California	L Alora	309 Montgomery St	Annual	Apr 10
Bullion-Beck M Co	Utah	A Badlam	322 Montgomery St	Annual	Apr 24
Champion M Co	California	T Wetzel	522 Montgomery St	Annual	Apr 9
Live Oak Drift G M Co	California	J Morizio	328 Montgomery St	Annual	Apr 16
Navajo Queen M Co	Nevada	J R Holling	526 Kearny St	Annual	Apr 16
Pacific Borax, Salt & Soda Co		A H Clough	230 Montgomery St	Annual	Apr 10
Russell Reduction & M Co	California	J Morizio	328 Montgomery St	Annual	Apr 22
Tioga Con M Co	California	B L Burling	309 Montgomery St	Annual	Apr 8

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	Mar 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 14.		WEEK ENDING Mar. 21		WEEK ENDING Mar. 25.		WEEK ENDING Apr. 4.	
Alpha	1.75	1.90	1.80	2.15	1.75	1.90	1.55	1.80
Alta	1.80	1.90	2.00	2.15	1.95	2.10	2.05	2.25
Andes	.85	.90	.90	.95	.80	.90	.75	.80
Argenta	....	....	....	....	....	....	....	.05
Belcher	1.75	3.00	2.80	3.25	2.75	3.30	3.05	3.50
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	4.05	4.35	4.20	4.65	3.75	4.30	3.75	4.15
Bullion	.85	.90	.85	.95	.75	.85	.70	.85
Baltimore	.20	.40	.40	.45	.35	.45	.25	.35
Belle Isle	....	....	....	....	....	.30	.25	.30
Bodie Con	1.25	1.30	1.45	1.50	1.25	1.35	1.00	1.20
Benton	....	3.50	....	....	3.35	4.00	....	3.75
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.30	.35	....	.35	....	.40	.30	.35
Con. Va. & Cal	7.50	7.75	8.25	8.75	8½	8.50	8¼	8½
Challenge	4.15	4.55	4.15	4.75	3.90	4.20	3.75	4.00
Champion	....	....	....	....	....	....	....	....
Chollar	2.40	2.65	2.40	2.85	2.10	2.60	2.10	2.40
Confidence	13½	13¾	13½	14¼	12¼	13¼	12	12½
Con. Imperial	.60	.85	.60	.75	.60	.65	.55	.65
Caledonia	....	.35	.35	.45	.35	.40	.30	.35
Con. Pacific	....	.20	.15	.20	....	.20	....	....
Crown Point	4.35	5¼	4.60	4.95	4.10	4.80	3.70	4.35
Crocker	.35	.55	.45	.50	.45	.55	.45	.60
Central	....	....	....	.25	....	....	....	....
Dudley	....	....	.20	.25	.20	.30	....	.25
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	2.00	....	2.00	1.00	1.25	.75	1.20
Exchequer	.80	.95	.80	.90	.75	.85	.65	.75
Grand Prize	.80	1.00	.70	.90	.65	.75	.65	.80
Gould & Curry	2.45	2.60	2.65	2.85	2.25	2.65	2.20	2.50
Hale & Norcross	3.70	3.90	3.70	4.00	3.65	3.95	4.05	4.45
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	....	....	.30	.40	....	....	....	.30
Justice	1.45	1.60	1.50	1.65	1.25	1.55	1.20	1.30
Kentuck	1.85	2.00	1.80	2.00	....	....	1.65	1.75
Lady Wash	.30	.35	.35	.40	....	.35	....	.40
Martin White	....	....	....	....	....	....	....	....
Mono	.55	.60	.75	.80	.60	.73	.50	1.00
Mexican	3.35	3.65	3.60	3.95	3.05	3.70	3.00	3.45
Mt. Diablo	....	....	....	2.00	....	2.25	....	2.75
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.00	1.25	1.00	1.05	1.10	1.15	.95	1.10
North Belle Isle	2.55	2.70	2.55	2.60	....	....	2.50	3.00
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.95	3.10	2.90	3.05	2.75	2.85	2.85	3.60
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.35	1.50	1.35	1.45	1.25	1.30	1.20	1.30
Ophir	5¼	5.50	5¾	6.50	5.00	5¾	5¼	5¾
Overman	1.30	1.40	1.40	1.50	1.10	1.40	1.25	1.50
Potosi	2.30	2.75	2.15	2.35	1.85	2.30	1.85	2.15
Peerless	.45	.65	.40	.60	.45	.65	.40	.45
Peer	.25	.35	....	....	.30	.35	....	....
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.75	3.00	2.75	3.00	2.50	2.80	2.40	3.00
S. B. & M	2.70	2.95	2.75	3.05	2.60	2.95	2.65	2.80
Sierra Nevada	2.85	3.10	3.00	3.30	2.60	3.00	2.50	2.80
Silver Hill	.65	.70	.60	.70	....	....	.50	.55
Silver King	....	.90	....	....	....	....	....	.85
Scorpion	.50	.55	....	.55	.50	.55	.45	.50
Syndicate	....	....	....	.10	....	....	....	....
Union Con	3.50	3.70	3.70	3.90	3.10	3.70	3.05	3.10
Utah	1.20	1.25	1.25	1.35	.90	1.20	.80	1.15
Yellow Jacket	3.75	4.25	3.80	4.10	3.30	4.05	3.25	3.80
	....	....	....	....	....	....	....	....

Sales at San Francisco Stock Exchange.

THURSDAY, Apr. 4.

100	Alta	2.15	
400	Alpha	1.55	
300	Andes	7c	
675	Belcher	3.05	
440	B. & Belcher	3.70	
300	Bodie	1.00	
100	Bullion	70c	
250	Baltimore	35c	
320	Chollar	2.10	
50	Con Va & Cal	8¼	
250	Crown Point	3.70	
20	Confidence	12.50	
700	Con Imperial	55c	
100	Challenge	3.75	
100	Commonwealth	5.50	
400	Exchequer	60c	
100	Gould & Curry	2.15	
500	Hale & Nor	4.05	
100	Julia	30c	
505	Mexican	3.15	
150	Mono	1.10	
130	N. Belle Is	3.00	
250	Overman	1.15	
250	Opnir	5.00	
600	Potosi	1.85	
200	Peer	30c	
100	Savage	2.45	
400	Scorpion	45c	
250	S. B. & M	2.80	
230	Sierra Nevada	2.60	
800	Utah	85c	
300	Union	3.10	
100	W Comstock	35c	
300	Weldon	20c	
630	Yellow Jacket	3.15	

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SEPARATIONS.—In the article on "Separations," published in the PRESS of March 30th, in the paragraph on "Copper, Nickel and Cobalt from Zinc and Cadmium," the sentence "in this sulphate solution," should read "in thiosulphate solution."

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

SAN FRANCISCO STREET RAILWAY CO., March 28. Capital stock, $2,500,000. The lines that will be operated are as follows: From the water-front on Market street to the intersection of Pine and Central avenue, along Market, Pine to Central avenue, returning by same route. From the bay on Fillmore street to the corner of Church and Thirteenth, along Fillmore to Ridley, to Church, to Thirteenth and returning by same route. From the corner of O'Farrell and Market to Fell and Stanyan, along O'Farrell to Fillmore, to Fell, to Stanyan, to Fillmore and Pine, where the other system will connect for the ferries. The total length of all the proposed lines is 25 miles. Directors—C. O'Connor, R. P. Hastings, Fisher Ames, Thos. J. Clunie and A. E. Davis.

ELK CREEK R. R. CO., March 29. Capital stock, $500,000. The object is to construct a narrow-gauge railroad of a length estimated at 32 miles. The road will commence near the mouth of Greenwood or Donahue creek, in Mendocino county, thence by the most practicable route to Elk Creek, thence up Elk Creek to a given point of survey, thence to the main branch of Alder creek, a distance of 24 miles, constituting the main line of the road. A branch road will be built from the main line on the right branch of Alder creek and will run along the line of the creek to about three miles from its mouth, an estimated distance of eight miles. Directors—L. E. White, J. H. Tate, Charles E. Wilson, T. Pollard and E. J. Dodge.

GARFIELD G. M. CO., April 1. Location, Greenwood district, El Dorado Co. Capital stock $500,000. Directors—J. E. Scott, J. B. Curtis, P. J. White, W. A. L. Miller, Wm. W. Bishop, James A. Watt and J. H. Sayre.

NIANTIC G. M. CO., April 2. Location, Nevada Co. Capital stock, $1,000,000. Directors—Frederick H. Hansman, Walter Speyer, Alexander Hay, James H. Mundy and Frederick K. Shawhan, all of this city.

WESTERN IRON WORKS, April 2. Object, to conduct a general foundry business. Capital stock, $60,000. Directors—Willard B. Morris, Howard C. Houghton, James Campbell, Hugh Jones and William D. Noyes.

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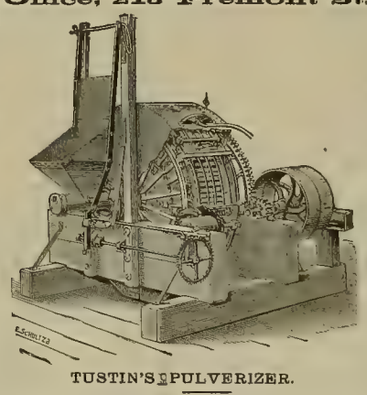
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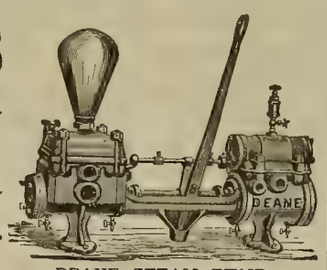

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COAL MINES OF THE WESTERN COAST.
A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for $2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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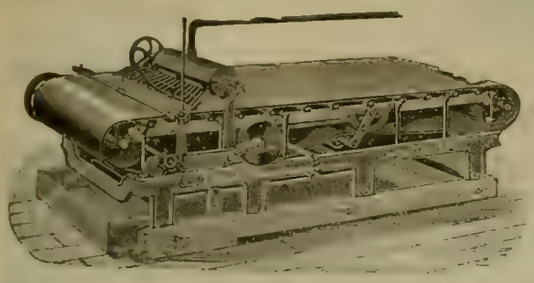

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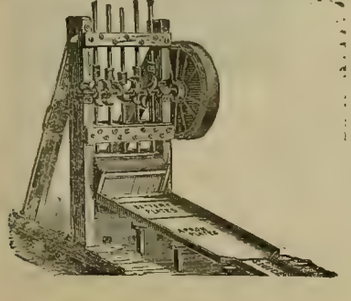

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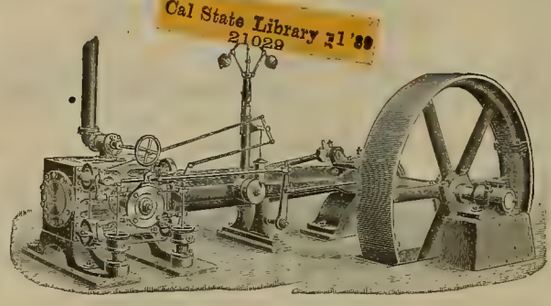

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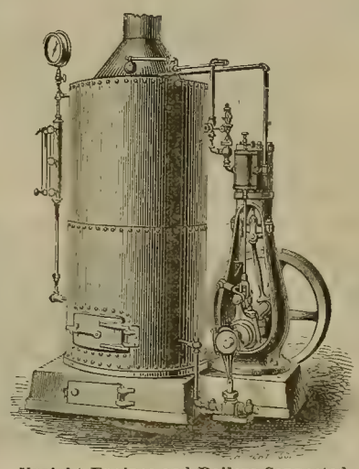

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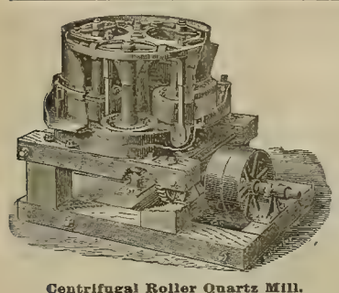

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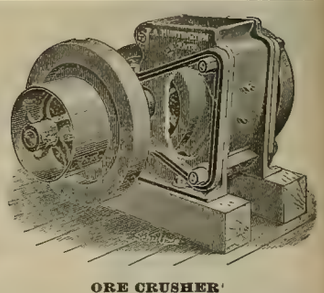

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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO. Publishers.

SAN FRANCISCO, SATURDAY, APRIL 13, 1889.

VOLUME LVIII. Number 15.

A Ledge.

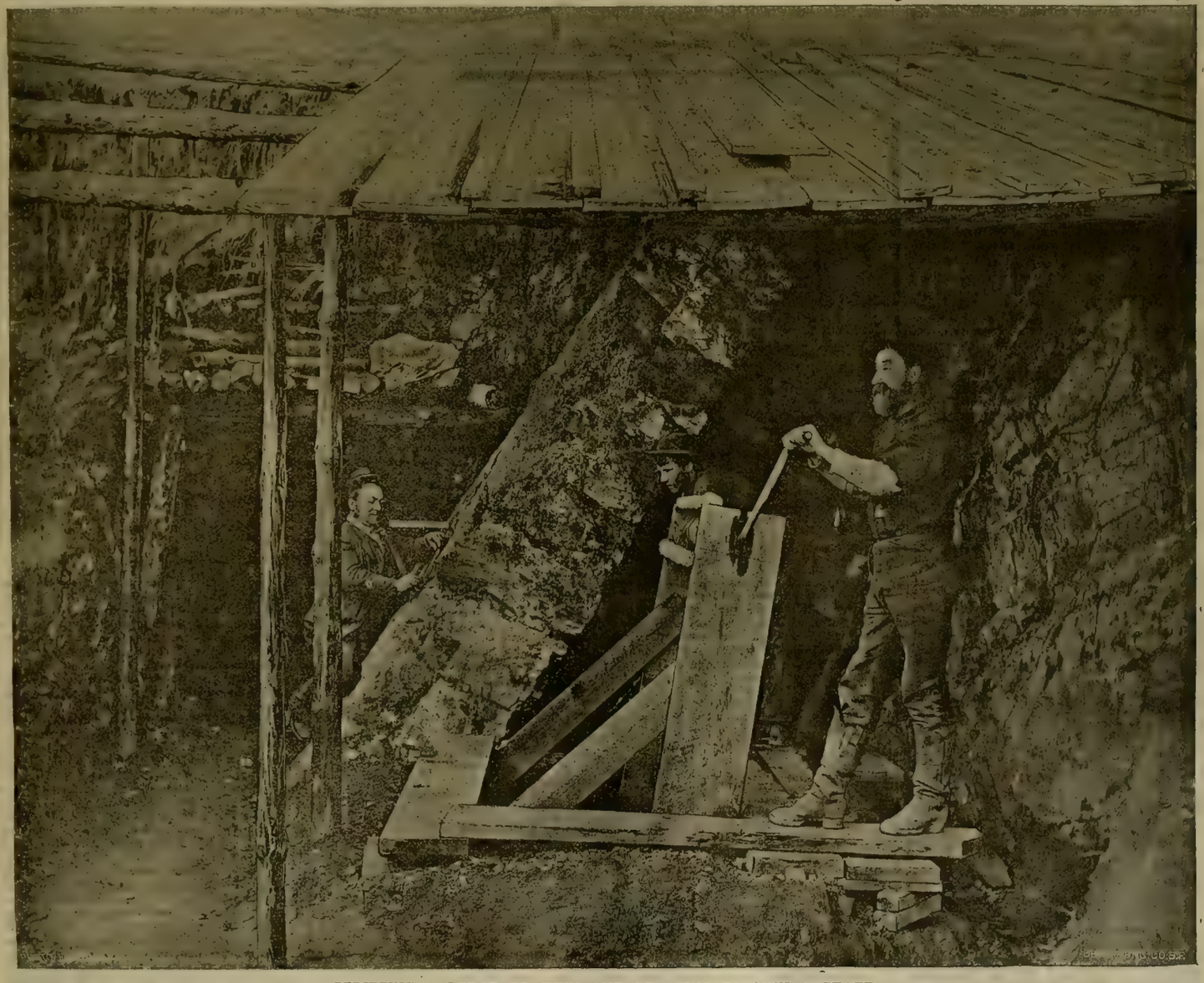
We give on this page a photo-facsimile of a ledge or vein, made from a photograph taken in the gold-mining regions of California. It shows the vein or ledge "stripped" and the men sinking a shaft. The windlass shown is the rough, common form used in the mines for preliminary work.

A mining engineer is using a clinometer to get the dip of the vein. The picture happens to be a good one of a well-known mining man and will be recognized by many.

We do not remember having seen a better illustration of a vein or ledge than that presented. The ledge has been stripped and stands out prominently, isolated from the surrounding rock. Those not familiar with mining matters can see from this how "the ledge" looks. In this vein or strip of rock is contained the ore which the men are in search of. The shaft or winze is continued down vertically, and drifts are run out to the vein and along its course, the vein being removed and taken through the drifts and shaft to the surface. Different levels are run from the shaft, and the vein is removed from all the space it occupies between the levels.

Some portions of the vein are richer than others. There may be a "chimney" of ore in the vein extending for some distance in all directions, and then a comparatively barren space may be met. The vein varies also in width occasionally. In some instances the gold is disseminated pretty evenly all through the rock of the vein, and again it comes in "pockets" or bunches. Moreover, while near the surface, the gold is found "free," or in pure native state; sometimes as depth is attained it is so combined with sulphurets that more elaborate processes are required to obtain it.

All ledges are by no means so wide and solid-looking as that shown in our picture. Ledges in gold mines vary from one to three feet, though they are occasionally much wider and sometimes narrow down to a mere "knife-blade." The very large ledges are apt to be of low grade. There are so many peculiarities to veins, however, that they could scarcely be enumerated in the course of a brief article.



STRIPPING A LEDGE OR VEIN AND STARTING TO SINK A SHAFT.

The black-sand placers on the ocean beach near Lompoc, Santa Barbara county, are causing some local excitement.

Ore in Dispute.—The Standard Consolidated M. Co., owner of the West Bullion lode in Mono county, has filed a suit in the U. S. Circuit Court against the Bulwer Consolidated Mining Co., which operates the Ralston claim adjoining, to settle the ownership of a lode which in its course runs under the surface boundaries of both claims. The plaintiff asks judgment for $2400 for ores taken out and for $5000 damages.

The first number of the new paper at the Santa Clara gold-fields, in Lower California, was issued March 23d. It is called the *Nugget*, and is a three-column sheet, printed on one side, but promises to grow if the town does.

The San Francisco Microscopical Society will give a public exhibition in August.

A Cylindrical Observatory Dome.

A Design for a Cylindrical Dome for a Thirty-Six-Inch Equatorial Telescope.

[An undergraduate thesis, by W. E. Downs, University of California.]

Astronomy is doubtless the most ancient of all sciences, dating back to the earliest records. Since the heavens could not fail of being an object of keen attention to the most primitive race, the study of the celestial bodies is as old as man himself. The recurrence of conjunctions and eclipses, the successive intervals of light and darkness, and the regular change of seasons, must have aroused a desire in earliest man to account for these phenomena by movements of the heavenly bodies, and must have led to systematic study and observations of their motions and positions. We have records of such an attempt to analyze the movements of the planets, in what is known as the Ptolemaic theory. The supporters of this theory supposed the earth to be a fixed center, around which the sun and heavenly bodies revolved by means of a system of invisible bars and cranks. By the aid of this incongruous combination, the places of the sun and planets were so accurately predicted that the error could not be detected by the rude instruments then in use.

Centuries later Lipperhey, a Dutch spectacle-maker, found, by chance, that two pieces of glass of certain shapes possessed, when rightly placed with respect to each other, the remarkable property of making distant objects appear near.

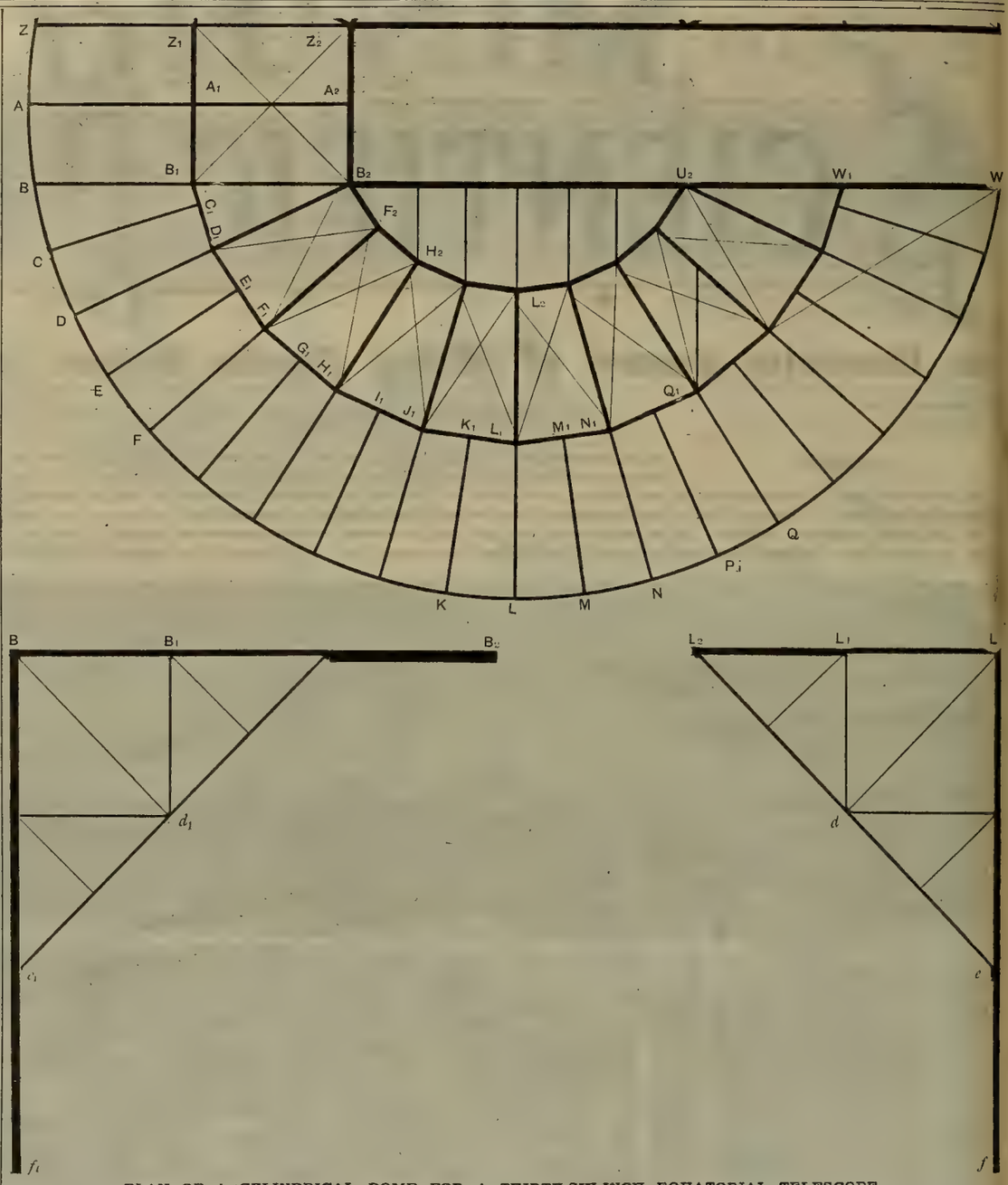
Galileo, the eminent philosopher, at once realized what possibilities such a discovery might lead to, and hastily constructed an instrument for testing its value. Though this instrument consisted simply of a lead pipe with a piece of glass set in either end, it was the first telescope, and demonstrated the practical worth of that class of instruments which was destined to overthrow the old Ptolemaic theory, to revolutionize the science of astronomy, and to furnish for it a solid foundation by revealing the secrets of the heavens. From that time to the present, the telescope with its appliances has been gradually nearing perfection, until to-day the intelligence of many distinguished scientists, aided by the mechanical skill of thoroughly trained workmen, has been enabled to produce an instrument that is of infinite value in the determination of celestial laws and conditions. The fact that the highest degree of perfection has been achieved by California, that there is now at Mt. Hamilton a telescope with bountiful equipments outranking all instruments of the kind in the world, imparts new interest, not only to astronomy, but to the means employed in the manufacture and preparation of the glass, and to the many intermediate steps in the construction necessary to place this instrument in perfect working order.

A feature that is of much interest to the writer, and which forms the subject of this paper, is the designing of a suitable dome for a 36-inch equatorial telescope. The length of the tube of the great telescope at Mt. Hamilton was calculated to be such as to require a dome of about 75 feet in diameter. Accordingly, an immense hemispherical dome was designed and constructed for that purpose. In order that the eye end of the telescope might be accessible to the observer at all times, an elevating floor of many tons weight partly counterpoised, operated by hydraulic engines, was necessary. In our designs we have chosen a cylindrical dome of rolled steel, feeling confident that the same degree of convenience could be obtained at a greatly reduced cost, both in the original construction and in subsequent operation, as is now secured by the present hemispherical form.

In place of an elevating floor and a curved shutter such as now exist in the great Lick dome, we will have an elevating platform and two shutters. The platform will be designed to carry two or three observers, together with a few necessary instruments to be used by them in working, and will be suspended from the roof just opposite the opening through which the telescope is to point. To secure ease of movement, it will be almost wholly counterpoised by four large weights. As regards the two shutters, we will designate one as the vertical and the other as the roof shutter. The former may be opened like an ordinary door and the latter will be counterpoised by a weight rolling upon a specially designed curve, and may be opened like an ordinary trap-door.

The advantages of a cylindrical shape are: first, ease of construction, since nearly all of the pieces will be straight and will have cross-sections of the ordinary commercial forms; second, (*a*) ease in operating the shutters, since they are to be controlled by the observer when he is on his platform, and, (*b*) convenience, since when observing in any portion of the heavens less than 41 or 42 degrees from the zenith or from the horizon only one shutter need be opened; third, ease with which the observer may control the movements of the platform while upon it.

The roofing of the Lick dome, as actually constructed, required a large number of special iron plates which added not a little to the cost of material, while the horizontal roof of a cylindrical dome could be easily covered with corrugated iron or iron plates similar to those now in use. The walls would require only



PLAN OF A CYLINDRICAL DOME FOR A THIRTY-SIX-INCH EQUATORIAL TELESCOPE.

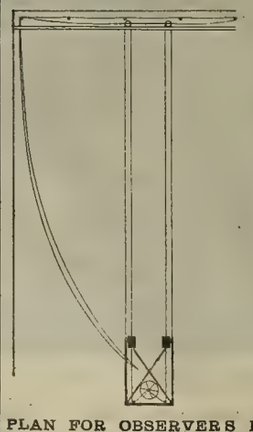
common rectangular plates curved to an arc, whose radius would be that of the cylinder.

For construction of the frame, steel is recommended in preference to wrought iron, because of its superior strength and its tendency, as now manufactured, to be of a more uniform grade.

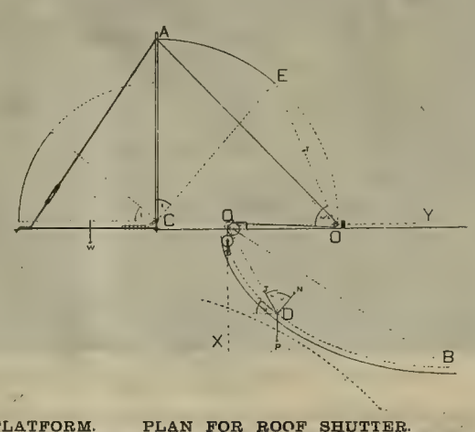
The weight of the dome would, as we have computed, be less than six-tenths of that of the Lick dome. This decrease in the weight of the material used would be an important factor in the cost of construction, especially when we consider the distance and difficulty of transportation.

In the following figure we will refer to the girder whose flanges are A_1B_1, B_1D_1, etc., and A_2B_2, B_2F_2, etc., as the circular girder.

Each flange will be made of at least three separate pieces. The center pieces of both flanges will be 12 feet long, which is the width of the shutter and a little heavier than their corresponding side pieces. The side pieces of the inner flange, which are symmetrical, will each be bent into eight equal parts, each part being the chord of a circle which is concentric with the axis of the dome. The corresponding pieces of the outer flange, which are also symmetrical,



PLAN FOR OBSERVER'S PLATFORM.



PLAN FOR ROOF SHUTTER.

will each be bent into ten parts forming chords, or parts of chords, as the case may be, of a larger concentric circle.

We have taken the mean diameter of the dome as 74 feet 3 inches, and the width of each shutter as 12 feet. This particular width of the shutters is such as to allow for an opening of from three to four times the diameter of the objective, so as to give ample room for a star to remain in the field of view for a reasonable length of time without the necessity of revolving the dome. We have taken the hight of the moving part of the dome as two feet greater than its radius, so as to give room for the curve that holds the counterpoise weight of the roof shutter, and for the counterpoise weights of the observer's platform. The dimensions of the various members of the dome have been computed analytically.

In calculating the strains resulting from the horizontal wind-pressure, the maximum pressure has been assumed to be 50 pounds per square foot of surface, which corresponds to a wind velocity of about 100 miles an hour.

We have assumed the pressure on the roof due to the weight of construction as 18 pounds per square foot, and have calculated upon a snow-pressure of 20 pounds, which would be a proper estimate for California climate, and a vertical wind-pressure, which is small in cases of this kind, of two pounds per square foot. The total vertical pressure would therefore be 40 pounds per square foot.

After taking into account the additional tension and compression strains due to these causes that come upon the circular girder, it was found that the strains for horizontal wind-pressure, if multiplied by 1.4, would give sufficiently accurate results for maximum strains. Since the stresses are computed for very high wind-pressures, with a somewhat large safety factor, and as the weight of the observer's platform is small so that it may be easily operated, we need compute no further. The allowable stress will be made 20,000 pounds per square inch.

All except the interior members of the dome have been dimensioned to resist bending moments due to the wind-pressure and the weight of construction and snow, in addition to resisting the forces already considered. In dimensioning, the Union Iron Mills catalogue has been used as a basis of calculation.

In order to brace Bf_1, Wf_1, etc., and Cf, Df, etc., we will have two continuous angle bars which will be bent into lengths equal to CE, DF, etc., and which will go around the structure from one side of the opening to the other, at the hight e. They will resist both the inner

and outer horizontal forces coming upon the vertical struts Bf_1, Cf, etc., at e_1, and e.

The elevating observer's platform will be 5x5 by 7 feet high. It will be suspended from pulleys that are attached to a car or truck. It will be counterpoised by four large weights, two of which are shown in the drawing. The weight of the empty platform will be slightly greater than these four weights so as to prevent its rising alone. The track upon which the car is to run will be rigidly fastened to the eyebars ZZ_1Z_2, AA_1A_2, and BB_1B_2 (see large figure), and 18 inches below them. It will consist of two rails gauged 4 feet 6 inches apart. The pulleys will be fitted upon the extension of the axle; that is, just outside of the wheels, so as to permit of lateral bracing between the rails.

The reason for having the platform rather high, as it appears in the drawing, is to make the center of gravity as far as possible below the points of support so as to prevent unsteadiness. Small weights of say 15 or 20 pounds, in friction slides fastened to the wall of the dome and connected with the observer's platform by ropes, would tend to prevent swinging.

The platform with its attachments may, however, be designed and constructed after everything else is completed, so as to suit the observer.

The vertical shutter will be 39 feet 1½ inches high. It will be securely hinged to the vertical strut running from W down to the upper track. There will be two ropes attached to the lower end of this shutter—one to open and the other to close it. They will run around either side of the dome to the observer's platform. In order to prevent any shock, a set of springs will be fixed to the dome, so as to receive the shutter when opened.

The roof shutter will be 49½ feet long. The drawing shows the manner in which it is hinged and counterpoised. When closed, the center of gravity of the shutter and its rigid appendages are at the same hight as the hinge. The curve is so designed that the weight rolling upon it will be in equilibrium with the shutter, for, suppose the shutter to be half or two-thirds open, then the tension in the rope leading from it to the weight will be such that both will remain where they are if left undisturbed.

Since friction acts both ways, we have disregarded it in the calculation of this curve, but in the designing of the details we will make the parts as frictionless as possible.

$O_1D - r$ = radius vector of the curve when O_1 is the pole.

l = length of rope less $OO_1 = EO + O_1D = AO - BO_1$.

P counterpoise weight on the curve.

T = tension in the rope.

W — weight of the shutter and its rigid appendages.

N = normal pressure exerted by the curve upon the weight P.

a distance from C to the center of gravity of the shutter and appendages.

b $CO - CA$

t, u, v and w represent angles.

The moment of force about C due to either W or $T = Wa\cos t = Tb\sin w$ but $\sin w = \frac{b\cos t}{l-r}$ $\therefore$ $Wa = \frac{Tb^2}{l-r}$

$\therefore$ (1) $T = \frac{Wa(l-r)}{b^2}$

$T\cos u + N\cos v = P$ and $T\sin u = N\sin v$

$\therefore$ (2) $T(\cos u + \sin u \operatorname{ctn} v) = P$ whence

(3) $\frac{P}{Wa}\frac{b^2}{} = (\cos u + \sin u \operatorname{ctn} v)(l-r)$

For $u = 0$, $v = 90°$ and $r = 0$

(4) $\frac{P}{Wa}\frac{b^2}{} = l$ which shows, as a necessary consequence, that P depends upon W when the values of the constants a, b, and l are given. From (3) and (4) we have:

(5) $l = (\cos u + \sin u \operatorname{ctn} v)(l - r)$ where

$\operatorname{ctn} v = \frac{dy}{dx}$ and $\begin{cases} x = r\cos u \\ y = r\sin u \end{cases}$

multiply (5) through by r, then —

$lr = (r\cos u + r\sin u \operatorname{ctn} v)(l-r)$

$\left\{ x + y\frac{dy}{dx} \right\}(l-r) - \frac{1}{2}\frac{d(x^2+y^2)}{dx}(l-r)$

$- \frac{1}{2}\frac{d(r^2)}{dx}(l-r)$

$\therefore$ $2ldx = \frac{l-r}{r}d(r^2) - d(2lr - r^2)$

By integrating, we have,

(6) $2lx = 2lr - r^2 + [c = 0]$ or

(7) $2lr\cos u = 2lr - r^2$, the polar equation of the curve. This may be thrown into the form,

(8) $r = 4l\sin^2\frac{u}{2}$

the inverse of a parabola with respect to the focus which is called a cardioid.

The following table gives a few values of x and y corresponding to given values of r (in feet), from which the inner curve has been drawn:

r	x	y	r	x	y	r	x	y
1	98	.21	8	6 55	4.60	16	10.18	12.34
2	1 91	.60	10	7 73	6 35	18	10 64	14 52
4	3.64	1.67	12	8 73	8 24	20	10 91	16 76
6	5 18	3.02	14	9.55	10.24	22	11.00	19.05

From this curve distances equal to the radius of the roller P were laid off and the new outer curve, the one that P actually rolls on, was constructed. The curve that is shown in the drawing just below these two represents the edge or surface of the hemisphere that the dome is supposed to circumscribe.

We have made that part of the rope OO_1 inclined, to guard against water running along it into the dome, and have covered the pulley where it enters the dome. The covering will be just low enough to be cleared by the vertical appendage of the roof shutter when the latter is lowered.

In opening and closing the roof shutter ease of operation and perfect freedom from all shocks or jars may be secured. To prevent shock in opening, a spring will be placed just back of the pulley at O, and in closing several springs will be properly fixed to the dome on the left hand side of the opening as we look out.

The movements of the roof shutter, as was the case with the vertical one, may be completely controlled by the proper arrangement of ropes fastened to the inner end from the observer's platform.

Both shutters will have some sort of trap-door attachments—which will be controlled from the observer's platform—to keep them in place when not in use. They will be made perfectly water-tight.

The area of the top and sides of the dome is 13,457 square feet. For roofing to cover this area we have taken galvanized corrugated iron, Birmingham wire gauge, No. 24, the thickness of which is given in Trautwine as 0 022 of an inch. Its weight is 1.44 pounds per square foot of roof. The total weight of this kind of roofing for the dome is 19,378 pounds.

The weight of the observer's platform, the roof shutter with its appendages, the attached curve with the counterpoise weight, and some smaller pieces not included in the general calculation of the frame will not, at the very highest estimate, exceed 10,000 pounds. Adding this to the weight of the frame and roofing, which is 94,577 pounds, we have for the total weight of the structure 104,577 pounds, or about 52 3 tons, which is a little more than half the weight of the great Lick dome. This estimate may be reduced to about 46 tons, by designing the vertical struts Lf, etc., with less metal area, but with the same moment of resistance as they now have.

The dome will be revolved by water-power, as is the case of the Lick dome, and controlled from the observer's platform through a system of ropes. We have heard it stated by good authority that the great telescope will be controlled by an observer at the eye end of the instrument. Thus we see that everything about our dome, together with the telescope, may be controlled from the observer's platform.

We feel convinced that the design proposed would be far cheaper than the present great dome, fully as substantial, and much more suitable.

To the Editor of the Mining and Scientific Press—SIR: In presenting this thesis to you for publication, allow me to make a few remarks with suggestions that have come to my notice since its completion last June.

Its character and scope is illustrative of what is required of a civil engineering student just prior to graduation. It is, like all others of its class, written with but very limited experience on the part of the writer as a foundation to work from and is only the first draft. In the copy that I send you I have reduced and omitted many of the tedious mathematical calculations and tables, but have strictly adhered to the principles set forth in the original.

Several changes may be made in the original design. 1. In addition to the regular camber, the roof should be slightly inclined from the edge up toward the center—just enough to insure rapid and thorough drainage. 2. The pressure on the roof due to the weight of construction was originally assumed as 18 lbs. per square foot, but by taking the actual figures for the weight as computed in the first draft it becomes 12.6 lbs. Now since the weight of construction would be less under a reduced pressure we can safely take the weight per square foot as 12 lbs. and consequently the total pressure as 34 lbs. per square foot. 3. The pieces BB_1, etc., B_1B_2, etc., LL_1, etc., and L_1L_2, etc., should each be braced at one point at least, say their centers, by small braces running from d, etc., and d_1, etc. Such a system would save considerable material and lessen the weight of the dome. 4. A system of ties or braces running from the d under L_1 to J_1 and N_1, etc., would give rigidity to the structure. 5. The hight of the dome may be lessened by a few inches so that the curve for the counterpoise weight of the roof shutter will be tangent to the hemisphere that the dome is supposed to circumscribe. This will not interfere with the movement of the observer's platform nor materially reduce the space for interior bracing. The hight could be made equal to the radius of the dome and the curve fitted in afterward, but in our case we do not think it is best to do so. 6. For very *exact* and prolonged observations, it is necessary that the astronomer should have as comfortable a position as possible. To insure this, many devices have been used. When a large refracting equatorial telescope is kept for any length of time on one object, the eye-piece moves quite rapidly, making frequent changes of the observer's position necessary. In our case it would require but little skill to devise some means of obviating this difficulty. The power that moves the dome may be made to act continuously during observation; in which case shutters of much less width than those shown in the design could be used. This motion may be regulated by the observer so that he will always have the right position in azimuth. The horizontal (radial) and vertical motions of the platform relatively to the dome may also be made continuous and completely under the observer's control.

W. E. DOWNS.

Mohave County, Arizona.

EDITORS PRESS:—The mines of Mohave county are beginning to be looked upon by mining men as the richest silver producers in the Territory, and they are deserving of far more attention from mining capitalists than they have received.

The Cupel mine, owned by Spruance, Stanley & Co., San Francisco, with an expenditure of about $25,000, produced or netted the lessee, J. K. Mackenzie, over $100,000 the past year.

The C. O. D. mine, owned by a Mr. Drexler of San Francisco, has been a steady paying property for the past four years. The Prince George South, owned by the same party, paid nearly $100,000 on an investment of $15,000.

The Prince George North, leased to J. K. Mackenzie, is producing an immense quantity of ore, ranging in value from 150 to 200 ounces silver per ton. On the face of the north drift, on the 60 foot level, there is six feet of solid ore of the above grade.

The Nighthawk, owned by Geo. Bowers and Sarah Althea Terry, has produced a good deal of high-grade ore during the past year, and is again to the front looking better than ever.

All the above mines are located in the vicinity of Stockton Hill, one of the richest silver camps in Arizona.

The Flores mine and mill at Cerbat is running night and day on good grade gold ore. The superintendent, J. H. Campbell, has been laboring under difficulties ever since his appointment to the superintendency, but has surmounted them, one by one, and now has everything running along as smoothly and successfully as could be desired.

The mill of the Arizona Northern Co. at Cerbat is being repaired, and will be started upon custom ore in a few weeks.

It is rumored that the Copper World mine near Yucca, has been sold, but the price has not been stated. The World is the highest grade copper mine in this section of Arizona.

The Rattan mine in San Francisco district, recently sold to a St. Louis company, is having a steam hoist put up and will soon erect a ten-stamp mill near the mine. The ledge is about three feet in width and carries about two ounces gold per ton.

The Old Moss, or Montezuma mine, as it is now called, has been sold to a New York company for $60,000. The company will erect a large mill on the Colorado river, nine miles from the mine, for the reduction of ore.

Altogether the mining outlook for 1889 in this county is good. JO KING.

A GERMAN MODE OF BRONZING.—A German technical journal gives the following method of producing a bronzelike surface on iron or steel, which prevents rust: The object to be acted upon must be cleaned so as to take off all oxidation or other impurity. It is then exposed for two or three minutes to the action of the vapors of the heated mixture of hydrochloric acid and nitric acid in equal portions, at a temperature ranging from 550° to 650° F. After the objects have cooled, they are to be rubbed over with vaseline and again heated until the vaseline begins to decompose. This treatment with the vaseline has to be repeated once. Should a lighter coloring than bronze be desired, it can be produced by mixing acetic acid with the other acids.

A VEIN of mineral soap was discovered last week in the bluffs north of the Italian ranch, about 15 miles east of the Comstock. An analysis disclosed the presence of a large percentage of arsenic in the composition. The vein is 18 inches in width. The color of the deposit is a light gray and contains but little grit. In its natural state it produces a lather equal to that of the finest soap used by barbers.

FAMOUS NUGGETS.—The famous "Welcome nugget" was worth $43,900. The "Welcome Stranger nugget," the largest ever found in the world, was worth $57,280. These figures are from official reports of the Melbourne Government.

THE profits of the Sutro Tunnel Co. since 1883 foot up more than three-fourths of a million. The receipts for royalty during January, 1889, were $22,200. The daily receipts for royalty on ore being extracted average $950.

SOME men in New York has produced an imitation gold which it is said defies the usual tests. Buyers of bullion may as well be on their guard.

Notes on Leaching Silver Ores.

NUMBER 2.

[Written for the MINING AND SCIENTIFIC PRESS by C. H. AARON.]

After many experiments with the Stetefeldt and the "Modified Howell" furnace, some "double-hearth" reverberatory furnaces were built, the lower hearths having 220 square feet of area and the upper 210 feet each, so that it seems they were really two-storied, two-hearth furnaces. "Each double furnace took four charges of one ton each. When one charge was finished all the others were moved forward, and on the first hearth a new charge dropped through an opening in the arch. From the second hearth the charge was dropped on the lower hearth through an opening in the bottom near the working door. The upper hearths were exclusively used for oxidizing roasting and the four per cent of salt were added while the charge was dropped on the lower hearth. * * Each charge was 10 to 12 hours in the furnace." The results were similar to those of the modified Howell furnace.

A series of interesting experiments were made in these furnaces, for the details of which I must refer the reader to the original articles. The consumption of wood in these furnaces was one cord to nine tons of ore.

"Both furnaces, the modified Howell and the reverberatory, gave about the same results, and the loss by volatilization was also nearly the same. The cost of roasting, however, is very different. We find the cost per ton of ore in the modified Howell to be $4.50 and in the reverberatory $3.67."

This will be a surprise to some; it results mainly from the low price of labor in Mexico, as will be seen by the following estimates from Mr. Hofmann's paper:

COST OF ROASTING 8½ TONS PER DAY IN THE MODIFIED HOWELL FURNACE.

2 head roasters at $1.60	$ 3 00
4 helpers at 90c	3 60
4 per cent salt, 680 pounds at 1 27c	8 63
15.7 cargas of wood at 75c	11 77
Steam-power, 10 cargas of wood at 75c	7 50
Oil, light, tools, etc	2 00
Management, office, mechanic, assay office	1 78
Total	$38 28

Cost per ton $4.50 Mexican currency.

The following is the statement of cost for two double-hearth furnaces roasting 18 tons per day:

2 head roasters at $1.50	$ 3 00
16 roasters at $1	16 00
2 wood-carriers and ore-wheelers at 90c	1 80
2 carmen for raw ore, chargers, at 90c	1 80
23.4 cargas wood at 75c	17 55
4 per cent salt, 1440 pounds at 1.27c	18 28
Tools, etc	4 00
Management, office, mechanics, assays	3 77
Total	$66 20

Or cost per ton $3 67 Mexican currency.

Difference in favor of reverberatory furnace 83 cents per ton.

This illustrates the truth of a remark which I have often made: in a country where labor is cheap, the use of labor-saving machinery is not always economical, especially if freights are high and repairs costly or difficult. Still, to quote Mr. Hofmann again: "There are, besides the merits of the furnace, other circumstances to be taken into consideration. The reverberatory furnace requires quite a number of skilled hands, and the result depends much more on the good-will and skill of the men than with the modified Howell." Mexicans, if properly handled, are, as a rule, very good workers, notwithstanding that they receive such moderate wages, but they like to lay off on Sundays and feast days. On such days quite a number of inexperienced substitutes will be found working at the furnaces, and consequently, Sunday roastings have to suffer. * * * For this reason it may be more advisable in a large mill to use the modified Howell furnace, notwithstanding that the reverberatory works cheaper and creates much less flue dust. The Howell forms a great deal of flue dust, which is far from being roasted, even if provided with an auxiliary fire."

I think it would be worth the while of those having to treat such ores as this to pay some attention to the Thompson furnace, another modification of the White, and much superior to the Howell-White. This furnace can be had with two cylinders, one for oxidizing and one for chloridizing, the former discharging into the latter. The inclination of the cylinder, and, therefore, the time of transit of the ore, is adjustable, as is also the speed of rotation which controls the exposure of the ore by showering; the air which enters the cylinder can be heated, if required, by the waste heat of the furnace and of the cooling ore. A special feature of this furnace is that the dust settling in the chamber is automatically brought to the lower end of the cylinder, and is there fed into the furnace, the greater part of it remaining with the chloridizing ore, and doing away with the need of an auxiliary fire.

In Mr. Hofmann's case it seems probable from his results in the Stetefeldt furnace, and from the description of the ore, that the greater part of the pyrite passes to the dust-chamber of the Howell furnace, and the benefit of this best of all chloridizing agents is lost to the main body of the ore. In the Thompson furnace this pyritous dust would be put exactly where it would do the most good. If the reverberatory attachment could be dispensed with by means of the two cylinders, it is probable that the cost of roasting would be even less per ton than in the reverberatory furnace.

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W. B. EWER.....SENIOR EDITOR

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TABLE OF CONTENTS.

EDITORIALS.—A Ledge, 259. Passing Events; Four Hundred Thousand Patents; Lodes on the Comstock; The Mining Bureau Appropriation, 262. John Bright; An Ore-Cooling Apparatus; Iron Steel and Coke, 263.

ILLUSTRATIONS.—Stripping a Ledge or Vein and Sinking a Winze, 259. Plan of a Cylindrical Dome for a Thirty-Six Inch Equatorial Telescope, 260. The Late John Bright; Ore-Cooling Apparatus, 269.

MISCELLANEOUS.—A Cylindrical Observatory Dome, 260 Mohave County, Arizona; A German Mode of Bronzing; Notes on Leaching Silver Ores; 261.

MECHANICAL PROGRESS.—Revival of the European Iron Trade; Running Locomotives with Soda Instead of Coal; A New Invention for Rolling Pipe Iron; Comparative Cost of Iron and Steel; A New Method in Steel Shafts and Guns; To Handle Blooms and Billets; Steel Welding Process; Comoressed Air as a Motive Power; Noiseless Gearing, 264.

SCIENTIFIC PROGRESS.—The Cause of Earthquakes; A Curious Theory; A New Theory About Diamonds; A Rich Field for the Scientific Student; When the World was Young; The Rays of Sunset; Temperature of the Moon, 264.

GOOD HEALTH.—Getting the Best out of Life; The Philosophy of Eating; A New Vice; Five Ways to Stop a Cold; A Notable Surgical Operation; Tired Eyes; Mind-Destroying Drugs, 265.

USEFUL INFORMATION.—A New Solder; Screw-Making Machinery; The Oldest Wine in America; To Preserve Pressed Leaves; Soda for Cleaning Lamp Chimneys; Paper as Tough as Wood; Mining Under a Lake; Electric-Light Carbons; A Profitable Purchase 265.

ELECTRICITY.—A Grand Electric Triumph; Is Light an Electrical Disturbance; An Electric Postal Railroad; Heat from Gas; The Brush Machines in England, 265.

MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyming, 266-7.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 270.

Business Announcements.

[NEW THIS ISSUE.]

Pumps—C. H. Evans & Co.
Gold Mine Wanted—I. H. Mayer & Co.
☞ *See Advertising Columns.*

Passing Events.

The reported discovery of silver ores in San Bernardino county is attracting some attention. The district is a distinct one from Calico, and is described in our "mining summary" on another page.

Tin, or indication of tin ore, has been found east of Duarte, in the Van Tassel canyon, Los Angeles county. The San Bernardino county deposit of tin ore has long been known and this new discovery may lead to more active prospecting for this metal throughout the mountains in the southern part of the State.

The project to make a seaport of San Jose, now being discussed, will necessitate, if carried out, very important and expensive engineering work. The plan is perfectly feasible, the only question being the amount of expense involved.

There is no news of special interest from the Lower California placers. Great numbers of those who went there during the excitement have returned, greatly disappointed. Others are still there prospecting. Some pretty good quartz claims were found, but at their present stage give no employment to labor. The whole thing was a grand "fizzle," and those who went are very bitter on the people who got up the affair and the newspapers that encouraged it.

Four Hundred Thousand Patents.

This month the patents issued by the United States are numbered 400,000 and upward.

The mere mention of the number of inventions should call the attention of people to the work that is being done by the inventive genius of the country. Patent No. 300,000 was issued in June, 1884, and Patent No. 400,000 in March, 1889. The increase of inventions in late years has been immense. It took from 1790 to 1870 to get the number 100,000 in the United States series—about 80 years—while it took less than five years to complete the last 100,000.

Among all these patents are many hundred secured by Pacific Coast inventors, mainly obtained through the agency connected with this office. Our files contain a pretty complete record of the progress of invention on this coast, all inventions of note having been described. In 1883, 765 patents were issued to Pacific Coast inventors; in 1884 there were 635; in 1885 there were 681; in 1886, 655; in 1887, 635; and last year 572.

California inventors have originated and devised many very important things aside from devices of minor importance. The insertible saw-tooth of N. W. Spaulding revolutionized the making of circular saws. The water-wheels of Knight and of Pelton have attained an efficiency which has made them known everywhere. The cable-road inventions of Hallidie, Epplesheimer, Root, Casebolt, Grim & Low, Hovey and others have made possible the magnificently rapid and efficient street-railroad systems of this and other cities. In harvesting machinery the improvements of Houser, Matteson & Williamson, the Shippee Co., Holt Bros., Best, Moore and others have almost entirely stopped the importation of Eastern thrashing machinery, and furnish in a compact form of machine by which the grain is cut, thrashed, separated, reclaimed and sacked in complete marketable condition, at a single operation in the field. The employment of steam to propel this class of machinery has received great impetus from the inventions of G. W. Berry of Visalia, who for the past few seasons has been successfully operating not only these machines in their season, but huge gangs of steam plows.

Mr. Best's inventions in grain-cleaning machinery are known all over the coast since 1871. The system of gang-plows originated here, and is still known as the "Stockton Gang."

In mining machinery we have many inventors. The pans of Wheeler, Knox, Varney and Randall; the ore-crushers or pulverizers of Dodge, Huntington, Kendall, Tustin, Stiles; the concentrators of Hendy, Morse, Adams & Carter; the ore-feeders of Stanford, Tulloch, Hendy; the silver-plated amalgamating plates of Dennison; the hydraulic nozzles of Craig, Hoskins and Fisher; Cranston's hydraulic elevator; the engines and steam machinery of Stevens, Scott, Eckart, O'Neill, Cross, Pitchford, Ohmen and Richards; the pumps of Hooker, Wilcox, Dow, Dickie, Moore and Jackson; quicksilver furnaces and condensers of Knox, Osborne, White and Randol; the ore furnaces of Stetefeldt, Bruckner, Thompson and Rueger—all these and many others are of great importance and value. The whole system of hydraulic mining with its appliances was devised in California. There have been great numbers of metallurgical processes also invented here.

The hay-baling presses, fruit-drying machines, cultivators, separators, vineyard plows, etc., are numerous. In sawmill and wood-working machinery Huntington, Spaulding, Campbell (of Parke & Lacy), Bowen (with Tatum & Bowen), Cook (with Gregory & Co.), and Robb, have made valuable and important inventions. E. L. Ransome and H. G. Fiske in artificial stone-work; P. H. Jackson in illuminating tiles, basement extensions, etc.; Forderer in skylight work; Arnold's riveting machine for leather work; dredging machinery of Angell, Von Schmidt and Bowers; Williams' water-jacket furnace; cartridge-loading machinery by Prentiss Selby; explosive compounds by Judson, Hardy and Dean; fruit packages of Swan, Morey and Weston; fruit-pitting and hulling machines by Heald, Donatelli and Alison; agricultural boilers of Heald, Enwright and Rice; Byron Jackson's thrashing feeders and straw-stacking machinery; ice machinery of Bath, Kitton, Boyle and Allegretti; logging locomotives of Dolbeer & Carson; looms of Hunt, Morris and Wilcomb; magazine guns of Snyder, Carr and Finch; road locomotives of Doane, Remington and Price—all these come to mind in thinking of important California inventions.

In writing these paragraphs many names have been omitted, as it would be impossible, without considerable research, to make a complete list of important California inventions. We write from memory only. Most of the things devised here have been called out by our necessities and the peculiar conditions of our industrial occupations. Machinery made for the purpose elsewhere did not answer the changed conditions in California, so something newer and better was demanded, and the demand was met.

Iron, Steel and Coke.

It is stated by those in position to know that the Puget Sound Iron Works at Irondale, Washington Territory, will increase their capital stock, which is now $1,000,000, with the view of erecting rolling-mills, to engage in the manufacture of steel and wrought iron in connection with their output of pig iron. The company in its various departments now give employment to about 400 men, but with the manufacture of steel and wrought iron they will keep about 100 more busy.

The Parrott Copper Company, of Butte, Montana, and the Oregon Iron and Steel Works at Oswego, Oregon, buy about all the coke manufactured by the Tacoma Coal Company, at their mines at Wilkeson, Washington. Owing to the large and growing consumptive demand the company will put in more ovens, so as to increase the output, which at present is about 100 tons a day.

TWO "HAMMONDS."—Inquiries have been made here as to whether certain reports by J. B. Hammond on mines, offered for sale, were by the well-known mining engineer of this State, John Hays Hammond. For general information, we may state that the mines favorably reported on by the latter gentleman have been bought and are being worked. No mines are being offered for sale by Mr. John Hays Hammond, and none of his reports are being used to sell mines. The similarity of names has caused the inquiries to be made.

AMONG the bills which the Controller considers inoperative is that appointing a commission to examine the rivers, the bill appropriating $350,000 for an insane asylum in Southern California, the Mining Bureau appropriation bill, and several others, making about $1,000,000 which the Controller will retain unless ordered to pay the money by the Supreme Court.

THE NEW COMET.—An approximate orbit of the comet discovered on March 31st by Mr. Barnard of the Lick Observatory has been computed by Prof. Schaebele. It is probable that this comet will become 7000 or 8000 times as bright as at present, with a distance from the sun of about 4,000,000 miles. On May 26th next it should be carefully observed.

BY an explosion at the California Powder Works, Pinole, Contra Costa county, one man was killed and another injured. Most of the men were away from the works at lunch at the time the nitro-glycerine exploded.

ASTRONOMER TODD of Amherst College has notified C. W. Irish of Carson City that the negatives of the late solar eclipse taken by him are the best that have been received from any observer.

AN OBSERVATORY DOME.—The article on pages 260 and 261 was written by a student in the Department of Civil Engineering and Astronomy of the University of California.

GEO. F. ALLEN of Petaluma has invented a "hydraulic water elevator," which he will soon put to a practical test. It is said to involve some new principles in raising water.

THE attempt to get up a gold excitement at Monrovia, Los Angeles county, met with utter failure. The largest nugget only weighed 30 cents.

MICHEL EUGENE CHEVREUL, the distinguished French chemist, has just died at the age of 102 years.

THE last cleanup of the Great Eastern quicksilver mine was 44 flasks.

H. D. RANLETT has returned to San Francisco from a trip East.

The Mining Bureau Appropriation.

The amended bill appropriating $100,000 for the State Mining Bureau, passed both branches of the Legislature, and was signed by the Governor. The measure as passed is as follows:

SECTION 1. The sum of $100,000 is hereby appropriated for the support and maintenance of the Mining Bureau, created under an Act entitled "An Act to provide for the establishment and maintenance of a Mining Bureau," approved April 16, 1880, and the Act supplementary thereto, approved March 21, 1885; and at least 70 per cent of this appropriation shall be used for geological work in the field.

SEC. 2. Not more than one-half of the said sum appropriated under this Act shall be expended during the forty-first fiscal year.

SEC. 3. This Act shall take effect immediately.

It is now stated that the bill is defective, in that it is not stated what fund the money is appropriated from. The usual and necessary form of drawing up a bill is: "The sum of $—— is hereby appropriated out of any money in the State Treasury not otherwise appropriated," etc., but in the State Mining Bureau bill there is nothing which says that the money is to be derived from the State Treasury at all.

Another defect lies in the fact that there is no clause authorizing the Controller to draw his warrant.

In view of these facts the Controller, referring to this and other bills in the same condition, says: "My opinion is that no legal appropriations were made in these bills, and unless I am ordered to by a mandamus from the court of proper authority I shall not pay out either sum. As Controller, I have no opinion to express as to the intention of the Legislature or as to the need of the appropriations. But I can't pay any money out of the State Treasury unless I am ordered to do so by the proper authority."

The officials of the State Mining Bureau do not seem to worry about the matter. The opinions of leading attorneys have been asked, and most of them think that the Supreme Court will decide that the Controller must pay the warrants if the question is brought up. Even if the appropriation proves unavailable on July 1st, the beginning of the next fiscal year, deficiency bills will probably be presented to the next Legislature to pay the expenses of the intervening two years.

There is no doubt that the Legislature intended to appropriate the money in question, and it is greatly to be regretted that any difficulty is liable to arise in obtaining it for the purposes specified. For many years the Mining Bureau was kept short of funds and little field-work was done. The previous Legislature gave it $30,000 a year for two years, and with this money State Mineralogist Irelan has been able to bring the Bureau to a point of usefulness not before attained. The information gathered by the field assistants is of a character which is needed, and which was not before available in permanent form. With the increased amount appropriated this year, and the experience already gained in field-work, very valuable and exact information relative to the mining industry of the State can be prepared. It is not gold mining alone that is benefited, but we need knowledge concerning our coal, iron, asphaltum, fertilizers, petroleum, natural gas, chrome, manganese, quicksilver, lime, borax, lead, mineral paints, copper and dozens of other things.

Mining has done much for the State, but the State has done very little for mining. The appropriation is none too large to be employed in the direction provided for in the law. Mr. Irelan has succeeded in making the Bureau more popular than it had previously been and better known to the mining community, he or his assistants having personally visited the various mines of the State in search of information. He is earnest in his endeavors to make the Bureau thoroughly useful to the mining community and to the public. It is greatly to be regretted that there should be any "hitch" in the matter of the appropriation. The trustees, Messrs. George Hearst, W. S. Keyes, Geo. W. Grayson, J. Z. Davis and Sol. Heydenfeldt, Jr., take an active interest in the affairs of the Bureau and desire to see it maintained at the point where it will be of the greatest practical value to the interests to which it is devoted.

THE Ventura *Democrat* says: It is reported that an 80-barrel oil well has recently been struck on the Cayugas ranch beyond Springville.

John Bright.

No Englishman of the present generation has carried with him to the grave such universal respect as the man whose name stands at the head of this article. From the Queen on her throne to the humblest of her subjects, the people of England have vied with each other in doing honor to the dead statesman. There has probably not been a political party during the fifty years of his active life which he has not at one time or another opposed, and sometimes with such vigor and success as to lead to its overthrow; and yet so exalted was his patriotism, and so pure the motives which prompted his opposition, that the acknowledged leader of each one of them contributed a wreath to adorn his bier and a eulogy to perpetuate his fame. Lord Salisbury, the present premier, and the embodiment of aristocratic English Toryism, against which the entire life of the great Commoner was in bitter antagonism, in his eulogy said: "He was the greatest master of English oratory in the present generation. He was inspired with pure patriotism from the beginning of his career to the close."

While he took an active part in every important measure that came before Parliament during his long political career, he was more especially identified with the repeal of the Corn laws, free trade and the extension of the suffrage. His position and arguments on each one of these questions he has lived to see triumphantly vindicated. The Corn laws were especially oppressive to the poor, who regarded him and his great colleague, Richard Cobden, as their champions, and their final repeal was made an occasion for universal rejoicing throughout England, "Cobden and Bright" being a conjunction of names embodying all that was politically hoped for by the millions of the disfranchised of Great Britain. It was the writer's privilege some time after the repeal of the Corn laws to be in the house of the great reformer at Cronkeyshaw, Rochdale, and he remembers well that occupying one entire side of the spacious library was a magnificent bookcase of English oak, embellished with carvings in relief of wheat, corn and other cereals, emblematic of the "staff of life," the gift of admiring friends in grateful remembrance of his exertions for the repeal of the obnoxious laws.

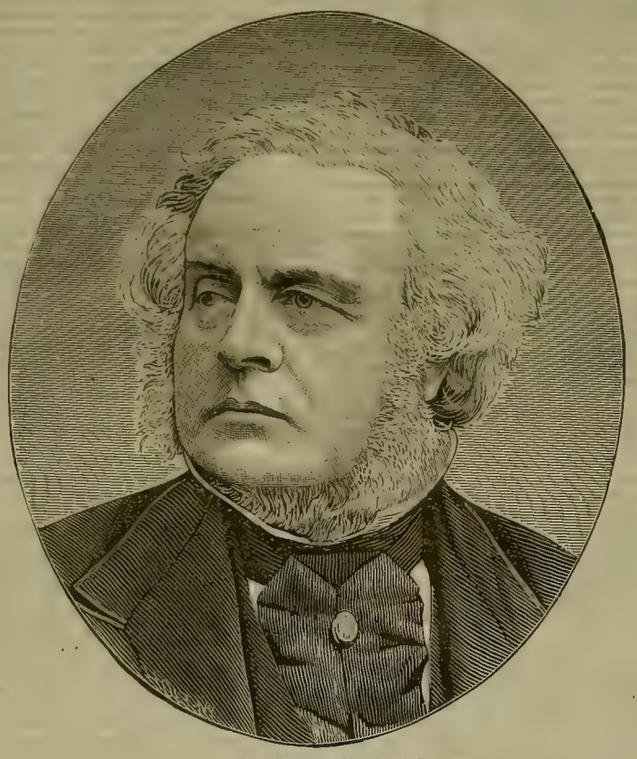
Whatever may be thought of free trade, as the policy best adapted to America, John Bright was convinced that it was the best thing for England 40 years ago, and, mainly through his exertions, laws were passed making it the settled policy for that country, and a long series of years of industrial prosperity seemed to verify the position he assumed on this question.

In regard to the extension of the franchise, if he was not so radical as some of his colleagues, he was probably wiser, his aim being to obtain, if not the best possible, at least the best he could get, and such a measure as would be best adapted to the condition of those it was intended to benefit. In this, also, he saw the fruition of his hopes and labors.

Being by birth, education and conviction, a member of the Society of Friends, his life was one long protest against war and bloodshed, and as he deemed it his duty on all suitable occasions to give emphatic expression to his convictions, it may well be imagined that he was often in hopeless conflict with the belligerent majority of his countrymen. This was particularly the case during the Crimean war between Russia on one side and Great Britain, Turkey, France and Italy on the other. His philippics, if the term in favor of peace be admissible, in the House of Commons, at this time, were among his grandest oratorical efforts, and though he knew they were entirely unavailing, and sometimes subjected him to ridicule, such was his fidelity to conviction that he was willing to brave it all rather than shirk his duty by cowardly silence. It was during one of these debates that Lord Palmerston flippantly alluded to him as "My honorable and *reverend* friend." He was promptly called to order by a friend of the sturdy Quaker, who, in the course of a scathing rebuke, told the noble lord that it ill became the representative of an insignificant pocket borough to insult the chosen representative of one of the largest industrial constituencies in England.

It seems an anomaly to American readers that a man so richly endowed and wielding such great influence should have been content for 45 years to sit in the lower house as an ordinary Commoner, and that when the party representing his ideas came into power, Gladstone, his warm personal friend and political chief, should have to labor with him half through the night to take a cabinet position in his Government, and his character can only be truly appreciated as we concede to him a lofty patriotism and a sturdy independence, which left him free to criticise or support his friends as he should be convinced their policy was for the good or otherwise of the country.

When Daniel Webster died some English



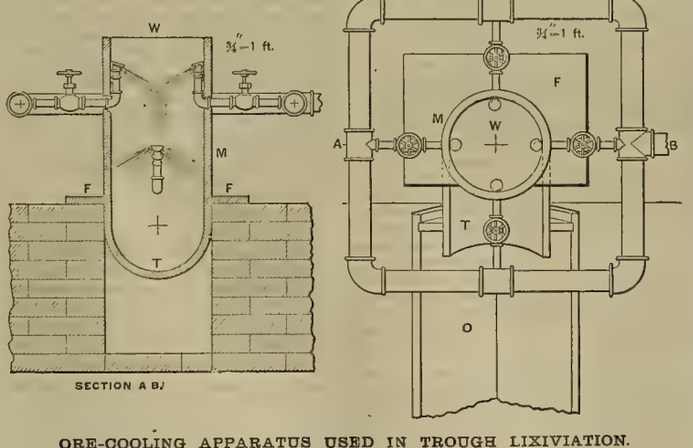
THE LATE JOHN BRIGHT.

newspapers put on the emblems of mourning in token of grief for the loss, not of a great American only, but also for the loss of a great representative of the Anglo-Saxon race, and it is meet that we testify to our sorrow, not only that England and the world has lost a great and upright statesman, but that in the death of John Bright America has lost her greatest friend when friends were needed most. Westminster may refuse his body burial, but his memory will be enshrined in the hearts of the millions the world around by whom his praises will be sung in the language he spoke so well.

Quicksilver.—The receipts of quicksilver at San Francisco in March were 1515 flasks and for the first quarter of the year 4183 flasks, against 7148 flasks last year and 6588 flasks in 1887. The exports for March were 1106 flasks, including 430 to New York and 675 to Mexico. It will be seen that the article has been very dull thus far this year. There is no demand from China, that market getting its supplies from London. Practically the only foreign demand is from Mexico.

An Ore-Cooling Apparatus.

In trough lixiviation, the transportation of the roasted ore to the settling tanks is effected by a stream of water, and it is apparent that by dropping the hot ore into the stream the costly and annoying cooling-floor manipulations can be avoided. For this purpose Mr. Ottokar Hofmann has constructed an apparatus which is shown in the accompanying cuts. It consists of a cast-iron tube *M* with a flange or plate *F* to keep it in an erect position. The lower part of the tube has the shape of a trough *T*, and is connected with trough *O*, which leads to the grinding machine. Inside the tube, and on two different levels, water spouts are so arranged and constructed that the entering water forms sheets (not sprays) which perfectly close the tube. At the line where the two opposite sheets meet, the water will drop straight down. The sheets of water are produced by placing a smooth plate of iron properly over the obliquely-cut ends of the pipes, as shown in the figure. The water-pipes inside the cooler ought to be made of cast iron, to resist longer the action of the solution. The hot ore drops through *W*, and in striking the water, is immediately carried below the sheets of water and is so quickly enwrapped in it that but little dust is formed, which will be absorbed by the sprays, while most of the steam will be condensed. The bottom *T* has sufficient inclination to make the ore move as soon as it strikes it.



ORE-COOLING APPARATUS USED IN TROUGH LIXIVIATION.

By cooling the ore in this way, we have the additional advantage of increasing the temperature of the water used for base-metal leaching, without incurring extra expense or labor. The resulting temperature of the water will depend on its original temperature, the temperature of the ore and the proportion of water and ore used. By a laboratory test Mr. Hofmann found that a dark red-hot ore, dropped in three times its weight of water, raises the temperature of the latter from 60° F. to 95° F. To work the ore-cooling apparatus to advantage the hot ore is evenly charged by the hot-ore feeding machine illustrated in the Press of March 30th.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING APRIL 2, 1889.

400,730.—Spray Nozzle—John Bean, Los Gatos, Cal.

400,544.—Railway Vehicle—G. W. Brown, Los Angeles, Cal.

400,748.—Splicing Cables—John Collins, S. F.

400,832.—Coated Sheet Metal Pipe—J. P. Culver, Los Angeles, Cal.

400,564.—Rocking Chair—L. C. Gunn, San Diego, Cal.

400,681.—Grinding-Pan—Philip Hinkle, S. F.

400,461.—Harness Loop—E. B. Knapp, San Jacinto, Cal.

400,577.—Medical Compound—Levering & Curry, Los Angeles, Cal.

400,592.—Fin for Vessels—G. W. Napier, Los Angeles, Cal.

400,596.—Parallel Ruler—Phelps & Ellis, Eureka, Cal.

Note.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

Grinding Pan.—Philip Hinkle, S. F. No. 400,681. Dated April 2, 1889. This improvement relates to certain improvements in grinding pans, more particularly to certain details of construction. Among other things the construction enables the inventor to make a low compact pan which is easily separated into comparatively small portions for shipment.

Lamp Shade Protector.—Gustave A. Tank, S. F. No. 400,372. Dated March 26, 1889. This invention relates to that class of protectors for lamp and gas shades and globes in which a shield of some indestructible but translucent material—such as mica—is interposed between the shade and globe and the lamp or gas flame. The object of the invention is to provide simple and practical means for applying the protector.

Splicing Cables.—John Collins, S. F., assignor of one-fourth to H. H. Lynch. No. 400,748. Dated April 2, 1889. This invention relates to the art of splicing cables, and particularly to that method which, from the disposition of the strand ends, is known as "inlaid." The object is to make an inlaid splice without having to remove or in any way interfere with the soft core of the cable, said splice being of an effective nature and especially adapted to be readily made. The invention consists in the following-described successive steps: Dividing the opposing strand-ends or tucks back to their union with the cable; cutting off even with the surface of the cable one division of each tuck; taking one or more half-turns with the lay of the remaining divisions, one from each side, so as to form a splice-strand occupying the vacant score of the cable; unlaying the projecting ends of said last-named divisions so as to separate them into individual wires, and introducing said wires under the strands and against the soft core of the cable and laying them along and about the soft core throughout their length.

The Charleston.—The new cruiser Charleston is now taking in coal at Mission Rock in anticipation of her trial trip, which will take place at an early date. It is proposed to make a run of 300 or 400 miles and thoroughly test all the qualities of the vessel. She will probably take a cruise down through the Santa Barbara channel. On her return she will be speeded over the measured mile course in San Francisco bay.

The Sierra City people have been driving away from their town men supposed to be anti-mining spies. The local paper says: "There never was a gravel mine within several miles of Sierra City, and the few that are so near as that have never worked since they were enjoined."

D. O. Mills will visit his gold-mining properties in Alaska this summer.

MECHANICAL PROGRESS.

Revival of the European Iron Trade.

The English correspondent of the *American Manufacturer* recently wrote to that journal as follows:

There is every indication in the present condition of the various English iron-making centers that we shall shortly see a wide expansion of business and of prices in our metallurgical industries. The activity in shipbuilding, the dearness of coal and coke, and the increase in wages, are factors which cannot but lead to considerable additions to the cost of iron.

There is a strong demand for pig iron in all the districts—a fact which sufficiently indicates how strong the likelihood of advanced prices really is. Home consumers are purchasing in order to obtain their supplies before the inevitable advance takes place. An enormous demand from Germany and other continental markets is being placed in Cleveland, though shipments are delayed by unfavorable winds.

One fact which has to be seriously remembered in estimating the future of the iron-trade revival is that the demand for crude iron for the United States is abnormally low in comparison with what it was a year or so ago. If the manufacturing revival which many authorities expect to see in the States this year should really happen and should extend its beneficial influences to England, the British iron trade will enjoy a prosperity greater than it has been favored with for very many years. In the meantime the reports which I include in this letter will sufficiently show that metallurgical industry in this country has before it the prospect not of an unsubstantial inflation, but of a gradual and growing increasing prosperity.

The effect of the anticipated large additional expenditure upon naval armaments, to which reference in these letters has previously been made, is now being discussed more freely than ever among shipbuilders and producers of iron and steel for ship-building purposes. The assumption is that the Government will propose to spend £20,000,000 during the next three or four years, or at the rate of about £6,000,000 per annum.

It is believed that 14 ironclads will be built within this period, at a cost of nearly a million sterling for each vessel, besides about 50 cruisers and other smaller ships. From 250,000 to 300,000 tons of steel is needed for an outlay on this scale, besides the weight of the extra armor required. At present the shipbuilding yards are so fully occupied in all directions in producing new vessels for trading purposes that these further requirements, should they be actually sanctioned, can hardly fail, it is thought, to give still further strength to the prices of new vessels. In view, however, of current fears that the building of mercantile steamers is being overdone, it is quite possible that the Government orders may do no more than sustain current rates.

RUNNING LOCOMOTIVES WITH SODA INSTEAD OF COAL.—At the Baldwin Locomotive Works, Philadelphia, there are in course of construction four locomotives which are designed to run by soda, which takes the place of fire under the boiler. The engines are now nearly finished and will be shipped within two weeks to Minneapolis, Minn., and are to be run on the streets of that city, where steam engines are forbidden. The engine is about 16 feet long, entirely boxed in, with no visible smokestack or pipes, as there is no exhaust or refuse. The boiler is of copper, 84½ inches in diameter and 15 feet long, having tubes running through it as in steam boilers. Inside the boiler will be placed five tons of soda, which, upon being damped by a jet of steam, produces an intense heat. In about six hours the soda is thoroughly saturated, when the action ceases. A stream of superheated steam from a stationary boiler is then forced through the soda, which drives out the moisture and the soda is ready for use again. The exhaust steam from the cylinders is used to saturate the soda, and by this means all refuse is used. These engines are the first of their kind that have been built in this country. They will have the same power as those used on the New York elevated roads. Soda engines are used in Berlin and other European cities very successfully, and they also traverse the St. Gothard tunnel, under the Alps, where the steam engines cannot be used, because the tunnel cannot be ventilated so as to carry off the noxious gases generated by a locomotive.

A NEW INVENTION FOR ROLLING PIPE IRON. Probably the most marvelous hydraulic machinery in the world was recently placed in operation in the Wheatland rolling-mill, Penn. It is designed for rolling pipe iron. Huge slabs of iron, weighing hundreds of pounds, were pulled from a furnace, placed on a long iron bed, which moved forward, upward, downward, and laterally, pushing the mass through rolls. The whole operation required the attendance of only one or two employes, who controlled the machinery by a few simple levers. It is the only machine of the kind in the world.

COMPARATIVE COST OF IRON AND STEEL.—In a lecture recently delivered before the London Institution by Mr. Edward Riley, F. C. S., that authority gave a very complete and interesting *resume* of modern iron and steel processes, and effectively demonstrated the increasing efficiency of steel. Mr. Riley made the following comparison between the relative cost of iron and steel works to make 1000 tons of puddled bars, or 1000 tons of ingots weekly. Puddled iron works: Cost of plant, exclusive of land, $250,000; area of land required, 10 acres; number of workmen employed, 500; foremen, 10; pig used per ton of iron made, 22 cwt.; workmen's cottages, 200; fuel, 30 cwt. of coal; fuel used per week, 1500 tons. cost per ton, taking $10 pig, $18 25. Steel works: Cost of plant, $125,000; land required, 5 acres; number of workmen employed, 120; foremen, 4; pig used per ton made, 24 cwt.; workmen's cottages, 40; fuel, 4 cwt. coal and 3 cwt. coke; fuel used per week, 360 tons; cost per ton, taking $10 pig, $16 87½.

A NEW METHOD IN STEEL SHAFTS AND GUNS. John Shinn of Roxborough, Pa., recently patented an improvement in the manufacture of heavy guns. His invention is a new method of constructing large masses of steel, iron or bronze, by building them up of small parts previously cast or rolled and either welded together by electricity or brazed. He proposes to use small ingots of steel, which are not apt to contain concealed defects. The ingots are cold-rolled into longitudinal sections of the gun or shaft, welded together and bound by rings and jackets as in the old method. Cold-rolling is said to increase the torsional strength about 50 per cent, and the strength of the gun is made uniform throughout. The inventor claims that besides producing better work by his method, it can be done much more quickly and at an expense very much less than that of making guns and shafts from such enormous castings as are now used. Comparing the two methods, he says: "Mine is 50 per cent cheaper in gun-making and 75 per cent cheaper in shafts, and a heavy gun that takes two or three years to construct after the old plan could be turned out in from two to three months by my method." The necessity for improvement in the manufacture of shafts is shown from the fact that 222 ocean steamers broke their shafts between 1881 and 1884. The causes of breakage in these cases were, of course, concealed defects, as the shafts are always supposed to be perfect before being used. In increasing torsional strength and lessening the chances of concealed defects, Mr. Shinn expects to revolutionize this branch of steel-making.

TO HANDLE BLOOMS AND BILLETS.—At the Bellaire mill, Pennsylvania, there is now in operation an improved apparatus devised by O. P. Mason, for facilitating the handling of steel blooms, billets and slabs, in a rolling-mill. The tables by means of which the ingot is led to the rolls have driven rollers on which the ingot lies, and by which it is moved backward and forward as it is passed to and fro through the rolls. A horizontal shaft is arranged on bearings under the rollers, and provided with projecting arms, of crescent shape at right angles to its axis, the arms extending upward between the rollers, and the shaft being operated by a pinion working into a rack actuated by a hydraulic cylinder, the length of the rack being such as to allow the shaft to make one complete revolution. With this construction the ingot, as it lies on the rollers, can be readily moved from one side to the other, the crescent-shaped arms catching the piece on its lower corner and tumbling it over, as the horizontal shaft is put in motion.

STEEL WELDING PROCESS.—Mr. W. B. Middleton, manager of the Penn Iron Works, Lancaster, has a process by which pieces of steel may, at a welding heat, be perfectly welded together after they have been coated with a solution of silicate of soda or other solution in which silica is contained. In practice, satisfactory results have been obtained by dipping the pieces of steel to be welded in a solution of silicate of soda, or by pouring the solution on them, bunching together the pieces to be welded, and heating them to an ordinary welding heat, and then passing them through rolls. This is the process followed with large pieces, but smaller articles can be welded under the hammer when treated previously with the solution. Mr. Middleton states that the process is applicable for reworking old steel rails and other heavy pieces, and that it renders certain kinds of steel scrap highly valuable which formerly were almost worthless.

COMPRESSED AIR AS A MOTIVE-POWER.—Compressed air is now being extensively employed as a motive-power in Paris instead of steam. The central station comprises 12 boilers and 6 compound engines, and the air which is compressed to six atmospheres is stored in receivers, and distributed as required in various industrial establishments. The compressed air also serves as a refrigerating medium, which can be utilized for sanitary and other purposes. It is intended to erect covered markets, which will be provided with cooling chambers, supplied with compressed air from the central station.

ACCORDING to Herr Leonhardt, a German engineer, the number of locomotives in use on German railroads was 12,450 in the year 1885–86, the average age being 12.49 years. Fifty engines built previous to the year 1850 were still in use at the date referred to, the oldest of which dated from 1845.

NOISELESS GEARING.—Where noise from gearing is objectionable, and smooth working a necessity, vulcanized fiber is being used for teeth in England with success. It prevents noise and wears well.

SCIENTIFIC PROGRESS.

The Cause of Earthquakes.

At the meeting of the Manchester Geological Society, held on Feb. 12th, Thos. Oldham read a paper on "The Causes of Earthquakes, or Dislocation and Overlapping of Strata, and of Similar Phenomena." The author said this was a subject which had caused much perplexity and doubt in the minds of many eminent geologists, in endeavoring to account for the cause of some of the greatest phenomena in nature continually taking place. These were the cause of earthquakes, the dislocation and overlapping of strata, and the submerging and upheaval of continents, etc. The hypothesis he intended to submit was based upon purely physical laws, and he had often felt surprised that such views had not previously been promulgated. He must premise by stating it had been ascertained that this globe is about nine miles smaller in diameter at the equator than at the poles; in the next place, it was known that the globe rotates on its axis at about 26,000 miles every 24 hours, which is nearly equal to the speed of a cannon-ball.

Another thing that had been ascertained was that the axis of the globe is gradually altering by becoming more oblique, and that it requires about 39,000 years before this alteration arrives at its maximum. When they took into consideration the great velocity at which the globe rotates, it was evident that a large amount of centrifugal force must be exerted, and as nature never did anything without a motive, it would be seen that this force is the cause of the globe being nine miles different at the equator and the poles. As the axis got gradually more oblique, so the direction of the equator would alter.

It is supposed that the crust of the earth is only about 15 or 16 miles in thickness, and below that distance there is a mass of incandescent minerals. This has been proved, in one way by mining, where they find in sinking the first 1000 feet the temperature rises very considerably and becomes greater as they get lower. In order to bring these things practically before them, he would suppose a model to be made to represent the globe, in exactly the same proportions as they stood toward each other, and for this purpose he would take a mass of some plastic material, say potters' clay, of sufficient consistency to allow of its being formed into a sphere of about nine feet in diameter; he would then pass an iron rod through it, and connect the whole with a steam engine to obtain the required motion. If they gradually raised one end of the axis, the equator would get more oblique, and more toward the north or south as the case might be. It is known that centrifugal force acts not only at right angles to the earth, but has also a lateral motion.

Astronomers told them that the deviation of the axis arrives at its maximum every 39,000 years, so that consequently the south pole, when the climax occurs, would occupy the place where the north pole is now. It was supposed that the last great climax was a glacial one, and there are plenty of evidences to prove this. In the River Amazon, which is now exactly on the equator, there are many evidences of glaciers, and in like manner these are also come across in northern latitudes.

When they looked upon human life in comparison with geological ages, the life of man seemed but an atom, and their historical records only went back 2000 years, anything further being purely legendary. It was supposed that at one time the spaces now occupied by the Atlantic and Pacific oceans were large continents, and when naturalists go up mountains, they frequently come across beautiful specimens of conchology which could only have got there by the upheaval of oceans. These changes, the author concluded, were the source of much perplexity to geologists, and were of great interest.

A CURIOUS THEORY.—Although geologists are accustomed to deal with considerable alterations of level as one of the causes operating to bring about profound changes in the topography of many regions, it has always seemed difficult to conceive, remarks a recent writer, that the vast depressions in the face of the earth now occupied by the sea could ever have been subject to such tremendous changes as would be necessary to convert them into land. Many geologists, therefore, appreciating this difficulty, are inclined to believe in the general permanence, during all time, of the great oceanic beds and of the continental areas. To account for the origin of the oceanic basins, a writer in a recent issue of the *Geological Magazine*, proceeding on the theory of Prof. Darwin that the moon broke away from the earth more than 50,000,000 years ago, expresses the opinion that the ocean basins may be the scars left by the breaking off the moon's mass, when that prodigious segregation took place, and that the basement rocks of the continents are fragments or portions of the crust, which had already been in a solidified state, and which were left behind.

NEW THEORY ABOUT DIAMONDS.—Prof. Simmler brings forward the somewhat plausible theory that the basis of diamond formation is liquefied carbonic acid. Indeed, facts observed by different savants tend to show, it is said, the presence of this agent in the coating of the most valuable gems. Upon the bursting of such crystals there are often found to occur two liquids in the cavities, the one behaving like water, the other liquid carbonic acid. On one occasion, indeed, it was observed that the liquid in a quartz crystal, which was dashed to pieces, scattered its contents around with a great noise, burning holes in the handkerchief wound around the hands of the experimenter. The acid contents itself had disappeared. Under these circumstances, Mr. Simmler argues that if carbon be soluble in liquid carbonic acid, it would then only be necessary to subject the solvent to slow evaporation. The carbon would thereby be deposited, and by taking proper care assume crystalline forms, and in evaporating quickly, the so-called black diamond, which, in the state of powder, is much used for polishing the colorless diamond, might be produced.

A RICH FIELD FOR THE SCIENTIFIC STUDENT. Some one has very correctly remarked that the Pacific Coast is almost a virgin field for the scientific student. Nowhere in the world can the history of creation be studied to better advantage. The geological survey of the State, which was undertaken in 1860 for the benefit of the mining interest, was brought to a close in 1874, and very little knowledge has been acquired since. It is known that, to speak familiarly, this was probably one of the last parts of the world to be finished by the hand of the Creator; the Sierra was still quaking and upheaving when volcanic agency had exhausted itself elsewhere. Parts of the Coast Range may have been lifted up and the rocks tilted on edge when man lived on the flank of the Sierra in the later tertiary age. High up on the same Sierra are cretaceous rocks which are obviously of marine origin; there must thus have been a time—and probably a long period—when Lassen county was washed by the waves of the ocean. Nearer home, on the Sacramento and in parts of Contra Costa county, are abundant pre-historic remains which have never been thoroughly examined. Here alone there is a field where the academy may find opportunities of usefulness. The whole State is full of marvels to the scientific mind, and it is time that they were investigated by competent persons.

WHEN THE WORLD WAS YOUNG.—According to Mr. Proctor, the present denuding effects of air and water upon the earth's surface are absolutely as nothing compared with the denuding forces which must have been in operation when the earth was young; the oxygen and nitrogen of the air are but a residue of what was once there; but besides these gases, now in due proportion to support the earth's life, there were immense quantities of carbonic-acid gas, of sulphurous acid, sulphureted hydrogen, chlorine, boracic acid, and other destructive gases, some ready to assume the liquid form, and thus to be still more destructive. Mr. Proctor thinks there must also have been immense quantities of water in the form of vapor; in fact, the presence of that primeval atmosphere must have been so great, he thinks, that the waters of such oceans as then existed could have turned into steam only at a temperature so far above the boiling point at the present atmospheric pressure as to have caused the surface of the ocean to actually glow with inherent luster. The water vapor in the air must also have been steam at a high pressure and intensely hot, and the rains falling then must have been in the form of torrents of hot water, impregnated with most destructive acids and falling on intensely heated rocks.

THE RAYS OF SUNSET.—Prof. Rovelli has published the result of his studies concerning the colors of twilight, from which it appears that red and orange tints predominate when the air is dry; on the contrary, yellow, and especially green, characterizes air charged with vesicular vapor. Prof. Rovelli studied the colorations of the air and their successive modifications in various cases, and in the various parts of the crepuscular region, in measure as the sun disappears from the horizon; also the same phenomena at the advent of "aurora with rosy fingers," and from them drew conclusions based upon the theory of the colors of the solar spectrum. Observation had already shown that the warmest colors of the spectrum predominate during a period of fine weather, while a yellow tint, followed by a greenish twilight, is the index of great humidity. Again, the atmosphere may be considered as formed of two strata, the lower of which containing clouds and dust, and the upper of which is more transparent; these two strata, as regards their refrangibility and absorption, appear differently in the presence of the rays that traverse them.

POSSIBLY the reader may draw his own conclusions from the following, which is now going the rounds: Mr. Friese Greene, a British photographer, has actually produced a picture with only the light issuing from his eye. Having stared for 15 seconds at a 5000-candle electric arc only three feet away, he closed his eye and quickly brought it over a sensitive plate at a distance of one inch. The result was a very faint but distinct image of the arc and the carbons, due, probably, to momentary phosphorescence of the retina. A second attempt failed, and gas lights proved too weak to produce effect.

TEMPERATURE ON THE MOON.—Astronomers claim that the moon's surface is subject to a degree of heat corresponding to about 500° of Fah. scale, when exposed to the sun's rays, and that it cools down to 250° below zero when not so exposed.

GOOD HEALTH.

GETTING THE BEST OUT OF LIFE.—The London *Standard*, in discussing whether it pays to try to live to be a hundred years old, gives some useful suggestions. It says: "The man who really gets the best that can be got out of life is the man who, with a fairly good constitution to begin with, is ready to squander it at any moment and on every occasion in a sufficient cause. He keeps no account of profit and loss with his vital energy; he sees work to do and he does it, he sees pleasure to be enjoyed, and he enjoys it. He is alive all his life save when he sleeps; and he wakes from each fresh slumber looking the world cheerfully and courageously in the face, and ready and even eager to be a combatant when there is a good, honest fight, and a runner, when there is a good, honorable race afoot. He may not live to be 100, but he may well live to be 70, 75, or even 80. He may have a career, if not so conspicuous, yet as active, as varied, and as restless as that, say, of Mr. Gladstone, and yet not be really old when time registers him among the aged. 'Better fifty years of Europe than a cycle of Cathay;' and better 20 years of uncalculated activity than the slow pulse and measured step of the circumspect snail that creeps surely on to 100. We are not denouncing centenarians. They are like angels' visits, few and far between, and they are too rare not to be welcomed. Moreover, we doubt not that they deserve their length of years. But it would be a misfortune if it was ever thought an object of life to live very long. The object of life is to live, live nobly, live bravely. As Shakespeare says: 'Ripeness is all.'"

THE PHILOSOPHY OF EATING.—Growth and waste and repair go on in a nearly uniform way the whole year through, but the amount of food necessary for these operations is surprisingly small. The generation of bodily heat requires a more variable quantity of food. In winter, with the temperature of the external air at zero, the temperature of the blood in healthy persons is 98 3°, and when the heats of summer drive the mercury of the thermometer near to or above that mark, the blood still registers 98.3°. The marvelous mechanism by which this uniform blood temperature is maintained at all seasons, it is not necessary to consider, but it must be evident to every one that the force needed to raise the temperature of the whole body to nearly 100° in winter is no longer needed in summer. The total amount of food needed for repair, for growth, and for heating, physiology teaches us is much less than is generally imagined, and it impresses us with the truth of the great surgeon Abernethy's saying, that "one-fourth of what we eat keeps us; the other three-fourths we eat at the peril of our lives." In winter we burn up the surplus food with a limited amount of extra exertion. In summer we get rid of it literally at some extra risk to health, and, of course, to life. We cannot burn it. Our vital furnaces are banked, and we worry the most important working organs with the exertion of removing what had better never have been taken into the stomach.—*Selected.*

A NEW VICE.—The latest vice in the way of intoxication is reported from Boston. The material employed consists of the vapor of naphtha, which is simply inhaled, and induces, so the inebriates say, a particularly agreeable exhilaration. Not even basheesh, it is understood, begets more fascinating dreams or more gorgeous visions of splendor. The girls in the rubber factories, of which there are a great number in Boston and its neighborhood, are greatly addicted to this novel form of drunkenness. In such establishments naphtha is used in enormous quantities to cleanse the rubber, being kept in big boilers, closed against the air. To the valves of these boilers the young women employes readily obtain access, and breathe the exhalations therefrom, some unlucky accident having betrayed to a chance experimenter the abominable secret. The notion is said to have been brought originally from Germany by immigrant laborers in petticoats. Now the manufacturers propose to put a stop to the evil by keeping the valves carefully locked. An overdose of naphtha fumes brings on hysterical convulsions and other unpleasant symptoms. The habit, long followed, causes a swelling of the face and other parts of the body, with dropsy to follow, and sometimes epilepsy.

FIVE WAYS TO STOP A COLD.—First—Bathe the feet in hot water and drink a pint of hot lemonade. Then sponge with salt water and remain in a warm room. Second—Bathe the face in very hot water every five minutes for an hour. Third—Snuff up the nostrils hot salt water every three hours. Fourth—Inhale ammonia or menthol. Fifth—Take four hours' active exercise in the open air. A ten-grain dose of quinine will usually break up a cold in the beginning. Anything that will set the blood actively in circulation will do it, whether it be drugs or the use of a buck saw. But better than all, if your cold is inveterate or serious, consult your family physician, and at once.

A NOTABLE SURGICAL OPERATION.—A very remarkable surgical operation was recently performed at Bridgeport, Conn., upon Mrs. Ida Brinsmade. The operation required the utmost skill and delicacy. It consisted of cutting through into the kidney to remove an abscess which had formed on the inside of that organ. The lady is 32 years of age. In the process of the operation the diagnosis of the physicians was found to be entirely correct. The operators cut alongside the backbone, below the lower rib, clear down to the kidney, to a depth of 3½ inches. The utmost nicety was required in order to strike the kidney, as half an inch variation would have done incalculable damage. The abscess was found, and over a pint of pus was removed after the incision had been made. The patient bore up through it all in a heroic manner. She is doing as well as could be expected, and there is every prospect that the operation will prove a complete success, and full recovery ensue.

TIRED EYES.—People speak about their eyes being fatigued, meaning that the retina, or nerve portion of the brain that does the seeing, is fatigued, but such is not the case, as the retina rarely tires. The fatigue is in the inner and outer muscles attached to the eyeball, and the muscle of accommodation which surrounds the lens of the eye. When a near object is to be looked at, this muscle relaxes and allows the lens to thicken, increasing its refractive power. The inner and outer muscles are used in covering the eye on the object to be looked at, the inner one being especially used when a near object is to be looked at. It is in these three muscles mentioned that the fatigue is felt, and relief is secured temporarily by closing the eyes or gazing at far distant objects. The usual indication of strain is redness of the rim of the eyelid betokening a congested state of the inner surface, which may be accompanied with some pain. When the eye tires easily, rest is not the proper remedy, but the use of glasses of sufficient power to aid in accommodating the eye to vision.

MIND-DESTROYING DRUGS.—Dr. Wilkins, superintendent of the insane asylum at Napa, in a recent conversation as to the number of young men and women at present in the asylum from the use of opium, morphine, cocaine and kindred narcotics, stated that the subject had given him more trouble than all other causes of insanity combined. He said that among his patients were those whose minds had become unbalanced through drink, family afflictions, business losses and from other causes, but the worst cases were those whose minds were destroyed through the use of narcotics. The number of patients from this cause is rapidly increasing, and there have been more men and women committed during the past six months suffering from dementia occasioned by drugs than there was from the same cause during the ten previous years. Said he: "The statement may appear incredible, but it is borne out by facts. Narcotics are a more prolific source of insanity than all other causes combined."

USEFUL INFORMATION.

A NEW SOLDER.—A soft alloy, which adheres so firmly to metallic, glass and porcelain surfaces that it can be used as a solder, and which is invaluable when the articles to be soldered are of such a nature that they cannot bear a high degree of temperature, consists of finely pulverized copper dust, which is obtained by shaking a solution of the sulphate of copper with granulated zinc. The temperature of the solution rises considerably, and the metallic copper is precipitated in the form of a brownish powder; 20, 30 or 36 parts of this copper dust, according to the hardness desired, are placed in a cast-iron or porcelain-lined mortar and well mixed with some sulphuric acid having a specific gravity of 1 85. Add to the paste thus formed 70 parts (by weight) of mercury, constantly stirring. When thoroughly mixed, the amalgam must be carefully rinsed in warm water to remove the acid, and then set aside to cool. In 10 or 12 hours it will be hard enough to scratch tin. When it is to be used it should be heated to a temperature of 375° C., when it becomes as soft as wax by kneading it in an iron mortar. In this ductile state it can be spread upon any surface, to which, as it cools and hardens, it adheres very tenaciously.—*Exchange.*

SCREW-MAKING MACHINERY.—*Invention* states that the first instance known of machinery being applied to the making of screws was in France, in 1569, by a man named Besson, who contrived a screw-cutting gauge to be used in a lathe. In 1741 Besson's device was improved by Hindley, a watchmaker of York; and for a long time the watchmakers of England employed the latter's method in making the small screws used in their work. The first English patent appears to have been issued to Job and William Wyatt, in 1760, for three machines—one for making blanks, another for nicking the heads, and a third for cutting the threads. Between that date and 1840 about 10 patents were issued.

THE OLDEST WINE IN AMERICA.—A newspaper paragraph has been going the rounds to the effect that the oldest wine in America dated back to 1790 or 1791, and was to be found in a wine-cellar in the city of Savannah, Ga. The Germantown (Pa.) *Telegraph*, however, says that Mr. Ellwood Johnson of Germantown has a bottle of wine made in 1760 by Thomas Livezey from grapes grown on the Wissahickon Hill about Allen's Lane Bridge. When the British were in and around Philadelphia, Mr. Livezey buried a cask of wine in his millrace. Mr. Johnson can claim the oldest wine, undoubtedly.

TO PRESERVE PRESSED LEAVES.—To preserve leaves and other parts of plants properly, they should be placed between sheets of blotting paper, and the papers should be changed once a day for two or three days. They should be dried as rapidly as possible, by passing a warm flatiron over the paper each time the change is made. They should be kept under moderate pressure at first, and to insure even pressing, it will be well to place a stiff piece of card-board or straw-board at intervals between the sheets. When the drying appears to be well advanced, the pressure on the specimens may be increased.

SODA FOR CLEANING LAMP CHIMNEYS.—Take a piece of saleda the size of a walnut, put into a quart of soft water, put your lamp-burner in it (an old tomato can is good enough), set it on the stove; after boiling five minutes remove the burner, and when put back on the lamp will be as good as new. All the carbon on the old burners should be removed once a month. Another way to keep your wicks from smoking is to immerse them in strong vinegar and dry them thoroughly.

PAPER AS TOUGH AS WOOD.—A plan for rendering paper as tough as wood or leather it is said has been recently introduced on the continent; it consists in mixing chloride of zinc with the pulp in the course of manufacture. It has been found that the greater the degree of concentration of the zinc solution, the greater will be the toughness of the paper. It can be used for making boxes, combs, for roofing, and even for making boats.

MINING UNDER A LAKE.—At the new hematite mine of the Cleveland Iron Mining Company, located under Lake Angeline, there is a scene of the greatest activity, noticed at any of the properties, new or old, in the region. The company, as is generally known, has a 200 foot vein of ore under the lake; it probably has even a greater width than that, but this much it has proven by exploration.

WROUGHT-IRON PIPE WORKS.—There are 24 wrought-iron pipe works in the United States—one in Massachusetts, two in New York, 14 in Pennsylvania, one in Delaware, one in West Virginia, two in Ohio, and three in Illinois. Of the 14 in Pennsylvania, six are in Pittsburg. All the others are in the eastern part of the State, four being in Philadelphia.

REWELDING OLD BALE TIES.—A machine has been invented for welding cut bale ties. By its means cut ties that accumulate at the compresses, which are so well known in the South, can be very quickly made up into proper lengths for use. At the present time cut band ties, though in large quantities, are worthless except as scrap iron.

ELECTRIC-LIGHT CARBONS.—Six years ago all the carbons burned in the electric lights of the country were made in one room in Boston by ten men. There are now 150 tons consumed daily, and of this number 100 tons are turned out in the 20 carbon furnaces of Cleveland.

A PROFITABLE PURCHASE.—The Alaska Commercial Company have paid into the United States treasury since the "Seward purchase" was completed $8,000,000. Russia received for the whole country $7,200,000.

CARPET MANUFACTURE IN PHILADELPHIA.—The carpet manufacturers of Philadelphia have 3750 looms in use, employ 17,800 hands, and manufacture annually 7,500,000 yards of carpet at a value of $44,970,000.

ARTIFICIAL FISH-DRYING.—The practicability of drying fish with artificial heat has been successfully tested at Canso, Nova Scotia. This new method will be tried on an extensive scale the coming season.

GAS VS. COAL FOR HEAT.—Fifteen cubic feet of gas will give as much heat as one pound of bituminous coal. Ten cubic feet of air is required for the perfect combustion of one cubic foot of gas.

RAPID ACCUMULATION OF WEALTH.—The accumulation of wealth in the United States is equal to one-third of the daily accumulation of all mankind outside of this country.

THE great number of big steamships that years ago filled the Mississippi are fast disappearing. The railroads have taken their places.

THE TANNING of boa constrictor skins forms a branch of industry in Hamburg, N. J. They are made into pocketbooks, principally.

A QUICK EXTINGUISHER.—It is stated that a solution of pearlash in water, thrown upon a fire, will extinguish it immediately.

DOUBLING the diameter of a pipe increases the capacity four times.

ELECTRICITY.

A GRAND ELECTRIC TRIUMPH.—The latest novelty in improvements in office-building is the "electric service" system for automatic regulation of heat. This invention has just been placed in the new market and Fulton National Bank building, corner Gold and Fulton streets. The heat in this building will be under electrical control, and every tenant can have the temperature he desires without paying any more attention to the matter than he would to the running of the furnace or boiler. Thus, in two adjoining rooms where a consumptive in one wants a temperature of 90 degrees and a full-blooded fellow in the other wishes only 60 degrees, each gets just what he desires. The engineer in the engine-room can tell whether any room is too cold and can instantly send additional steam into the office whose thermostat placed before him reveals the necessity. The landlord saves from 25 to 40 per cent on fuel, and the tenant escapes severe colds and general discomfort. If a new tenant comes in, he merely notifies the engineer of his individual tastes and the heat is regulated accordingly.—*Progressive Age.*

IS LIGHT AN ELECTRICAL DISTURBANCE?—Prof. Oliver Lodge, in a very interesting study on the modern view of electricity, says that light is an electrical disturbance, and that light waves are excited by electrical oscillations. Our present system of making light artificially he characterizes as wasteful and ineffective. We want a certain range of oscillation—between 7000 and 4000 billion vibrations per second. Perhaps, speaking theoretically, this is sound reasoning; but practically, we don't see how anything that serves a purpose as well as we have learned to serve it can be wasteful, nor how, when a thing is accomplished satisfactorily and thoroughly, it can be called "ineffective." It *must* be effective because it succeeds, and must be regarded as economical at least until we can find a cheaper means.

AN ELECTRIC POSTAL RAILROAD.—Three hundred miles an hour is the proposed speed for the electric postal railroad of the future. An experimental line has been erected at Laurel, 20 miles from Baltimore, Md. A compromise between the pneumatic tube and the ordinary railroad carries a miniature train of two cars, solely for mails and light parcels, without any attendance. The road has three rails—one above the car, for carrying the current, and two below, which carry the cars. The cars are built of sheet iron, and are two feet square and 21 feet long. Speed will be regulated, and power or brakes applied by electricity solely. If the experiment at Laurel succeeds, it is stated that similar roads will be laid between Baltimore and Washington and elsewhere.—*Exchange.*

ELECTRICITY is being more and more used for the purification of kaolin and other porcelain clays. The clay is sifted on to a rapidly revolving horizontal plate, which is surrounded with powerful electro-magnets, which retain the particles of iron. From this the clay passes to a second plate, which removes the last traces. The process is said to be comparatively cheap and very rapid, and since its introduction many clays, hitherto rejected as containing too much iron, have become of value for the manufacture of pottery.

A NEW TYPE OF DYNAMO, called the wheel-armature dynamo, has been brought out in Berlin. Details of the construction are lacking, but it is said that it is possible to construct it without core, without cotton insulation and without copper. The armature takes the form of a grating of fine wrought-iron rods, with no other insulating material between them than the air. The rapidity with which electric science is developing already surpasses all former records. "What will the harvest be?"

HEAT FROM GAS.—While the electric light is gradually taking the place of illuminating gas in Germany, the latter article is evidently going to meet with an extensive sale in another direction, on account of its considerable evolution of heat. In comparison with the electric light, it is this property which is, apart from minor brightness, considered as its principal deficiency. It is stated that the heat from equal amounts of gas and coal is in the proportions of 26 to 15.

THE BRUSH MACHINES IN ENGLAND.—The Anglo-American Brush Electric Light Corporation, Limited, have just secured an important contract for the supply of about 40 sets of combined engines and dynamos of their special design, and have now in hand orders for nearly 50 sets of apparatus of this pattern. The design has met with much favor from European Governments since its introduction, and has been largely adopted for ships of war and other vessels.

THE LONGEST DISTANCE that the electric current has yet been successfully carried for lighting purposes is less than six miles. At Portland, Me., the Westinghouse Electric Co. is preparing to utilize a water-power 12 miles distant from the city for electric-lighting purposes.

THE EDISON SYSTEM of electric-lighting has sufficient underground wires in New York City to supply 200,000 16-candle power lamps.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

DRYTOWN.—Cor. Amador *Ledger*, April 6: Work on the Drytown Con. mine is progressing. The pipe is all laid, and the trestle-work across the creek completed. Two loads of the framing for the hoisting works was hauled in this week, and they are now waiting for the machinery. The Gover mill has been idle for a couple of days on account of the breaking of the rock-crusher. They are now putting in a new one in the ore-house near the mine instead of in the mill where the old one was. The water skips and pumps are kept busy at the mine taking the water out of the shaft. It will take some time before they reach the bottom. Then the intention is to sink 200 feet deeper. At the Cosmopolitan the new boiler has been placed in position. A new station has been made at the 300-foot level, and some splendid rock encountered. The Potosi mill is still running on ore taken from the North California mine.

SUTTER CREEK.—Cor. Amador *Ledger*, April 3: Work at the North Star is almost suspended on account of the expiration of the two years' lease being so near at hand, and there being nothing in sight to justify the stockholders in buying the mine. To-day they are cleaning up at the Wildman, and the plates look well. Knight & Co. have just received a contract for two 17-inch pumps and one hydraulic engine to go to the Marguerite mine.

BUNKER HILL.—Amador *Ledger*, April 6: The big tunnel of the Bunker Hill is stopped. A chart of the mine was taken and sent East; the popular impression is that the mine will change owners. The directors of the North California met in Sutter Creek Tuesday; the mill will be closed down and prospecting will be carried on extensively. The Keystone is prospecting on a very extensive scale.

NORTH CALIFORNIA.—*Dispatch*, April 6: The mill was closed down for a few days last week, as one of the flumes was blown down on the ditch. It has since been repaired and the mill is pounding away again.

SALE.—Mr. Duff Reaves has bought the Evans quartz-mill below Plymouth and is moving it up to his mine, where he proposes to set it up and operate it. Mr. Gordon of Amador City is going to rebuild the mill. Mr. Reaves has an unlimited amount of good quartz to put through the mill when in order to work.

ZEILE.—The shaft at this mine has been sunk to a depth of 1160 feet, at which place it is the intention to run a level. The lowest level is about 100 feet above this place. During the sinking from 10 to 15 stamps were "hung up." The mill will run to its full capacity hereafter.

OVERPLUS.—The Huntington mill is kept running steady, reaping a harvest in the way of bullion; it is paying well.

Fresno.

MT. RAYMOND DISTRICT. — Fresno *Review*, March 29: Fred McMillan of Mt. Raymond mining district, situated in the northern part of this county, arrived in this city yesterday and reports that operations in the mines in that district are very active. The Star Mining and Reduction Co., the principal company operating there, have just completed their concentrating mill and commence reducing ores on the 1st of April. The mill has a capacity of reducing 125 tons of ore daily. Their Hallidie cable tramway is now in operation, conveying ore from the mine to the mill, a distance of one and one-half miles, and is a perfect success as a transporter. There are about 60 men employed at present, and about 100 will be engaged as soon as the mill starts. Reports speak favorably of a San Francisco company commencing operations on the Harlow group of mines this season. The operations of the Star company will certainly demonstrate that the lead and silver mines of that district can be successfully and profitably worked, and this season will place Fresno county among the lead and silver producers of the world. There is an unlimited amount of galena ores there, which is only awaiting the miner with capital to make them great metal producers. Mining operations are active at Grub gulch. The Surprise mill is running day and night, and the mine is reported looking better now than ever. A large force of men is employed. The Gambetta mine, owned by John Haley, is still being profitably worked. The Crystal Spring M. Co., which commenced operations on its mines a year ago, but suspended work last fall, will again commence operations in a few weeks.

Inyo.

BEING WORKED.—Inyo.*Register*, April 4: The mines on Fish Spring hill are being worked by Messrs. Welch, Daly, Mairs and others. Gold ore is being taken out and worked in Henry Melone's arastra.

Monterey.

LOS BURROS.—Monterey *Democrat*, April 6: The heavy rains left the ground in excellent condition for prospecting, and in consequence all the miners, prospectors and every one else of the camps who are not busy have joined the pan and shovel brigade. Sluicing was being done at a lively rate on Main street, Saturday, all along with very satisfactory results. Sunday quite a crowd went to the Old Man of the Mountain placer grounds to try their luck. Much fine gold and several nuggets were taken out. Wild Bill took two from one pan of dirt for which he was offered $10. Several new discoveries are reported in the last few days. A party from San Jose, Messrs. Keeler, Jackson & Lovell, have found and located a very rich ledge. The Enterprise Development and Tunnel Co., J. F. Holmes, president, are to begin operations in a few days, on their property in this district. The Cruikshank ledges are looking well. The two drifts from the main level show about 140 feet of the ledge averaging about five feet in thickness and showing free gold the entire distance. Capt. Jack Sargent reports favorably from the Willow Creek country. Pete Gillis struck a very rich pocket on his claim, the San Juan, one nugget weighing $20. From all indications this district will before long be one of the most important in the State, the gold running belt extending from the ocean to the Lion's Den country, a distance of about 15 miles. Gold has been found the entire length, from fine colors to a nugget weighing $41, and as the main and most important mines and prospects of the camp, viz.: Sure Pop, Melville, Last Chance, King, Ajax, Wild Bill, and many others, lie almost in direct line, it shows that it must be one continuous fissure vein or mother lode having its many spurs and feeders. That the gold-bearing ledges are permanent below the surface is proved by the Cruikshank lead, which is the only mine that has been prospected any depth. This mine at a depth of 150 feet shows the ledges three times the size as at the surface and as rich in proportion. The only drawback seems to be that the richest prospects are owned by men who have not the money to develop them at once, and it is only of late that this country has been of much note among outside mining men and capitalists. This is owing to the fact that it can only be reached by a long and tedious route which can only be traveled on horseback, but the proposed county wagon-road across the mountains will do away with this inconvenience and facilitate opening of the mines.

Nevada.

SHAFT.—*Tidings*, April 6: The shaft of the W. Y. O. D. mine is down 440 feet, and sinking is being continued for a 500-foot station. The ledge improves with depth.

NORTH BANNER.—The annual meeting of the stockholders of the North Banner M. Co. was held this afternoon. The reports of the various officers showed that the mine is profitable property, with good promise for the future. Directors as follows were elected, to serve for the ensuing year: Geo. Fletcher (Pres.), John F. Kidder, E. H. Brown (Treas.), A. Mattison and W. E. Brown, the last named of San Francisco. M. J. Farrell was elected as secretary, and John Skewes as superintendent.

Placer.

MICHIGAN BLUFF.—Placer *Herald*, April 6: The *Herald* is indebted to A. Rodgers for the following mining news from Michigan Bluff and vicinity: Robert Watson has been made superintendent of the Dam claim. The company will soon begin an air shaft, which is necessary to the working of the mine. This shaft will be 500 feet in depth. The tunnel, which is 3600 feet in length, has been straightened in places and T rails have been laid. During the last year a gravel channel running nearly north and south has been struck. This channel is 240 feet wide and holds rich gravel, but will require hoisting apparatus, as it is lower than the old channel and carries a large body of water. The Co. and those who have visited the mine think it is the Mayflower channel, as the gravel is similar. F. Chappellet & Co. are running a tunnel into the Eureka claim, which is three miles above the Dam. At the Hogsback a drift is being run across the channel in search of the other rim. The Red Point and Hidden Treasure mines are paying big. The Sutcliffe boys have been doing well in El Dorado canyon. They have found new ground in many places in the bed of the canyon which has paid handsome dividends. They haven't said much about their claim, but it is known that it has paid as high as $1500 a week for several consecutive weeks. Two mining experts have been examining the ledges in El Dorado canyon, and they think systematic prospecting would discover rich quartz mines there. William Muir is taking out good pay at the Oro, which is situated just above the old Weske mine. The gold is coarse and heavy.

Shasta.

MINING OUTLOOK.—Redding *Free Press*, March 30: The mining outlook, so far as quartz is concerned, was never better. It is true, if there were more snow in the mountains, water in the creeks and springs would hold out longer and be a blessing to the prospector and his pack animals away from living streams, but the numerous quartz-mills with water for motive-power are pretty generally located on such creeks as do not depend altogether on the snowfall along the watersheds for their midsummer water supplies. In the Old Diggings district, placer mining still occupies the attention of a few old residents, but the weather this season has not been very kind to them. The quartz miners, however, have bright prospects, and as there are now several big mining corporations interested in property in the county, there is no reason under the sun why the quartz branch of our mining industry should not flourish as it never has before.

Sierra.

COMMENCED CRUSHING.—Nevada *Transcript*, April 4: Holcomb, Moore & Callahan, who are engaged in prospecting the North Alaska (formerly Graphic) quartz claim, which is situated a mile above Plum Valley, Sierra county, have erected a four-stamp mill there, and about a week ago began a test crushing. If the results are favorable they hope to be able to interest Eastern capitalists in the property. The new owners claim that the Graphic Co.'s failure was due to the fact that they worked upon a break from the main ledge instead of upon the ledge itself.

SIERRA CITY.—*Tribune*, April 6: Sierra City is going to be the liveliest and best mining town on the coast this summer. It is a settled fact that we are going to have a boom. We have not had quietness for the past few months for nothing. The people here have just been preparing for the boom. No town in the State has as many rich mines as Sierra City, and no district has as many good prospects as old Sierra City; and together with all these good things, at no place in the State can you find as many experienced and capable men for working a mine as you can right here.

Siskiyou.

RIVER MINING.—Yreka *Journal*, March 29: The river companies on the Klamath are all getting ready for work, and will soon put in wingdams, as the river is not likely to be any higher this season, with prospects of low water much earlier than for many years past. Shasta river, for some distance above its mouth, is becoming a rich mining camp, several of the claim-owners having taken out considerable dust during the past year. Henry Marion, who has a ditch in that locality, started below a few days since to secure machinery for elevation of water from Shasta river, in order to gain a pressure for hydraulic operations. The other companies all work with sluices, shoveling the pay gravel from the banks. Pullen is pushing things at Klamath river, getting ready to put his wingdam into the stream. He will put up a derrick, and we understand he has a good paying claim. Jillson & Co. hydraulic as often as they can collect enough water in their reservoir. We did not learn what the prospect is. It is very unfortunate that there is so little water.

QUARTZ.—Messrs. Heckathorn & Wademan have found another rich pocket in their quartz mine on Greenhorn creek, a short distance south of Yreka, which prospects exceedingly rich. They pounded out $40 last Friday in a hand mortar, and next day in a couple of hours some $10 more. They have an arastra about completed, and as soon as sufficient water is obtainable, will commence grinding out the rich quartz on hand. Mr. McCook, the enterprising Humbug creek quartz miner, is busy fixing up the quartz-mill at forks of Humbug, in which he will place the new stamps ordered from San Francisco. Osborne & Dee have men at work getting timbers, lumber and poles on the ground to open the Keeneenaw mine. There is every chance of their making a big strike, for, just opposite, was taken out a large amount of gold many years ago. On last Saturday, Messrs. Goodrich, Disen, Storey and Amos made a discovery of what appears to be a good quartz ledge 14 inches thick, in a gulch about three-fourths of a mile from the Anderson ranch. They propose to put an arastra on it, to prospect. They claim the rock will go from $100 to $1000 to the ton. This is the second or third good ledge they have discovered in that vicinity.

FROM KLAMATH RIVER.—Yreka *Journal*, April 5: From the Anderson grade can be seen three new buildings on the west side of the river; that of Mr. Chas. Jillson, on the summit above rancherie, near his hydraulic mines; that of Osborn and Dee on the Keneenaw mine at mouth of Printer gulch, and that of Mr. Wm. Jillson below the Pope ranch. This begins to look something like a boom for Klamath river. Pullen is putting in rock cribs. Waggonner & Freshour, Osborn & Dee, and Jillson commence this week or next. From Cottonwood creek to the mouth of Shasta river there will be not less than 50 men working in the mines in Klamath river. Deyson, one of the parties who was reported as finding a rich quartz ledge last week, is very much elated over his find and desires to sell or bond his ledge, guaranteeing that it will go from $50 to $500 to the ton. His reason for so doing, we understand, is lack of capital to open it.

San Bernardino.

THAT SILVER MINE.—*Times-Index*, April 6: This morning W. A. Evans of this city visited the *Times-Index* office to show the samples of ore and the assays made therefrom taken from the new, rich lode just discovered by him and his associates, who are Frank H. Evans, O. D. Gass and A. Preciado. The mine is in the mountains nine miles a little west of south of Bagdad, a station on the Atlantic & Pacific railroad, about 60 miles east of Daggett. The vein is very narrow on the surface, and as the vein goes down it widens out, a wash cuts the vein at one point and in the bottom of the wash the vein is three feet wide. This is about 30 feet below the adjoining surface. At four feet below the surface, the ore yields 2600 ounces of silver to the ton. In the bottom of the wash the ore goes 425 ounces to the ton, surface rock only being used. The character of this ore is the same as that found at Calico, but much richer and in wider veins. The owners have a ton of ore now out taken from the croppings, which will be shipped to the Selby Smelting Co. as soon as possible. Joe Craig and his brother Clark Craig, sons of the old pioneer assayer, Joseph Craig, leave to-morrow morning with assaying outfit and tools to open up their extension of the original mine, which is named the Silver Cornucopia. The owners of the original mine have a force now at work tunneling and opening up what promises to be the richest silver lead ever struck in the State. The vein has been traced for over two and a half miles, and the rock the entire distance appears to be about the same, although no assays have been made beyond the original mine.

Trinity.

COX BAR.—Trinity *Journal*, April 6: We received the following from T. C. Wright of Cox Bar in regard to matters in that place: T. B. Price began his summer work in his drift claim Wednesday with a full crew; the claim is in good shape to work and has plenty of good ground. He has at least three seasons' work of good pay dirt in sight and will undoubtedly make a good showing this summer. The Willshire hydraulic mine, owned by Bigelow, Jordan & Stackpole, is running with a good head of water and has good prospects considering the shortness of the season. C. J. Johnson's mine is also in fine shape and is paying good dividends right along. The dam at the Lower Trinity tunnel put in last summer by T. J. McWorthy has successfully stood every raise on the river.

Tuolumne.

BLACK OAK.—*Union Democrat*, March 30: The ten stamps at the Black Oak mill are pounding away merrily, and the company contemplates putting in five more. The admirable management of the mine has made it one of the most successful in the county. The new hoisting works are being pushed to completion.

AIR-COMPRESSOR.—During the past week there has been placed in operation on the Bonanza mine a Richman air compressor. It operates the engine, pump and hoisting works by compressed air instead of steam as heretofore used, and greatly facilitates the mining operations with considerable reduction of expense. With steam, it has been necessary to stop the pumping engine several hours in the day, so great was the heat in the lower workings; with air the mine is kept cool by a steady cold current of air flowing therein. The machine is a solid, compact, simple structure. The compressor in the Bonanza mine is operated by a 24-foot overshot water-wheel, erected by Mr. James Hamilton.

NEVADA.

Washoe District.

CROWN POINT.—Virginia *Enterprise*, April 6: Shipped to the Mexican mill during the week 912 tons 880 pounds of ore, of which 875 tons were milled, the average battery assay of which was $1.37 per ton.

HALE & NORCROSS.—On the 400 level are stoping ore of good quality from the south drift from west crosscut. The drift north from west crosscut No. 1 is advanced 25 feet and continues in fine ore, 25 feet being added since last report. On the 500 level have started a northwest crosscut 75 feet north of main west drift; this crosscut is now advanced 40 feet. The north and south upraises continue in excellent ore. On the 600 level are extracting the usual quantity of fine-grade ore from the several stopes. On the 700 level have started a south drif from the end of the main west drift. This drift is now advanced 25 feet, the last 15 feet being in good ore. Seventy-five feet north of this point started a new west crosscut from the main north lateral drift. This crosscut is now advanced 30 feet. The north upraise was advanced 15 feet and connected with the 600 level. This greatly benefits the ventilation of this part of the mine. During the week have hoisted 952 tons of ore; have shipped to the Nevada mill 958½ tons and have milled 802 tons. Average battery samples, $27. Shipped during the week bullion amounting to $16,030, and have $25,000 bullion on hand.

SAVAGE.—On the 400 level are stoping ore of fair quality from Nos. 1 and 2 southwest crosscuts. From the north drift on this level are extracting ore from the old stopes. On the 500 level the upraise from No. 3 west crosscut was extended 17 feet, and continues in low-grade quartz. From the south drift on this level are extracting ore from the old stopes, also from No. 3 east crosscut, 600 level. During the week hoisted 612 tons of ore and shipped to Rock Point mill 525 tons. Average battery assays $21.18. Have shipped $19,399.19 in bullion, and have bullion at the mill amounting to $15,000.

ALPHA AND EXCHEQUER.—On the 382 level the northwest crosscut is in 57 feet. Face in clay and porphyry. The northeast crosscut is in 54 feet. Face showing streaks of quartz, clay and a little water. On the 500 level the north lateral drift is in 413 feet; face in quartz and clay and the ground is very heavy, with a little water. The northwest crosscut is in 256 feet. The face is in hard blue porphyry.

CONFIDENCE.—The joint challenge and Confidence east crosscut No. 1 on the 1300 level is in 30 feet, 13 feet having been added during the week. The face shows vein material. East crosscut No. 2 on the same level is out 7 feet. Shipped during the week to the Brunswick mill for reduction 427 tons of ore, the average battery sample of which shows a value of $34.71 per ton.

OVERMAN.—Extracted 292 tons 1600 pounds of ore. Shipped to the Vivian mill 238 tons 1720 pounds of ore. Are stoping out ore at top of upraise from the east drift on the 226 level. The ore is of fair grade. Stope from winze from west crosscut No. 7 continues to yield the usual quantity of fair ore. Have done some repairs on Lambert winze.

ALTA.—The mill running steadily from ore on the 800 level and stopes above the 825 and 955 levels. Are upraising in fair milling ore on the 925 level in a body from 10 to 11 feet wide. The upraise on the 725 level is up 380 feet. Crosscutting will commence 30 feet further up to connect with the workings on the Keystone ledge.

SEG. BELCHER.—The west crosscut on the 1100 level is out 153 feet, having advanced 45 feet during the week. It has cut two stringers of quartz, which yielded fair assays, and the face is now in material of an encouraging nature.

CHALLENGE CON.—The work in this mine is jointly with the Confidence. During the week 22 tons of Challenge ore was shipped to the Brunswick mill, the average battery sample of which shows a value of $34.21 per ton.

CHOLLAR.—North drift 850 level is out 66 feet; face in very hard ground. North drift 750 level is out 117 feet; face in clay and porphyry. North drift 550 level is out 857 feet; face in low-grade quartz.

THERE are no new developments to report beyond progress in Justice, Baltimore, Silver Hill, New York, Bullion, Andes and Yellow Jacket, where fair prospecting work is being done.

SCORPION.—During the past week the west crosscut on the 350 level was advanced 16 feet, making its total distance 440 feet. The face of the drift continues in vein porphyry and clay.

POTOSI.—West raise 930 level, 400 feet south of the shaft, is up 27 feet; face in porphyry and low-grade quartz. West drift 650 level is out 29 feet; face in low-grade quartz.

CON. IMPERIAL.—Repairs to the main north lateral drift of the Con. Imperial mine being for the present completed, all work in this mine has been temporarily suspended.

BELCHER.—The 200 east crosscut advanced 42 feet during the week, making its total length 140 feet. The surface is in quartz and porphyry giving low assays.

Bristol District.

COPPER.—The Roe Bros. shipped from Bristol last week 24 tons of copper bullion, the product of the last run of their small furnace. The collapse of the copper syndicate will prevent further working in Bristol mines for copper until the market becomes more settled.

Jumbo District.

PANDORA.—Virginia *Chronicle*, April 3: The Pandora mine is yielding the usual amount of ore, showing an assay value of over $200 a ton in gold. Another batch of ore is being hauled to the arastras on the Carson river on the site of the Merrimac mill for crushing. The Wild Goose is also producing ore of even higher grade than the Pandora. Ore from the latter mine is crushed at Fisher's mill in Six-mile canyon.

Pioche District.

YUBA.—Since last mention of work here, a new vein of galena ore has been discovered, which is termed the "south contact." It lies west of the shaft and was first struck on the 11th level. A short crosscut from the 12th also cut the vein, where the ore is almost pure galena, from 6 to 12 inches in width, and assaying 100 to 150 ounces in silver. The vein is being developed on both levels. The crosscut from the 12th level running north to strike the Chief of the Hill and Burke ledges has progressed 140 feet. Small stringers of ore are encountered, though it is estimated that 100 feet or more must yet be run before cutting the ledges. During the past ten days teams have come in well, and 25 tons of ore have been shipped to the terminus.

TANK.—An iron tank of 600 gallons capacity, for hoisting water from the Raymond shaft, arrived last Sunday. It will be used to facilitate the first operations of the big pump in cleaning the sump. From 7500 to 8000 gallons per hour can be hoisted with it.

PUMP COLUMN.—The 40-foot timbers for use on

the pump column at the Raymond shaft have begun to arrive. Two of them make a load for the average team, and to see them freighted in this style is in contrast with the way Pritchard's fast freight teams brought in similar timbers years ago from Eureka, when one of the teams carried as much as a railroad train.

DISCHARGED.—Twelve men were discharged last Saturday night at the reduction works. The number employed there could not be advantageously worked. All the stone-work connected with the plant will be finished by contract, which has already been let to L. Syphus & Sons.

Tuscarora District.

BELLE ISLE.—*Times Reporter*, April 5: West crosscut 250-level, extended 10 feet, the face shows the same character of porphyry and is a little harder.

COMMONWEALTH.—100-foot level: North drift from No. 1 east crosscut, has been advanced 17 feet, face being in ore assaying $129 per ton. North drift from Queen line is showing high-grade ore, where the stull timbers are being put in. The main south drift is also yielding good ore 140 feet south of the shaft, where it is being stulled. North of the shaft, same level, No. 1 west crosscut has been advanced eight feet, and connected with the intermediate drift, cutting rich ore. West intermediate drift has been extended 11 feet. It does not show quite so well, the ore being a little mixed. 225-foot level: Intermediate drift from east lateral winze has been extended 11 feet south and 10 feet north, exposing very fine ore the entire distance. South drift from bottom of No. 1 winze has been advanced 8 feet; total, 23 feet; and north from same point, seven feet; total, 16 feet. The ore being developed by this drift is very high grade.

NEVADA QUEEN.—The Union mill was started Monday, the 1st, and is running nicely, the machinery all working well. The concentrator is also running steadily and doing good work. At the mine the east crosscut on the 450-foot level has been advanced 18 feet, passing through small seams of sulphurets and clay, looking very favorable for ore. The stopes are improved since last report, and are yielding some good milling ore. Average assay of ore hoisted $182 per ton. Everything around the mine is working well.

NORTH BELLE ISLE.—North drift, 500-foot level, extended seven feet. The water is now under control and the ventilation good. The intermediate stopes are looking fair. The stopes above the 300-foot level are opening out wide and are looking very fine. The stopes on the 150-foot level turning out some high-grade ore. The Union mill started Monday on Nevada Queen and North Belle Isle ore and everything is running smoothly.

GRAND PRIZE.—East drift, 300-foot level, extended 13 feet; face showing 18 inches of good ore. 400-foot level: East drift from north crosscut extended 12 feet. West drift from same crosscut 21 feet and an east drift No. 2 from north crosscut started and is in 17 feet, ore streak one foot wide and high grade. Face of south drift advanced 14 feet. East crosscut 17 feet through a more favorable looking formation.

NAVAJO.—The stopes are looking fair throughout the mine and the usual quantity of ore has been sent to the mill.

ARIZONA.

HASSAYAMPA DISTRICT.—Prescott *Courier*, April 5: The Blue Dick, Hassayampa district, continues to favor John McDonald and Tom Brown with plenty of rich ore. They shipped yesterday 23,170 lbs. of ore worth, per ton, silver, $427; gold, $1800. This shipment contained six per cent copper. A carload of second-class ore, shipped by them last week, sampled 235 ounces of silver and $12 gold to the ton. For the 11 months previous to this, these worthy miners mined, packed and shipped ore worth $9000. They have in stopes and on dumps 2000 tons of ore worth $30 a ton.

CONGRESS.—Several wagon-loads of rich gold-bearing sulphuret ore arrived yesterday from the Congress mine. A 20-stamp mill will soon be up and running at the mine. About 100 men are employed in and around mine and mill. Harlan & Barrington are crushing ore from the Howard mine in their mill, 12 miles south of Prescott. Mr. Dunkle has struck it rich in the Scotch Lassie. Tom Bowman of Lynx creek was at the Pioneer hotel yesterday, and stated that 50 or 60 men were making good wages in the placers. T. W. Otto had, yesterday, 16 ounces of nice gold, besides a 2½-ounce piece which Peter Brady recently found above the Lynx creek hydraulics. The tapping of old workings in the Senator mine caused a big flow of water, which rose 40 feet in the new shaft.

DAKOTA.

AFRAID OF DAKOTA TIN.—Deadwood *Pioneer*, April 6: The project in London to form a combination of tinplate manufacturers to control the price and amount of production received a check when on the point of consummation, by the receipt of private reports concerning tin mines in Dakota. While many of those interested in the proposed combination look at stories of their richness as exaggerated or altogether untrue, prudence demands further investigation. One Jewish capitalist is known to have invested heavily in the Dakota fields, on the strength of reports sent to him by a relative in America, and the amount of money he has at stake is enormous. The mines of Cornwall are worked with ever-increasing difficulty and expense. The Banca deposits are the only others of known value, and the product of this distant Malayan district is uncertain. South Wales and Worcestershire tinplate makers look with alarm at the possibility of having to contend with factories established in the heart of a country which is by far their best customer. It may be looked upon as certain that if the situation proves to be as critical for them as it now seems, they will make desperate efforts to gain control of the Dakota mines at any cost.

IDAHO.

ROCKY BAR.—Wood River *Times*, April 3: E. C. Coffin returned to-day from Rocky Bar, where he went to complete arrangements to resume operations with the Alturas Fast Freight Line between Hailey and the Bar. He says that it is rather quiet there just now; but that in two or three weeks the Alturas Limited will resume operations on a larger scale than ever. This company discharged most of its employes some time ago, pending reorganization. This is progressing, and will doubtless be completed within a month.

RED ELEPHANT.—Last Thursday afternoon a new ore body was cut into in the upraise about 700 feet from the east end-line of the Red Elephant claim. This was in entirely new ground, and higher than there have heretofore been any workings at that end of the claim. Only 10 men are employed at the Red Elephant group at present, the force having been greatly reduced since Col. Bryan, the manager and third owner, left for the East about three weeks ago to purchase hoisting and concentrating machinery.

THE NARROW GAUGES.—Supt. Wilson of the Narrow Gauge group of mines intends to go to work at once to put a hoisting engine and pump in position near the end-line of the Narrow Gauge No. 2 mine, preparatory to sinking a shaft down about 115 feet for the present.

PINE GROVE is also dull at present; but the companies interested there are expected to resume operations soon, when the camp will, it is hoped, become permanent.

MONTANA.

HELENA DISTRICT.—*Montana Mining Review*, April 6: A flying trip to the Helena district a few days since revealed the fact that mining operations in that locality are assuming proportions that tend to place the district in the front rank of Montana's great mineral-producing belts. On every side signs of activity are manifest, and not only is the indefatigable "prospector" abroad pursuing his search for new discoveries, but many claims are being put in readiness to be extensively developed. Of late, the district has attracted more or less attention from capitalists and mining men from abroad. Probably the most important transaction of the past week relative to the Helena district was the bonding of the West Grass Valley mine by Messrs. Hauser, Holter et al., the bond to expire in June. This is a very promising property, and has produced some very fine ore, showing improvement as development progressed. The owners, Messrs. Brennan, Coffee and Nevill, have shipped considerable ore from this mine with very satisfactory results. It is said that the stockholders of the Christmas Gift are trying to perfect such arrangements as will enable them to develop their property, which has produced some of the richest ore in the district, and has only lain dormant for the past few years because of a lack of harmony among the stockholders. The Bonanza Co. have let the contract for 50 feet of sinking on the Little Bonanza lode, and arrangements are now going ahead to have everything in readiness to commence putting the shaft down in the course of the next few days. The Hard Cash is looking well, and a few days since 11 tons of first-class ore were shipped from the mine. We hear talk to the effect that the well-known Helena mine will be worked and brought to the front this season.

NEW MEXICO.

RUBY.—*Western Liberal*, April 5: The Ruby Co. of Gold Hill made a shipment of some of its ruby silver ore this week. It is reported that this summer two more large companies will go into the Pinos Altos camp. The Hachita Mining Co. is patenting the Copper King, Center and Mammoth mines in the Apache district. During March about $23,000 in gold bullion and nearly the same value in silver bullion was shipped from Silver City through Wells, Fargo & Co. Robert Williams shipped a carload of ore from his Ocean Wave mine to the International smelter at El Paso this week, and the smelter has contracted to take all he will ship. The ore runs from 50 to 60 per cent lead and good pay in silver. There seems to be quite a demand just now for lead ore. The Santa Fe Copper Co. last week issued the following order: To the foremen of the mines and smelters of the Santa Fe Copper Co.: You are hereby notified that you will be held personally responsible not to employ or keep in employment any man who gets drunk or is in the habit of frequenting gambling-houses. Such employes, whether miners, laborers, foremen, teamsters, etc., must be discharged at once, and will not be employed again by the company. This is done for the benefit of the camp and the employes generally.

UTAH.

REVIEW.—Salt Lake *Tribune*, April 6: Three months of the current year have now passed, with bullion receipts as follows in this city, excluding all ores:

January	$177 442 83
February	181,249 63
March	238 226 00
Total	$597,918 46

A number of producing operations are not reported herein, which do not make current reports. The week has been a dull one, so far as new enterprises are concerned, in the precious metals. But the bullion output was high for the week, and the movement of ore fair. For the week ending April 3d, inclusive, the receipts in this city aggregated $168,852, of which $111,967 was in bullion and $56,885 was in ore. The week previous the receipts were of the value of $93,468 in the aggregate, of which $53,768 was in ore and $39,700 was in bullion. The product of the Ontario for the week was from ore sales, 326,-926.13; bullion, 21,309.68 fine ounces; an approximate total of $48,235.81. The March returns are not all in, so that the statement for that month is not available. The total number of dividends paid by the Ontario, including that of March, 1889, is 154, amounting to $9,950,000. The Daly output for the week was of ore sold, $12,252.30; bullion, $10,267.-40; a total, approximately, of $22,519 70. The total dividends paid by the Daly number 25, and amount to $975,000, including that for March. The Horn Silver is doing very fairly in its preliminary and development work. It ships some ore, and has a reserve fund on hand sufficient to meet all ordinary and some extraordinary expenses; and that fund is growing. Fine bar receipts in this city were valued at $76,662 for the week; base bullion, $20,755. The Hanauer smelter produced bullion during the week valued at $14,200. Ore receipts in this city for the week were of the value of $37,260 by Wells, Fargo & Co., and $19,625 by McCornick & Co.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, April 11, 1889.

General trade continues steady, with buyers evidently pursuing a conservative course. Iron-workers still report "slow business." Much of this, no doubt, is due to the uncertainty regarding the future price of lumber. Many contractors do not wish to make bids on buildings and other work when both iron and wood are used, fearing that advances will be made in the price of lumber, which may entail heavy losses to them. The local money market is dull and inactive, with more funds offering than can be absorbed. The past week loans have been made on gilt-edged security at the rate of from 4 to 5 per cent a year. On realty there were placed nearly $300,000 at from 6 to 7 per cent a year. The mercantile community report collections fairly easy. The favorable outlook for large crops and the heavy deposit of snow in the mountain ranges are important factors in promoting a very hopeful confidential feeling. Exchanges on the East are easier.

The receipts of treasure by sea the past week aggregated $13,205.

In the month of March the shipments of treasure from this port aggregated in fine silver, $683,700; gold coin, $914,312; silver coin, $52,635; Mexican dollars, 457,635; currency, $491,301.

The amounts and descriptions of specie shipped from San Francisco in the first three months of the year compare as follows:

	1888.	1889.
Silver bars	$2,185,450	$2,082,200
Mexican dollars	928 620	1,507,078
South American dollars	2,208	41,131
Gold coin	1,100,228	2,910,017
Silver coin	7,300	42,450
Gold dust	160	670
Currency	249 980	531,301
Totals	$4,473,946	$7,114.847

The last steamer sailing for China took out in Mexican dollars $312,888; gold coin, $6425; gold dust, $70; silver bullion, $209,000. Total, $528,383.

SILVER—The market weakened off a fraction, then recovered, but shaded off to 92½c on yesterday, at which price our market is quoted weak at the close. London cables came through to-day quoting 42¾d, while New York was quoted at 92⅜c against press telegrams received yesterday of 92½c. The supply of bullion in our market is still very light, yet owing to the dull, inactive market, prices are barely sustained at New York quotations. The shipments to China are small compared to that made in Mexican dollars. The easier rates for exchange on the Eastern cities are against silver locally. Cablegrams report that the Indian Council bills have been allotted quite cheap, which combined with an easy money market in India, is against silver.

MEXICAN DOLLARS—The demand continues fairly good, absorbing about all received, at from 72¾ to 73¼c, according to quality. The price, contrary to former seasons, has not fluctuated with that of silver bullion.

QUICKSILVER—The market is quiet, but firm. Foreign advices indicate an improvement later on in the market. Receipts the past week were as follows: T. Bell & Co., 70 flasks; Parrott & Co., 40; W. B. Bradford, 34; Knox & Osbourne, 16; Haas Bros., 71. Total, 231 flasks.

COPPER—The market is quiet, pending final settlement of the affairs of the late French syndicate. Cablegrams encourage the belief that a settlement has been arrived at satisfactory to all interests, but the details are not, at this writing, obtainable, and until authoritative advices are received, conjectures are useless.

LEAD—The market is without change. The local demand is fairly active, but this usually obtains during the canning season.

TIN—The arrival Wednesday of 45,868 boxes tinplate has relieved the market, bringing in sellers for spot at from $5 to $5.25. At the decline there is more business. The shipments by water the past week were 164,162 lbs. of tinplate to Victoria, B. C. Foreign advices indicate that the syndicate which was reported to be forming will probably come to nothing, and the project be abandoned.

PIG IRON—The market is very quiet, but the tone is strong under firm holding, owing to advancing markets abroad. Consumers continue to pursue a conservative course, for they only buy in a hand-to-mouth way. The Puget Sound Iron Co., at Irondale, contemplates building a rolling-mill. The Moss Iron and Steel Works on Puget Sound will soon be ready for work.

BORAX—The market is quiet but steady. Receipts the past week aggregated 1664 ctls., while the shipments via Victoria, B. C., were as follows: 20,164 lbs. to Chicago, and 24,576 to Cedar Rapids, Iowa.

LIME—Receipts the past week aggregated 4,-468 bbls. The demand is good.

COAL—Imports the past week were as follows: From Tacoma, 5900 tons; Australia, 3959; Seattle, 7027; Coos bay, 650; Departure bay, 3838; Nanaimo, 815. Total, 22,189. For Cumberland the market is strong, owing to light stock and high freights. In English, the market is steady, but for Australian and coast, buyers are favored, or, in other words, the market is easy.

Eastern Metal Markets.

By Telegraph.

NEW YORK, April 11, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42¼	92¼	$14 50	$3 67	$21 25
Friday	42¼	92⅜	14 25	3 72½	21 19
Saturday	42¼	92⅜	14 25	3 67½	21 05
Monday	42 5-16	92⅜	14 50	3 65	20 95
Tuesday	42 5-16	92⅜	14 25	3 65	20 90
Wednesday	42⅜	92⅝	14 50	3 65	20 86

NEW YORK, April 11.—Copper remains without much actual business. Speculators seem banded to hold up prices until a more favorable understanding in relation to the winding up of the deal across the ocean can be obtained. Lake ingot was offered at 15½c for spot, or delivery in a month at 15c; May, 13½c; June and July, 13c, sellers option for the rest of the year; merchandise brands, 12@12¾c; early delivery. May to close of the year, from 10 4-5 down to 9½c. Pig lead, after easing off, closed steadier. Tin closed firmer, with the tendency upward. Pig iron has a firmer tone, due to the large consumption and light supplies.

Coal.

TO LOAD.

	Per Ton.		Per Ton.
Australian	$ 6 50 @ 7 00	Cardiff	9 50@10 00
Liverpool Cnl	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	16 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	8 00
Scotch Splint	9 00	Seattle	8 50
West Hartley	10 00	Coos Bay	8 00
Greta	9 00	Cannel	10 00
Westminster Brymbo	9 00	Egg, hard	10 00
Nanaimo	9 00	Cumberland, in sacks	18 50
Sydney	$ 9 00	do, bulk	17 00

Mining Share Market.

Trading in mining stocks the past week was more active, with Mexican and Union the leaders, under confirmed reports of an improvement in the former and important work going on in the latter. In the MINING AND SCIENTIFIC PRESS of December 22d it was stated that mention was made that when crosscuts were run in Mexican and Union from the 1465-foot Ophir drift running north, it was expected that ore bodies of value would be run into. In the Mexican this has been verified, and in Union, mining engineers are confident of still better results, provided the heat does not force the company to make an upraise to the 1300-foot level of Union for air connection. About ten years ago an important ore development was made in the 1300-foot level in Union, a winze sunk on the ore body, but work was discontinued, although the face of the winze is said to have been in rich ore. The news from Hale and Norcross is of an important character. The assay value of the ore is steadily increasing, as is the quantity of ore being milled. The work in the mine toward the west is very important. In Crown Point, preparations are being made to resume work in the crosscuts from the west drift on the 400-foot level. Advices from Mexican report the ore to be improving in value and of more importance than before claimed. From the other mines being worked on the Comstock, the news continues of an encouraging character, while preparatory work is either under way or will be soon inaugurated to resume explorations. From the Tuscaroras the news does not vary materially from that heretofore given. The same remarks are applicable to the Bodie and Quijotoa districts.

The past week the following assessments were levied: Occidental, 50 cents, Bulwer, 25 cents, and Found Treasure 12½ cents.

The ore yield of the Comstock mines during the week ended April 8th aggregated 6672 tons, as follows: Consolidated California and Virginia, 2896 tons, assay value of $30.10; Gould and Curry, 74 tons, assay value, $19.75; Best and Belcher, 40 tons, assay value, $38.50; Savage, 525 tons, assay value, $19 50; Hale and Norcross, 958 tons, assaying $30; Confidence, 497 tons, assay value, $34.21; Challenge, 22 tons, assay value, $34.21; Crown Point, 912 tons, assay value, $19.37; Overman, 248 tons; Alta and Justice, 500 tons. The bullion yield of the above was about $155,000.

An Electric Railway for Portland.

The Willamette Bridge Co. have accepted the Sprague Co.'s proposal to equip the Albina division of their street railway system in Portland, Oregon. The equipment is to include 1½ miles of track, five cars, 15-horse motors and a drawbridge.

A letter to Mr. J. L. Jayne, the agent of the company in this city, relative to this contract, is as follows:

PACIFIC BRIDGE COMPANY,
SAN FRANCISCO, April 2 1889.

J. L. Jayne, Esq., San Francisco—DEAR SIR: In answer to your inquiry of this date in regard to building an electric line at East Portland of the Sprague Electric Railway System, I would say that after our inquiries in the East in regard to your system, we have concluded to adopt it on our Portland and Albina line, believing it to be the best electrical railway system in use, and believing it to be the cheapest street railway system now in use, taking into consideration the advantages it has over steam, horse or cable railways.

Messrs. Swigert and Campbell, who run our Portland railroad, and are half-owners of the same, have made a careful study also of your system, and it was through them that I was induced to investigate your system, and both agree with me in adopting it.

We shall commence work on it at once, and expect to complete it in three months. Very respectfully yours,

R. W. GORRILL,
President Pacific Bridge Co.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Hale and Norcross, April 6, $16,030; Savage, 6, $19,736; Cons. California and Virginia, 6, $112,127; Gould and Curry, 6, $3381; Clip Consolidated, 6, $10,000; Savage, 8, $8200; Peerless, 8, $10,420; Crown Point, 6, $10,321; Mt. Diablo, 4, $7830—total for March, $36,348; Hanauer, 6, $1865; Alice, 6, $34,160; Bluebird, 6, $13,840; Cons. California and Virginia, 10, $76,404—total for March, $338,456; Mt. Diablo, 10, $8188; West Comstock, 10, $3000; Justice, 8, $3325; Lexington, 6, $26 224; Moulton, 6, $7888; Alice, 6, $33.000; Butte and Boston, 6, $23,920; Hanauer, 3, $4600; 6, $2500; Alice, 6, $34,160.

THE trouble between the colored coal miners imported into Roslyn by the Northern Pacific Company and the whites is not ended.

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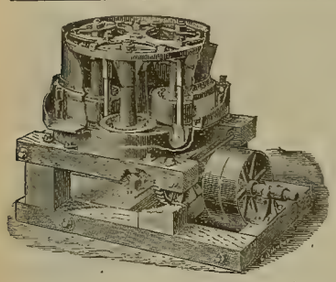

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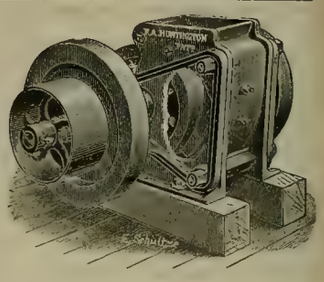

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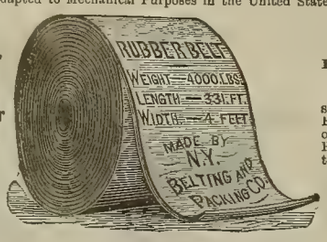

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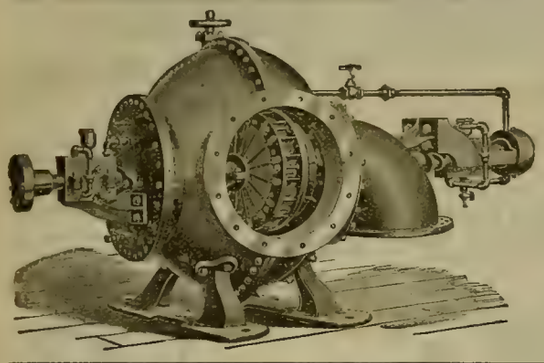

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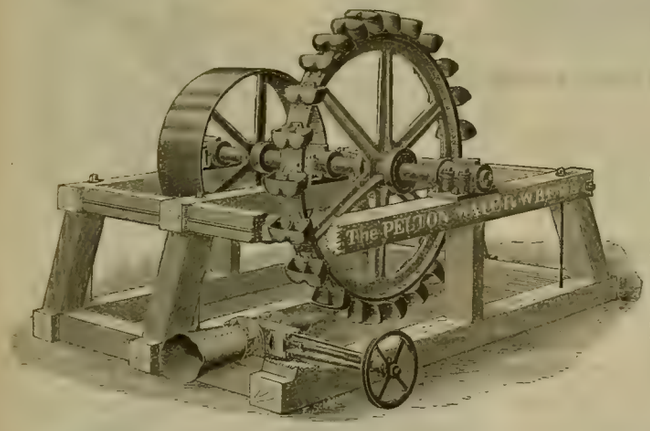

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COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Bodie Con M Co	California	10	50	Mar 25	Apr 30	June 4	B L Burling	309 Montgomery St
Calaveras Blue Gravel M Co	Cal	2	05	Mar 23	Apr 30	May 27	B Burris	240 Montgomery St
Crocker M Co	Arizona	6	10	Feb 25	Apr 2	Apr 24	A Waterman	309 Montgomery St
ChristyM Co	Utah	1	10	Feb 20	Mar 25	Apr 15	G R Spinney	310 Pine St
Eureka Con M Co	Nevada	11	50	Mar 19	Apr 27	May 20	H P Bush	306 Pine St
Exchequer M Co	Nevada	27	25	Apr 2	May 7	May 28	C E Elliott	309 Montgomery St
Gray Eagle M Co	California	12	05	Mar 19	Apr 23	May 14	O H Bogart	327 Pine St
Grand Prize M Co	Nevada	20	30	Mar 15	Apr 20	May 13	R R Grayson	327 Pine St
Laguna Con M Co	Nevada	1	03	Feb 23	Apr 25	June 5	J Stadfeld Jr	309 Montgomery St
Los Putos Coal, Iron & Mfg Co	Cal	1	1¼	Mar 25	Apr 30	May 20	W C Stedfeld	309 Montgomery St
Mexican M Co	Nevada	37	25	Mar 5	Apr 10	Apr 30	C E Elliott	309 Montgomery St
Mono M Co	California	27	10	Feb 28	Apr 2	May 8	B L Burling	309 Montgomery St
North Commonwealth M Co	Nevada	2	30	Apr 3	May 8	May 30	J W Pew	310 Pine St
North Peer G & S M Co	Arizona	5	05	Feb 25	Apr 1	Apr 24	H Deas	309 Montgomery St
Oak Con M Co	California	1	03	Feb 25	Apr 8	Apr 23	E J Ryan	230 Montgomery St
Occidental Cons M Co	Nevada	4	50	Apr 8	May 13	June 5	A K Dustron	309 Montgomery St
Peerless M Co	Arizona	12	25	Mar 25	Apr 26	May 21	A Waterman	309 Montgomery St
Piedmont M Co	Nevada	1	05	Jan 28	Mar 6	Apr 23	J J Scoville	309 Montgomery St
San Francisco Copper Co	California	3	10	Mar 18	Apr 23	May 21	G Ruegg	405 California St
Sierra Nevada M Co	Nevada	94	25	Mar 5	Apr 9	Apr 23	E L Parker	309 Montgomery St
Taylor M & M Co	California	17	3.00	Mar 20	May 1	May 18	A E Ball	Mechants Ex
Utah Con M Co	Nevada	6	25	Mar 5	Apr 10	Apr 29	A H Fish	309 Montgomery St
Western Mineral Co	California	3	2 00	Feb 21	Mar 26	Apr 16	A Chemicant	328 Montgmery St
Yellow Jacket M Co	Nevada	46	50	Mar 28	May 1	June 1	W H Blauvelt	Gold Hill

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Bullion-Beck M Co	Utah	A Badlam	322 Montgomery St	Annual	Apr 24
Live Oak Drift G M Co	California	J Morizio	328 Montgomery St	Annual	Apr 15
Navajo Queen M Co	Nevada	J F Holling	526 Kearny St	Annual	Apr 16
Pacific Borax, Salt & Soda Co		A H Clough	230 Montgomery St	Annual	Apr 10
Russell Reduction & M Co	California	J Morizio	328 Montgomery St	Annual	Apr 22

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M C	Nevada	A S Chemicant	328 Montgomery St	08	Mar 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 21		WEEK ENDING Mar. 25.		WEEK ENDING Apr. 4.		WEEK ENDING Apr. 11.	
Alpha	1.80	2.15	1.75	1.90	1.55	1.80	1.70	1.75
Alta	2.00	2.15	1.95	2.10	2.15	2.25	2.15	2.25
Andes	.90	.95	.80	.90	.75	.80	.75	.80
Argenta	....	....	....	....	....	.05	....	....
Belcher	2.80	3.25	2.75	3.30	3.05	3.50	3.15	3.35
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	4.20	4.65	3.75	4.30	3.75	4.15	4.00	4.35
Bullion	.85	.95	.75	.85	.70	.80	.75	.85
Baltimore	.40	.45	.35	.45	.25	.35	.25	.35
Belle Isle	....	....	....	.30	.25	.30	....	....
Bodie Con	1.45	1.50	1.25	1.35	1.00	1.20	1 00	1.20
Benton	....	....	3.85	4.00	....	3.75	3.50	....
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	....	.35	....	.40	.30	.35	.35	....
Con. Va. & Cal	8.25	8.75	8⅛	8.50	8⅛	88	7⅞	8.50
Challenge	4.15	4.75	3.90	4.20	3.75	4.00	3.70	3 85
Champion	....	....	....	....	....	....	....	....
Chollar	2.40	2.8	2.10	2.60	2.10	2.40	2.10	2 40
Confidence	13⅞	14⅛	12½	13⅜	112	12⅛	12⅜	15⅜
Con. Imperial	.60	.75	.60	.65	.55	.65	.55	.60
Caledonia	.35	.45	.35	.40	.30	.35	.30	.35
Con. Pacific	.15	.20	....	.20	....	....	....	....
Crown Point	4.60	4.95	4.10	4.50	3.70	4.35	3 85	4.25
Crocker	.45	.50	.45	.55	.45	.60	.55	.60
Central	....	.25	....	....	....	....	....	....
Dudley	.20	.25	.20	.30	....	.25	.30	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	2.00	1.00	1.25	.75	1.20	1.15	....
Exchequer	.80	.90	.75	.85	.65	.75	.60	.70
Grand Prize	.70	.90	.65	.75	.65	.8.	.70	.75
Gould & Curry	2.65	2.35	2.25	2.65	2.20	2.50	2.30	2.50
Hale & Norcross	3.70	4.00	3.65	3.95	4.05	4.45	4.15	4.50
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	.30	.40	....	....	....	....	.35	....
Justice	1.50	1.65	1.25	1.55	1.20	1.30	1.20	1 25
Kentuck	1.80	2.00	....	....	1.65	1.75	....	....
Lady Wash	.35	.40	....	.35	....	.40	.35	....
Martin White	....	....	....	....	....	....	....	....
Mono	.75	.80	.60	.73	.50	1.00	1.25	1.30
Mexican	3.60	3.95	3.05	3.70	3.00	3 45	3.35	4 45
Mt. Diablo	....	2.00	....	2.25	....	....	2.75	....
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.00	1.05	1.10	1.15	.95	1.10	1.00	....
North Belle Isle	2.55	2.60	....	....	2.50	3.0	2.90	3.00
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.90	3.05	2.75	2 35	2.85	3.00	2.95	3.00
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.35	1.45	1.25	1.30	1.20	1.3	1.00	1.20
Ophir	5⅛	6.50	5.00	5⅛	5⅛	5⅝	5⅛	5⅝
Overman	1.40	1.50	1.25	1.40	1.25	1.30	1 20	1.30
Potosi	2.15	2.35	1.85	2.30	1.85	2.15	1.85	2.75
Peerless	.40	.60	.45	.65	.40	.45	.40	.50
Perr	....	....	.30	.35	....	....	.30	.35
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.75	3.00	2.50	2 80	2.40	3.00	2.60	2.80
S. B. & M	2 75	3.05	2.20	2 95	2.65	2 80	2.70	2.90
Sierra Nevada	3.00	3.30	2.60	3.00	2.50	2.80	2.95	3.30
Silver Hill	.60	.70	....	....	.50	.55	.50	....
Silver King	....	....	....	....	....	.85	....	....
Scorpion	....	.55	.50	.55	.45	.50	.50	.55
Syndicate	....	.10	....	....	....	....	....	....
Union Con	3.70	3.90	3.10	3.70	3.05	3.10	3.30	4 05
Utah	1.25	1.35	.90	1.30	.80	1.45	1.15	1.30
Yellow Jacket	3.80	4.10	3.30	4.05	3.25	3.80	3.25	3.40
....	....	....	....	....	....	....	....	....

Sales at San Francisco Stock Exchange.

THURSDAY, Apr. 11.

100	Alta	2.05	
200	Belcher	3.25	
150	B. & Belcher	4.15	
10	Bodie	1.10	
150	Bulwer	30c	
150	Bullion	70c	
100	Baltimore	25c	
50	Chollar	2.15	
100	Con Va & Cal	8.00	
300	Grand Prize	70	
200	Con Imperial	55c	
170	Gould & Curry	2.30	
450	Hale & Nor	4.20	
100	Julia	30c	
200	Mexican	4.15	
350	N. Belle Is	2.70	
300	Overman	1.25	
50	Ophir	5.25	
300	Occidental Con	1.00	
300	Potosi	1.75	
100	Peer	35c	
100	Peerless	45c	
170	Savage	2 65	
150	S. B. & M	2.55	
100	Sierra Nevada	3.10	
150	Utah	1.25	
505	Union	3.80	
300	W Comstock	40c	
300	Weldon	25c	
200	Yellow Jacket	3.15	

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THE Cons. California and Virginia M. Co. worked last month 11,783 tons of ore. Total bullion produced—Gold, $152,300.95; silver, $186,155.07; total, $338,456.02. Average yield in bullion per ton, gold, $12.92; silver, $15.79; total, $28.71. Average assay value of the ore per ton, $33.89.

The Death of D. K. Regar.

S'owly and solemnly, to the dirgeful strains of the Elkhorn Brass Band, a long procession moved off to follow the remains of D. K. Regar to their last resting-place. Mr. Regar was well known in mining circles in Nevada, California, New Mexico and Arizona. He was foreman of the Elkhorn Mining Co.'s property, of which Mr. J. W. Ponder is General Superintendent, and had been with him a number of years. On the morning of the 20th of March a large piece of shale fell upon him from the hanging-wall, breaking six of his ribs and making a compound fracture of his left leg above the ankle. All that care and medical skill could do was done for him, but he rapidly sank under his severe injuries and expired at 4 P. M. on the 21st. The large number of mourners who followed in the long funeral pilgrimage of 18 miles attest more strongly than words to the esteem in which the deceased was held by the community. He was buried at Boulder, in the cemetery of the I. O. O. F., under the auspices of that order, of which he was a member. *Requiescat in pace.*

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THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Leller, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide. Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No 1, 32 ft.; No. 2, 94 ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

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NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 19th day of March 1889, an assessment, No. 12, of Five Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Room 9, No. 327 Pine Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23d day of April, 1889, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 14th day of May, 1889, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

O. H. BOGART, Secretary.

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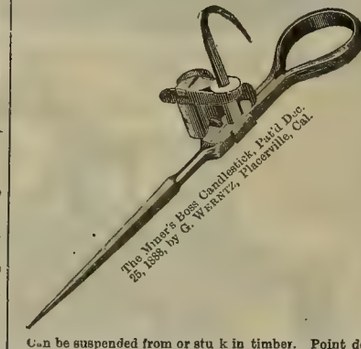

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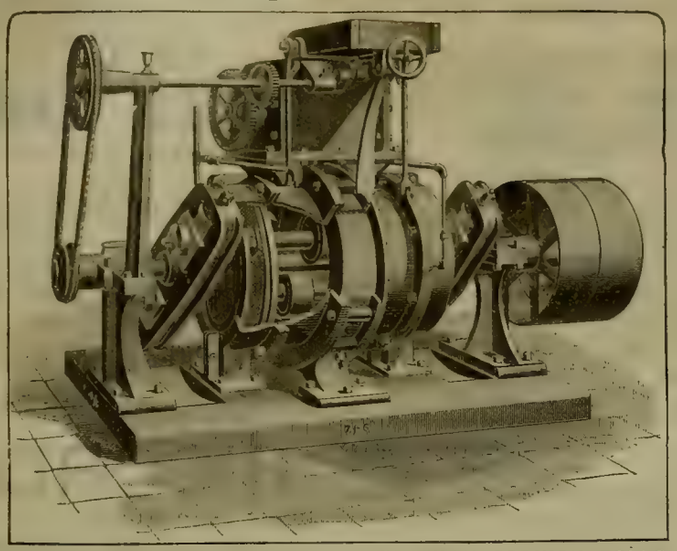

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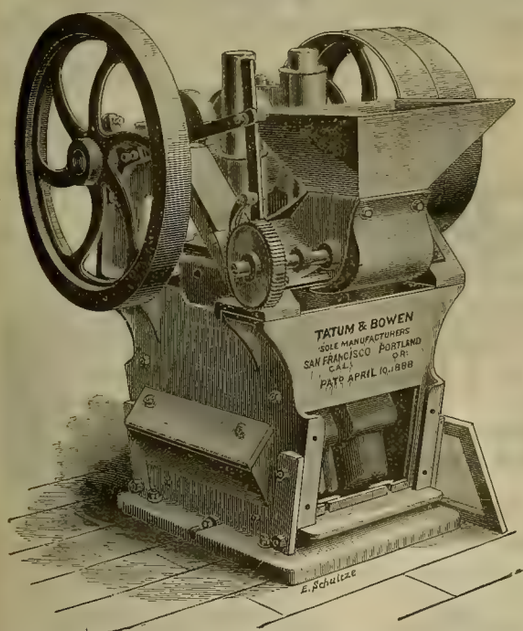

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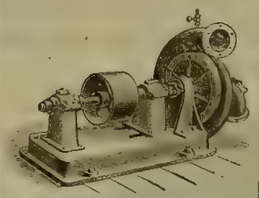

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SECOND-HAND BOILERS AND OLD MACHINERY
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.....MANUFACTURERS OF.....
Cast Steel Castings and Steel Forgings
UP TO 20,000 LBS. WEIGHT.
True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.
GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.
—ALSO—
HOMOGENEOUS STEEL, SOFT and DUCTILE, SUPERIOR TO IRON FOR
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ALSO Steel Rods, from ¼ to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shape Steel Wagon, Buggy, and Truck Tires, Plow Steel; Machinery and Special Shape Steel to size and lengths **STEEL RAILS** from 12 to 45 pounds per yard. ALSO, **Railroad and Merchant Iron,** Rolled Beams, Angle, Channel, and T Iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes; Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.
HIGHEST PRICE PAID FOR SCRAP IRON AND STEEL.
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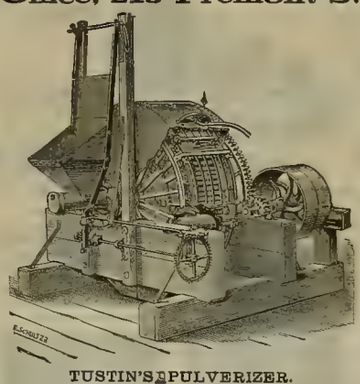
FULTON IRON WORKS,
HINCKLEY, SPIERS & HAYES, Proprietors.
[ESTABLISHED IN 1855.]
Office, 213 Fremont St., San Francisco.



TUSTIN'S PULVERIZER.

—MANUFACTURERS OF—
MARINE ENGINES AND BOILERS.—Propeller Engines, either High Pressure or Compound, Stern or Side-wheel Engines.
MINING MACHINERY.—Hoisting Engines and Works, Cages, Ore Buckets, Ore Cars, Pumping Engines and Pumps, Water Buckets, Pump Columns, Air Compressors, Air Receivers, Air Pipes.
MILL MACHINERY.—Batteries for Dry or Wet Crushing, Amalgamating Pans, Settlers, Furnaces, Retorts, Concentrators, Ore Feeders, Rock Breakers, Furnaces for Reducing Ores, Water Jackets, etc.
MISCELLANEOUS MACHINERY.—Flour Mill Machinery, Saw Mill Engines and Boilers, Dredging Machinery, Powder Mill Machinery, Water Wheels.

Tustin's Pulverizer
WORKS ORE WET OR DRY.

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Either for use on Steamboats or for use on Land.
Water Pipe, Pump or Air Columns, Fish Tanks for Salmon Canneries
OF EVERY DESCRIPTION.
Boiler Repairs Promptly attended to and at very moderate rates.
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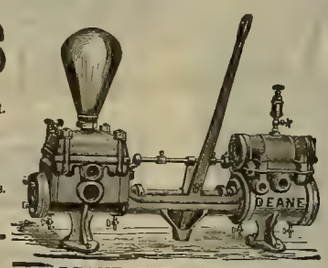
Deane Steam Pump.
SPECIALTIES:
Corliss Engines and Tustin Ore Pulverizers.
Agents and Manufacturers of the Llewellyn Feed Water Purifier and Heater.



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Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as
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GIANT POWDER or DYNAMITE,
Of Different Strengths as Required.
NOBEL'S EXPLOSIVE GELATINE," which contains **94 per cent of Nitro-Glycerine,** and **GELATINE-DYNAMITE, Stronger than Dynamite** and even Safer in Handling.
JUDSON POWDER IMPROVED.
FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.
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CAPS and FUSE for Sale GENERAL AGENTS, SAN FRANCISCO CAL.

QUARTZ SCREENS
A specialty. Round, slot or burred slot holes. Genuine Russia Iron, Homogeneous Steel, Cast Steel or American planished Iron.
Zinc, Copper or Brass Screens for all purposes. California Perforating Screen Co., 145 & 147 Beale St., S. F.

COAL MINES OF THE WESTERN COAST.
A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for $2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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Manufacturers of
SPAULDING'S
Inserted Tooth
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CHISEL BIT
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Engineers' Tables of Progress
WITH MAPS, ILLUSTRATIONS
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DR. RICORD'S RESTORATIVE PILLS, a specific for exhausted vitality, physical debility, wasted forces, nervous derangements, constitutional weakness, etc., approved by the Academy of Medicine, Paris, and the medical celebrities of the world. Agents, **J. G. STEELE & CO., 635 Market Street Palace Hotel, San Francisco, Cal.**
☞Sent by mail or express anywhere. Box of 50, $1.25; of 100, $2.00; of 200, $3.50; of 400, $6.00; preparatory pills, $2.00.
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Laundry Free for the use of Families
HOT AND COLD BATHS FREE.
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ROOMS WITH OR WITHOUT BOARD.
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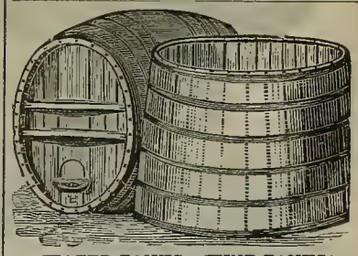

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ALL KINDS OF CASKS, TANKS, Etc.
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ALL SIZES.
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Iron cut, punched and formed, for making pipe on ground All kinds of Tools supplied for making Pipe. Estimates given. Are prepared for coating all sizes of Pipe with a composition of Coal Tar and Asphaltum.

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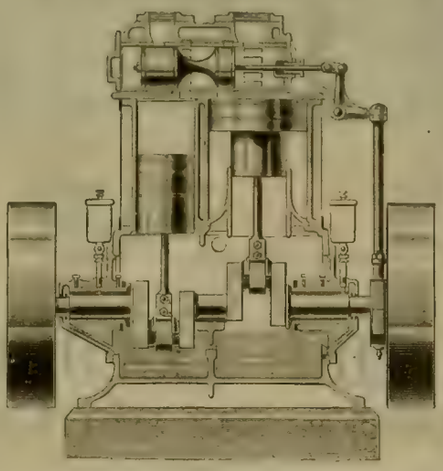
Golden Gate Concentrators,
GREATEST CAPACITY
OF ANY CONCENTRATOR MADE,
One Machine Taking Pulp from 10 Stamps.



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SALES DURING LAST FOUR MONTHS:

COMPOUND, 44 ENGINES, 5215 HORSE POWER. STANDARD, 99 ENGINES, 4500 HORSE POWER. JUNIOR, 166 ENGINES, 4260 HORSE POWER.

Grand Total, 309 Engines, Aggregating 13,975 Horse Power.

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1850. 1888.

—BUILDERS OF—

MINING MACHINERY.

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PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 38 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

THE GATES CRUSHER

Is beyond all question the most important improvement that has ever been made in this class of mining machinery. It will do more than twice the work with a given amount of wear than any other Crusher made, besides crushing so much finer that for mining uses, the capacity of the mill is greatly increased. It has the same relative superiority for macadamizing purposes, affording the cheapest and most reliable machine for this use.

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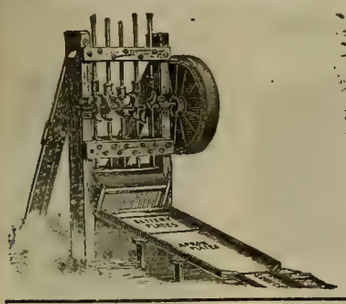
PACIFIC IRON WORKS,

NO. 127 FIRST STREET, - - - - SAN FRANCISCO, CAL.



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SILVER-PLATED AMALGAM PLATES for SAVING GOLD

IN QUARTZ, GRAVEL AND PLACER MINING.

PRICES GREATLY REDUCED.

Only Refined Silver and Best Copper used. Over 3000 Orders filled. Fifteen Medals Awarded. Old Mining Plates can be Replated. Old Plates Bought, or Gold Separated.

These Plates can also be purchased of JOHN TAYLOR & CO., Corner First and Mission Sts.

San Francisco Gold, Silver and Nickel Plating Works, 653 & 655 Mission St., San Francisco, Cal., E. G. Denniston, Prop'r.

Our Plates have been used for 20 years. They have proved the best. We adhere strictly to contract in weight of Silver and Copper. SEND FOR CIRCULAR.

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For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER

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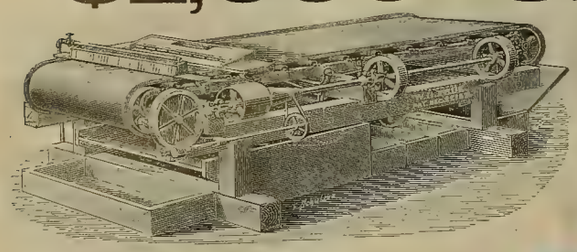
HYDRO-CARBON ASSAY FURNACES

$1,000 CHALLENGE!



PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS ($575.00) F. O. B.

OVER 2200 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at **220 FREMONT ST., SAN FRANCISCO.**

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIRS:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

—— THE ——

FRUE ORE CONCENTRATOR OR VANNING MACHINE.

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ADAMS & CARTER, Agents Frue Vanning Machine Co.,

232 Market Street, - - - - - - - SAN FRANCISCO, CAL.

WM. H. TAYLOR, President. R. S. MOORE, Superintendent.

Risdon Iron and Locomotive Works,

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FOR MINING AND IRRIGATION PURPOSES.

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—AND—

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—AND—

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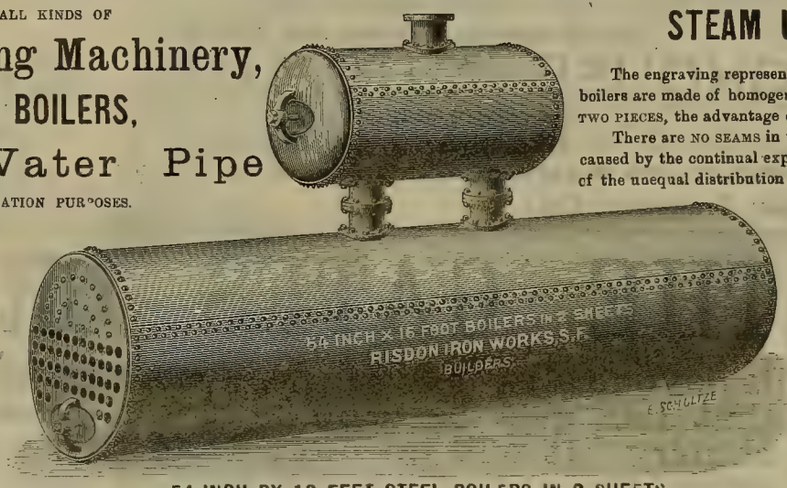


54-INCH BY 16 FEET STEEL BOILERS IN 2 SHEETS.

STEAM USERS, ATTENTION!

The engraving represents our standard 54 in. x 16 ft. Boiler. These boilers are made of homogeneous STEEL, and the shell, as shown, being in TWO PIECES, the advantage of this will be readily appreciated by steam users.

There are NO SEAMS in the fire to leak, nor loose rivets to contend with, caused by the continual expansion and contraction of the plate on account of the unequal distribution of the heat under the boiler, the bottom presenting a smooth, even surface which can be easily cleaned. We place a manhole at the back end above the tubes, and one in the front end under the tubes.

The FRONT MANHOLE gives free access to the sheet over the fire, THE VITAL PART OF EVERY BOILER. This point is often overlooked by purchasers, and boilers are supplied with a small hand hole, and the remaining space filled with tubes which allows absolutely no access for cleaning, and in a short time tubes and sediment are one solid mass, and instead of gain in efficiency by a few feet of tube surface, the result is a positive loss.

SPECIFICATION OF BOILER AND FIXTURES:

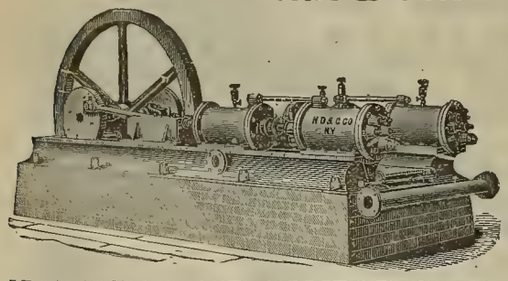
1 Boiler, 54 inches diameter by 16 feet, with 46 3½ inch tubes; Shell, 5 16; Heads, 7-16.
1 Steam Drum, 36 inches diameter by 72 inches long.
1 Breeching.
1 Smokestack, 30 inches by 60 feet, Nos. 12 and 14 Iron.
300 feet galvanized strand for Guys.
1 C. I. Front, complete.
1 Foundation Plate for front.
1 Set Grate Bars for coal or wood.
1 Back Bar Bearer.
1 Ash Cleaning Door and Frame.
1 Back Arch Plate.
1 Set Binder Braces and Bolts for Brickwork.
1 Stand for back end of Boiler.
1 Steam Gauge and Syphon.
1 Glass Water Gauge, complete, with column and 3 Gauge Cocks.
1 Safety Valve.
1 Stop Valve.
1 Feed Valve.
1 Blow-off Valve.
1 Check Valve.

These Boilers are tested to 150 pounds hydrostatic pressure and are intended for a working pressure of 100 pounds. Total weight of Boiler and fixtures, 17,000 pounds.

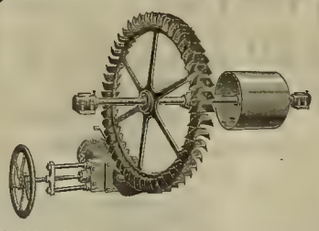
☞ BOILERS ON HAND READY FOR SHIPMENT. ☞ SEND FOR CIRCULARS.

COMPRESSED AIR and WATER POWER MACHINERY.

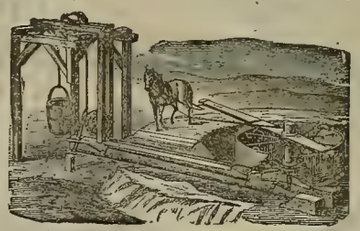
RIX & FIRTH, 225 and 227 First St., San Francisco.



NATIONAL AIR COMPRESSORS.
SINGLE OR DUPLEX, STEAM OR BELT POWER.
62 Sold on the Pacific Coast.



KNIGHT'S WATER WHEEL,
—FOR—
MILLS, PUMPING AND HOISTING.
Over 300 in use. All estimates guaranteed. Send for Circular.



MINERS' HORSE WHIM.
All wrought iron. No gears, no breakage. One horse will easily handle rock or water to a depth of 350 feet, giving entire satisfaction to the prospector. Price, complete, $200. 150 sold on this Coast.

NATIONAL ROCK DRILL.
200 Sold on this Coast. Has less repairs than any other Drill.

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SPRAGUE ELECTRIC RAILWAY AND MOTOR CO., OF NEW YORK.

LOW-GRADE ORES CAN BE PROFITABLY WORKED BY ELECTRIC TRANSMISSION OF POWER FROM DISTANT WATERFALLS.

Plants will, in many cases, pay for themselves in from 1 to 5 years by the saving produced by Electric Transmission compared with other systems.

Suspension and Surface Tramways, Hoists, Pumps, Drills, Stamp-mills, etc., operated by Electric Motors.

☞ FOR FURTHER INFORMATION, CIRCULARS, ESTIMATES, ETC., APPLY TO

JAYNE & DUNCAN, Agents, Room 8, No. 328 Montgomery St., San Francisco, Cal.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO. Publishers.

SAN FRANCISCO, SATURDAY, APRIL 20, 1889.

VOLUME LVIII Number 16.

California Salt.

The most important mineral industry in Alameda county is the recovery of salt from the waters of San Francisco bay. This business is carried on extensively upon the east shore of the bay, in the neighborhood of Alvarado and Mt. Eden. At the former place Messrs. Plummer, Barton, Quigley and others have their works; at Mt. Eden are the works of P. Marsicano and the Union Pacific. Two methods are employed in Alameda county for the recovery of salt from sea-water. One is by complete natural evaporation and gathering the residue; the other by allowing tanks of sea-water to evaporate until a saturated solution is obtained, from which the salt is recovered as it crystallizes.

The first process is in use in the salt-ponds of the Messrs. Quigley of Alvarado. At these works a pond covering 400 acres and surrounded by a levee, is filled with sea-water at spring tide. This pond is divided into tanks. There are three tanks side by side, covering an area of 400 acres. As the density of the water in the tanks increases by evaporation, it is pumped by windmills from the two outside tanks to the center one until it is filled with strong brine. This brine is then pumped into a reservoir of 30 to 40 acres in extent, which is filled to a depth of 12 to 13 inches.

Here the density of the liquid rapidly increases, and the salt commences to crystallize. When a crust one and a half inches in thickness has formed upon the floor of the pond, the salt is scraped up. After gathering the salt, whatever mother liquor (bittern) remains is run off, no effort being made to recover any of the elements it may contain. The best and whitest salt is obtained in warm, windy weather, the wind forming ripples in the solution, which wash the rapidly forming crystals. In still, hot weather the salt has a yellow tinge. It takes about three years for a pond to get into a suitable condition for the production of salt. In that time a peculiar "skin" grows over the bottom, this protecting the solution from contamination by earthy matter. These works have been running for twenty years. Their output has been from 2500 to 3000 tons per annum. The second process is in use at the California and Union Pacific Salt Works, in the vicinity of Mt. Eden.

SALT POND AT ALVARADO.

The works of the California Salt Company are situated about half a mile southwest from Mt. Eden railroad depot. The plant consists of 50 salt ponds, which are arranged in "schools" (rows), together with several large reservoirs, one of which is three miles in circumference, the whole covering 2000 acres of land. The sea-water is let into the larger reservoirs, and from there is pumped by windmill into the smaller ponds, and from one pond into another, each pond increasing in the density of its solution. When a saturated solution has been obtained the salt crystallizes upon the surface; it then falls to the bottom of the liquid, where it accumulates. When it has collected to a depth of three or four inches, it is raked out and piled on platforms to dry. The crude material thus obtained is shipped from these works to San Francisco, where it is manufactured into the finer grades of salt by the American Salt Co. In their works the salt is placed in galvanized iron driers, heated by steam, each drier having a capacity of 22 tons per day. When thoroughly dried it is ground in burr-mills to various degrees of fineness, for dairy and household use. The capacity of the California Salt Works at Mt. Eden is 15,000 tons per annum; that of the mills of the American Salt Co. in San Francisco 1200 tons per month. The cuts show a salt pond at Alvarado and the grounds of the California Salt Works. For these and for the information herein we are indebted to the State Mining Bureau.

CALIFORNIA SALT WORKS, ALVARADO, CAL.

THE COPPER CORNER.—It is learned through a private letter from Paris that the American representatives at the Copper Conference desire to fix the price at £40 to £45 per ton. The Rio Tinto people want it fixed at £35, while the bankers interested desire it placed at £50. There is some talk of reconstructing the Societe des Metaux with Secretan as manager. Secretan attributes the collapse of the syndicate to the bankers, who insisted upon a high price instead of allowing a steady rise. The letter intimates that the Calumet and Hecla may make the price of copper, without regard to the Frenchmen, by combining with the Anaconda and Tamarack, but does not want to force the suspension of the production of other Lake Superior mines.

Displacing a Stamp-Mill.

In Old Diggings, nine miles north of Redding, on the east side of the Sacramento river, in Shasta county, is the Texas and Georgia mine, consisting of two claims bearing these respective names. The mine has prospected well and is turning out a lot of good ore.

Mr. Fleming ran arastras on the claim for three years and then sold to Hart & Day, who put up a five-stamp mill, getting as returns from $8 to $15 per ton from the rock. The mill burned down and Hart sold out, but Day not being a miner, the original owner, Fleming, took the mine back and Hart joined him. These two then commenced taking out ore, sorting it and shipping it to the Selby Lead Works, though the mill had in the meantime been rebuilt. They have shipped about seven or eight carloads of sorted rock, leaving about 450 tons of the refuse or low-grade ore. About one-tenth of all taken out was shipped.

Lately they have displaced the stamp-mill for a Dodge rock-breaker and pulverizer, which work very finely on this ore. After shipping the selected ore, the balance yields about $10 a ton in the Dodge machines. They obtain as much from the ore now, after the "cream" of it has been shipped, as they did out of it all under the mill system. One of the owners, who was recently in the city, gives us this information, and says that as far as tested the rock-breaker and pulverizer together take much less power and fuel than the stamp-mill itself did.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS

Tuolumne Mines.

EDITORS PRESS:—The Golden Gate mine is situated about one mile south of Sonora, and on the east of Woods Creek. The vein is large in size—from 3 to 12 feet thick. The quartz generally is of a grayish-blue color, lined by ribbons of arsenical pyrites; besides, the same base metal permeates the whole mass of rock, yielding about 3 to 3½ per cent of high-grade sulphurets when concentrated. The formation is magnesian slate, heavy mineralized, of which is the hanging-wall, with a small gouge under it.

The foot-wall is magnesian diorite dyke. The vein between the walls will average four feet, and appears to grow richer as depth is attained, being more solid and compact and gaining in percentage of sulphurets. I find assays made by Messrs. Riotte & Luckhardt, Falkenau & Reese and other responsible metallurgists, ranging from $573.30, $733.28, $1012.72, $1020.69, $8300.47. The latter is exceedingly high grade, far above average, but by careful treatment and close concentration of the finer grade of sulphurets, they being the richest, of a dark gray-steel color, I consider $1000 per ton should be realized on an average.

The vein cuts the slate at an angle of 15° to 20°, and this is the cause of getting such very high-grade metal, such being found where crossings strike the vein matter. In my experience where veins conform and run with the slates the yield of gold will be more regular, but certainly not so rich. These sulphurets yield easily to the chlorination process. With economy in the treatment and management generally, a grand margin of profit must result.

The mill can be run by water-power (free), turbine-wheels the most advantageous. There being only an elevation of 30 feet, high-pressure wheels cannot be used satisfactorily. The ditch is excavated to millsite and in working order. There is a reverberatory furnace that needs some repair; capacity, 2½ tons per charge. The bed and crown is constructed of steatite, of very pure quality, found about a mile from the mine. A most commodious dwelling and boarding house and out-buildings, etc., are to be seen adjacent to the reduction works. A good buggy-road leads into the property.

I now ascend the slope of the hill to mine to No. 1 shaft, hoisting works, blacksmith-shop, etc. This shaft is sunk 171 feet from collar and operated by a horse-whim, but Messrs. W. G. Long & Co., who are opening up and developing under a working bond, contemplate immediately putting in a hurdy-gurdy wheel, with suitable hoisting gear, to enable them to more rapidly and efficiently proceed with their explorations.

The water will be provided by the Tuolumne Water Company at so much per inch, at an elevation above shaft of 130 feet vertical.

On descending the shaft, which is in size 5x12 feet in the clear, and is most thoroughly and securely timbered, following down on the vein the whole distance sunk, we stop at the 100-foot level, which is opened 30 feet to north and south, each way disclosing a good four-foot vein, showing same character of sulphurets as before described. Descending to bottom of shaft to No. 2 level, which is drifted north 170 feet, passing through a fine vein of from four to five feet, the entire distance glistening with the rich arsenical sulphurets—in places showing a heavy percentage. From this point to apex of mountain in vertical hight is 471 feet. This is a very important prospective piece of work, and should be continued north to boundary of the mine, being quite deep enough to prove the value of the property; it will intersect the shoots found in upper works, from which 14,000 tons of rock has been extracted and reduced, yielding an average of $15 per ton. This was worked in 1873-4-5-6. The appliances at that time in the treatment of ore were crude and expensive. What would not pay large profits at that time, will now pay handsomely with greater and more perfect facilities. Furthermore, the sulphurets improve in value and percentage as depth is attained. Coming to the surface, I find the old tunnel through which the mine was stoped out to apex of mountain, on one shoot 200 feet long. This tunnel was entered 320 feet, but not far enough north to intersect the north shoot. A winze was sunk 92 feet that gave exceedingly rich rock, where the $8000 assay came from. This point has not been reached or passed under by No. 2 level, in No. 1 shaft. These old works are all full of water and much caved, but it is being effectually drained day and night by whim at No. 1 shaft.

Passing to apex of mountain, I find the vein cropping out boldly to northern boundary, over 1000 feet; in places 10 to 12 feet of solid quartz, here to a depth of 40 feet free gold was found, that paid in arastra $8 to $48 per ton, but afterward, when the oxidized rock was passed, the gold was no longer free, but same character of sulphurets is here met with that is found to the south. Evidence before me shows clearly the gold run or pay shoot must be fully 1000 feet in length, for the shoots far out in depth at No. 2 level, No. 1 shaft, prove the statement so far opened on.

The same formation with dyke is found over the entire area of the mine, which is 2900 feet by 600 feet, held in two locations. Through the courtesy of the superintendent, Mr. Long, I was escorted over and through the property. He is a thoroughly practical miner of over a quarter of a century of experience in quartz-mining. The works in progress show his sound judgment and excellent capabilities in conducting and developing the mine in his charge. I look forward to see this property in the near future a large producer of the precious metal, as the gentlemen now operating mean to run it to its full capacity. Such sagacity deserves success.

ARGUS.

Calaveras County Mines.

[From our Own Correspondent.]

At Indian Creek district, 3½ miles north of Murphys, Messrs. Cunliffe and Driver are running their five-stamp mill on quartz from their Horseshoe mine, which is opened by a 140-foot tunnel crosscutting the 16-inch vein of $18 rock at a depth of 60 feet. They are also the owners of the Hercules mine—No. 1, which is opened by a shaft 150 feet deep on 18-inch vein of $16 rock; No. 2 is opened by shaft 130 feet deep on 4-foot ledge of $10 rock; Caledonia, a 12-inch vein, of $12 rock; the Sunflower, an eight-foot ledge running $4 in free gold and carrying a large percentage of sulphurets. All of these ledges are in the immediate vicinity of their mill. Country rock is slate. They have their own water for power to mill, during the winter months, and will put in an engine to carry them through the dry season. This interesting group of mines can be connected with the Union Water Co.'s ditches and have all the fall required for power.

Sheep Ranch.

The Sheep Ranch mine of J. B. Haggin & Co. is the leading property of the camp. At this time the shaft is down 1100 feet on the two-foot ledge, with a shoot 600 feet in length to stope from, 20 stamps crushing 2¼ tons to the stamp in 24 hours. There is a force of 63 men. Miners' wages are $2.50 a day.

The Tom Smith mine is opened by a 300-foot tunnel, cutting an 18-inch vein of $17 rock, 150 feet deep. In the Anderson mine an 80-foot shaft shows up a 14 inch vein of $12 rock. These mines are the property of Mr. G. Rodeseni of Mt. Ranch. At El Dorado (Mt. Ranch), Mr. Rodeseni has opened up the Rose Hill mine by a 172-foot shaft, and two tunnels cutting the 18-foot ledge 500 feet deep. There is a 10 stamp mill running by water-power; the quartz mills $5 to the ton. The Gaston Hill property is also owned by Mr. Rodeseni and is developed by a 103-foot shaft on a 20-inch vein of $15 rock.

Railroad Flat.

The quartz mines of this section are looking very promising at this time, though the most of the mines are in the prospecting stage. The Last Chance shaft is now down 40 feet on a two foot vein, milling $20 a ton.

New York mine has a shaft down 140 feet on an 18-inch ledge and the mill is just starting up.

Henry Seemans has a 40 foot shaft with $10 rock in a 20-inch vein.

Beal & Cook have a 75-foot shaft on a two-foot ledge of $20 rock, which is worked by arastra.

Bilse & Ellsworth have a 75-foot shaft on a 10-inch vein of ore, milling $29 50 a ton.

Houst, Beal & Cook have a 30-foot shaft on a 4-foot ledge of $10 rock.

West Point.

About two years ago some San Francisco merchants came into this camp, and becoming excited over the high grade of the ores, bonded everything in sight. Work was begun on a number of the mines, but the steel-like hardness of the granite in which the veins run proved too much for their limited capital, attachments following. With the shutting down of the mines the miners went back to prospecting. Their labor is now bearing fruit in a large number of fine prospects, some of which have been sold. A number of the old mines have passed into other hands able to work them, thus making the coming season promising for the mining interests of the camp. Here, as at Soulbsyville, in Tuolumne, where the same granite and sulphuret ores occur, the veins pinch at from 25 to 200 feet, and then in sinking through 25 to 100 feet of this pinch the veins widen out and are rich. So far all of the mining has been done by hand drill, at an expense of $5 to $15 a foot in drifting. The one thing needed is power drills.

The Blazing Star is owned by Moore, Danford & Page. This property is opened by a 230-foot shaft on a five foot vein of $140 rock, carrying six per cent of sulphurets. Ores are crushed in the company's three-stamp mill.

The Lockwood is perhaps the best-known mine in the camp. At present the company is working to develop larger ore reserves, though at this time they have sufficient ore in sight to run them six months. They have developed the vein by shaft to a depth of 300 feet. Their five-stamp mill is now running and the owners are confident of opening up as large and valuable ore bodies as the Lockwood has shown in the past. Then but 50 per cent of the ore's value was saved, but now close to 100 will be caught.

The Lone Star property will shortly be equipped with a 20-stamp mill, which will soon place it on record.

Mr. Courtiss is developing the Soap Root property, with every prospect of its proving a valuable mine. Miners' wages, here as elsewhere in the county, $2.50 per day. Mr. Carlton's custom arastra is running steadily on rock from the numerous prospects in and about West Point.

Glencoe.

Mr. T. W. Knox is showing what pluck will do and receiving the accompanying luck in return in working the Fidelity. This mine, after sinking 200 feet and meeting with no encouragement, was abandoned some four years ago. Mr. Knox coming into possession, pumped out the water and the second shot knocked the cap off of a shoot on a 3½-foot ledge of $40 rock.

Mokelumne Hill.

At the Ilex the work is all of a prospecting and drilling character, the exceptionally fine plant, unexcelled by any in the State, being idle.

The River mine is the property of Mr. W. R. Petrie of the Ilex. The eight-foot vein is cut 330 feet deep by a tunnel 450 feet long. The walls are diorite. The quartz averages $5 a ton in free gold. The mine is most favorably situated, and by reason of this fact and the fine water privilege enjoyed the quartz is mined and milled for $1 a ton. At present Mr. Petrie is running a 10-stamp mill and driving ahead to develop the mine, not only paying expenses, but netting each month a handsome return from working the mine. Hutchison & Brackett have a four-foot ledge. A shaft 35 feet deep has been sunk, the owners thus far working the selected quartz by hand, mortar and pan, realizing $120 a day for the two men.

Mr. Von Dell is mining on the Calaveras two miles east of Rich Gulch. This ledge is 3½ feet wide and is opened by a shaft 80 feet deep. The quartz is ground in a water-power arastra, yielding $9 a ton.

San Andreas.

The Cordova Union Gold Co. is located 3½ miles southwest of San Andreas. The gentlemen in charge of this property have shown how to bring victory out of defeat. Finding the old ledge of no value, they put down three shafts of 46, 92 and 162 feet on a parallel vein in entirely different country rock (metallic slate). The present vein carries a width of 11 feet with a fine gouge and splendid walls. Mr. Charles Cowland, an English gentleman from the mines of Australia, is in charge during the absence of the superintendent, Mr. Rickard. Mr. Cowland is shoving things with vigor. His feat of breaking ground on the 1st of March and having a 10-stamp steam-mill running with everything inclosed and in place by the first of April, is an Australian way of rushing that California mining men are not accustomed to, and is as much in contrast as Mr. C.'s accounts of the mines that run by the ounce in Australia as compared with California dollars.

The Burgess Mine,

Rathbeg Bros. owners, is but a half-mile distant from the Cordova. It covers 4500 feet on a 50-foot ledge. From the old 102-foot shaft the ore extracted in sinking alone gave $18,000. The present shaft is now down 80 feet and levels run; estimated milling value of rock, $6 a ton. A fine 20-stamp mill has just been put in operation. Frue vanners are on the ground to be added to the plant. The size of the ledge, value of the rock, extent of territory and capacity of the mill must make this a fine proposition.

E. H. SCHAEFFLE.

The Plumas-Eureka.

The editor of the Sierraville *Leader* recently made a visit to the Plumas-Eureka, and has the following to say about the mine: It is a great curiosity for the magnitude of the lodes and their various dips and angles. The ore is found in bodies at every point of the compass, and even horizontally. There are millions of running feet of timber, mostly from 18 to 30 inches in diameter, to be seen almost everywhere throughout the mine. The ore bodies vary from one inch to 20 feet wide, with the peculiar feature before mentioned, viz: that of being found deposited in all directions. The small engines in the various locations throughout the mine are run by compressed air which passes through pipes from the big air-compressing engine that is over 1½ miles away. There is one pump that is run to hoist water from a prospect shaft 140 feet below the lowest tunnel by water instead of steam or air, that has over 700 feet of pressure. The stroke of the water engine is seven feet and makes only seven strokes per minute. In many places the huge timbers are crushed as though they were only a few inches thick. Before the company got compressed air to run the engines, steam was carried 3000 feet in pipes, laid in boxes covered with ashes to keep the steam from condensing. There are over 3000 feet of tramway to conduct the ore down the hill to a 60-stamp mill, which is now being run by water-power. Two hundred men are on the pay-roll at present. There is one tunnel over 1½ miles in length.

PORTLAND papers claim that 5000 hands are employed in the various works of that city. During the past year nearly $3,000,000 has been spent in reviving old industries and establishing new ones, while over $1,000,000 has been expended by established institutions in the enlargement of their facilities.

THE Eel River Lumber Co. bought 920 acres of timber land on Elk river recently for $44,000.

Notes on Leaching Silver Ores.

NUMBER 3.

[Written for the MINING AND SCIENTIFIC PRESS by C. H. AARON.]

Hofmann's trough lixiviation has called forth such animadversion as to necessitate its abandonment or vindication by the inventor, and that gentleman has shown himself equal to the emergency. The fundamental fact on which trough lixiviation is based was known to others, but the appreciation of its full significance and its application in a practical form we owe to Ottokar Hofmann. I have always thought the objections urged against this process of little importance with one exception—it was supposed to require a relatively enormous volume of solution, but this supposition is now shown to be erroneous. On the contrary, a very much smaller quantity of hypo is required in this way than by the ordinary process of leaching in vats.

I have been surprised at the small volume of solution required for some ores, as given in Stetefeldt's book. In one case it seems to be hardly more than enough to saturate the ore; but Hofmann looked deeper and found that the statements were erroneous, as proved by calculation from the given time of leaching and the rate of filtering. In fact it requires from 3 to 20 tons of hypo to leach a ton of ore by filtration, while by the trough system not only is the average quantity greatly reduced, but the rate of the little filtration required is increased from an average of 8½ inches per hour to 12 inches per hour, which falsifies the prediction made by the opponents of the process, that the ore would be so packed and stratified in alternate beds of sand and slime that filtration would be almost impossible. I never attached much weight to this objection, as I felt sure that when the heavy and coarse sand should enter the vat it would so interpenetrate the small quantity of fine stuff already accumulated as to prevent trouble from that cause, and it does so apparently. The greater average rate of filtration in the trough process is to be ascribed to the briefness of the filtering period, for, the longer the filtration is continued the slower it will become in general, unless channels form which are very disadvantageous for the extraction of the silver.

Mr. Ellsworth Daggett regarded trough lixiviation as amounting to nothing more than an automatic method of charging the leaching vats, effecting an insignificant economy. Were this its only merit, it would deserve almost as much consideration as does the similar method of discharging the vats by sluicing the tailings out of them, and it seems strange that those who have taken the pains to point out an alleged economy of a few cents per ton by the use of sodium instead of calcium sulphide should so despise a saving in the cost of charging the vats, though, by the way, Mr. Hofmann proves by statistics that economy in the choice of a sulphide lies on the side of calcium in the particular instance referred to. But the chief merit of trough lixiviation does not consist in charging the vats cheaply, but in the fact that only a very small proportion of the solution has to filter through the ore, by far the greater part of it being rapidly removed by a process analogous to decantation, an advantage which every chemist will appreciate, even though a final (rapid) filtration through a thin bed of sand is necessary in order to obtain a perfectly clear solution.

One of the defects ascribed to this process was the amount of grade required for two sets of leaching vats, and two sets of troughs each with a length of 140 feet; this was little more than caviling, because a mill is always built on a slope if possible, and, in large works at least, it is all the better if the several departments are separated, provided it costs nothing to transfer the ore from the one to the other. But Hofmann has shown that a length of 12 feet of V trough suffices for the washing, and another 12 feet for the lixiviation with hypo, and this fact goes far to invalidate another alleged difficulty, which was that the hypo would oxidize rapidly in consequence of flowing through such a length of trough.

The saving of time by trough leaching of the particular ore in question is enormous, the common process requiring 109½ hours, including the washings, against 15 hours for the same quantity of ore by the trough system; this means a great reduction of plant and housing. Also the quality of the precipitate from the trough process is better than that from the other, which may be due to the shorter exposure of the ore to the dissolving action, causing less lead to be extracted. It has been objected that the effect of the caustic lime in some roasted ores is the same in trough leaching as in filtering, but it may be answered that the remedy is also the same, namely, an addition of acid, sodium disulphate, cupric sulphate or ferrous sulphate to the wash-water, which can be elevated and used again if required, as in such a case any base metal it may hold in solution, as well as free acid, will effect the desired result of neutralizing the lime.

On one point Mr. Hofmann seems to have caught us all napping, himself included, I think. It has been generally, though perhaps thoughtlessly, admitted that in leaching with sodium hypo and precipitating with calcium sulphide, the sodium hypo is gradually replaced by calcium hypo. Mr. Hofmann says he finds this to be an error; the leaching solution remains essentially sodium hypo, and he sustains

the assertion by the analysis of his hypo after more than three months' use. The analysis shows only a trifle more calcium than the quantity which corresponds to the sulphuric anhydride present, and that corresponds exactly with a saturated solution of gypsum; hence Mr. Hofmann says that the process which he first introduced, and which has been generally used in the West, is not the Kiss process. Kiss used calcium hypo for the leaching and the corresponding sulphide for the precipitation; Patera used the sodium salts for both. The process here discussed is, therefore, says Mr. Hofmann, a combination of the two.

The conservation of the sodium hypo is explained by the fact that the roasted ore retains a quantity of sodium sulphate after the base metal leaching, and this, dissolving in the hypo subsequently, precipitates the calcium from the sulphide and from its accompanying calcium hypo, in the form of gypsum. I suggest, as a concurrent circumstance, that the sodium sulphate produced by oxidation of the hypo acts in the same way.

Thus Mr. Hofmann vindicates his "obstinately" adhering to the use of calcium sulphide, against the opinion of Mr. Stetefeldt, by showing on the one hand that Mr. Stetefeldt's objection to calcium hypo on account of its rapid deterioration does not apply, while on the other hand the injurious accumulation of sodium sulphate in the hypo is prevented.

The Government Surveys.

At the last meeting of the State Board of Trade, W. H. Mills spoke of the recent Arid Land and Irrigation Act of Congress, which provides for surveys, etc., leading to the redemption of the arid regions of the Western States and Territories. He spoke of the appropriation of some $3,000,000 for this work and of its great value to all the West, as well as the entire country. The land policy of the country was considered briefly, and the speaker closed by introducing State Engineer Hall.

Mr. Hall has been in Washington lately and has interested himself in this arid land survey project. He gave a history of the bill and commented upon the value to the Territory interested. The plan, in the judgment of the speaker, is the beginning in carrying out the new land policy demanded by the necessities of the country at present. While in Washington he learned that the unappropriated Government land now remaining is surprisingly small. His investigations have shown him that the arid regions of the United States amount to fully 1,300,000 square miles. Of this, fully 15 per cent is mountainous and not irrigable. A large part of the remainder can be irrigated by arrangement of a proper and systematic storage-reservoir system. The committee on the new public-land policy appointed by Congress is regarded as one of the most important appointed since the war. Senator Stewart is chairman, and Senators Allison, Hiscock, Gorman and Plumb are members of the committee. The speaker commented on the fact that the representatives of New Mexico, Nevada and the Western Territories have been urgent in claiming a part of the appropriation and the services of the assigned engineers, but that California had done very little. He urged the need of the State Board or some other body taking the matter up.

Mr. Mills said that he had already interested himself in the work spoken of, and had called the attention of the Geological Survey to the demand of California. On March 24th Mr. Huntington sent dispatches to Major Powell, of the Geological Survey, and to Senator Stewart. These dispatches called attention of the persons addressed to the mountainous region on the west side of the San Joaquin valley, which, it was said, was of little or no value, owing to the lack of water.

The following resolutions, presented by Gen. N. P. Chipman, were adopted:

Resolved, First, inasmuch as the exceptional climate of California, offering not only unusual charms for physical existence, but being of the highest economic value, is attracting universal interest throughout the Union; and inasmuch as there are large areas of rich and productive lands in our State capable, with irrigation, of wonderful results, as Fresno, Riverside and other tropical regions amply testify, we invite the attention of the eminent authorities in charge of the surveys in question to an early inspection of our State.

Resolved, Second, that our delegation in Congress be requested to exert its influence toward securing the most complete examination of our State, and showing its need of some general and comprehensive system looking to the irrigation of large tracts of land incalculably valuable with water, but of little value without.

Resolved, Third, that in our judgment the Government ought to attach to its corps of surveyors and engineers the most competent engineer to be found upon our coast, familiar with its topographical resources and needs, and we ask our Congressional delegation to secure, if possible, the selection of some such person to represent the region west of the Rocky mountains, and if possible, to conduct the survey of that region.

Copies of these resolutions were ordered sent to Major Powell and to the various Congressmen.

Information of the magnitude of the timber interests of Puget Sound has reached the heavy lumber capitalists of Minnesota, and Mr. Winston came out to see what could be done. It is said that a big company, representing about $20,000,000, is about to be organized of Minnesota and Wisconsin capitalists to invest in Puget Sound.

Wild Ginger.

Another of the series of American medicinal plants described by Dr. Vasey, U. S. Botanist, is illustrated on this page. Early mention of others of the series has been made from time to time in our columns. The plant we show herewith is known as wild ginger, and botanically as *Asarum Canadense*. It is a small perennial herbaceous plant growing in rich shady woods on hillsides from Canada to the mountains of North Carolina and westward to Iowa. It is a plant of some commercial importance, for Dr. Vasey says that one firm in North Carolina purchases about 11,000 pounds per year of the roots. The engraving shows, first, the general appearance of the plant, root and leaf, the blossom and the fruit in cross-section. That part which is commonly called the root is botanically called the rhizoma, or a creeping underground stem, usually two or three inches long, and half an inch thick, giving off fibrous roots from the lower side. The extremity of the root stock sends up a pair of kidney-shaped leaves on stalks six to ten inches long. The leaves, when fully developed, are five to six inches broad, and about three inches from the base to the obtuse point. The margins are entire. The leaves and stalks, when young, are somewhat hairy, becoming nearly smooth in age. From between the leaves, close to the ground and terminating the root-stock, there issues a single flower on a drooping peduncle one or two inches long. This flower, when fully developed, is about an inch in length. It has no proper corolla, but a bell-shaped calyx divided above into three oblong, short-pointed spreading lobes, which are of a brownish-purple color inside. The lower part of the calyx is pubescent externally and coherent with the ovary, which above spreads out into six radiating stigmas. There are 12 stamens united to the base of the style, the anthers short. The flower is usually buried among the old leaves which cover the ground where it grows. The fruit is formed of the thickened, fleshy calyx and ovary, divided into six cells, each containing a number of small seeds. The wild ginger belongs to the same botanical family as the *Serpentaria*. The rhizoma or root-stock has an agreeable aromatic taste approaching that of the true ginger, and also somewhat like that of *Serpentaria*. Medicinally it is a warm, aromatic stimulant. It has been employed as a substitute for ginger in common domestic use. The leaves and flowers possess the same taste and quality as the root-stock.

WILD GINGER—Asarum Canadense.

Esmeralda Borax Mines.—No county in the State can boast of more extensive borax works than are those now in operation in Esmeralda, and yet it appears that the laboring men derive but very little benefit therefrom. A stranger walked into town the other day and was overheard to remark that while coming from Candelaria he stopped at one of the principal borax-producing headquarters in the county and asked the gentleman in charge for a job. He was told that if he wanted to work for the same wages then being paid to the Piutes and Chinamen, which he learned was from $1 to $1.50 a day, he could pull off his coat and consider himself engaged. He declined the position and started afoot for Hawthorne. We are painfully aware that Chinamen and Indians are the principal persons employed in and about our borax mines, and why it should be thus is hard to understand. Why would it not be just as well for the owners of these works to give our laboring white men, of whom there are a number at present out of work, a chance to earn an honest dollar, instead of giving the opportunity to a lot of thieving Piutes and hated Mongolians? The mines are fully valuable enough to allow of the payment of decent wages. Several men have made independent fortunes out of these same mines, and it is safe to presume that the present owners are not losing money in their operation. Give the white man a chance.—*Esmeralda News.*

It is understood that the Southern Pacific Company will build new roundhouses at Oakland on an extensive scale. The site has not yet been selected, but General Manager Towne, Treasurer Hopkins, Superintendent Fillmore and others have been surveying the field, and it is thought the work will be begun soon.

The Washington Centenary.

A Proclamation.

By the President of the United States of America:

A hundred years have passed since the Government which our forefathers founded was formally organized. At noon on the 30th day of April, 1789, in the city of New York and in the presence of an assemblage of heroic men whose patriotic devotion had led the colonies to victory and independence, George Washington took the oath of office as chief magistrate of the new-born republic. This impressive act was preceded at 9 o'clock in the morning in all the churches of the city by prayer for God's blessing on the Government and its first President. The centennial of this illustrious event in our history has been declared a general holiday by Act of Congress, to the end that the people of the whole country may join in commemorative exercises appropriate to the day. In order that the joy of the occasion may be associated with deep thankfulness in the minds of the people for all our blessings in the past, and devout supplication to God for their gracious continuance in the future, representatives of religious creeds, both Christian and Hebrew, have memorialized the Government to designate an hour for prayer and thanksgiving on that day.

Now, therefore, I, Benjamin Harrison, President of the United States of America, in response to this pious and reasonable request, do recommend that Tuesday, April 30th, at the hour of 9 o'clock in the morning, the people of the entire country repair to their respective places of divine worship to implore the favor of God that the blessings of liberty, prosperity and peace may abide with us as a people, and that His hand may lead us in paths of righteousness and good deeds.

In witness whereof, I have hereunto set my name and caused the seal of the United States of America to be affixed. Done in the city of Washington this 4th day of April, in the year of our Lord 1889, and of the independence of the United States the 114th.

By the President, BENJAMIN HARRISON.
JAMES G. BLAINE, Secretary of State.

The Governor has issued the following proclamation:

EXECUTIVE DEPARTMENT,
STATE OF CALIFORNIA,
SACRAMENTO, March 30, 1889.

To all whom these presents shall come—GREETING: Whereas, on April 30, 1789, the first President of the United States, George Washington, was inaugurated in the city of New York, this date—as the formal beginning of the present Government of this country—marks a period in the history of the Government of the people, by and for themselves; and as such it is appropriate that the centenary anniversary of this date be observed by the people of this State.

Now, therefore, I, R. W. Waterman, Governor of the State of California, by virtue of the power conferred upon me by the Constitution and laws of this State, do hereby declare Tuesday, April 30, 1889, the centennial of the foundation of the constitutional Government of the United States, and the inauguration of President Washington, a legal holiday; and request that each citizen within the confines of this State refrain from pursuing his usual vocation and so observe the day that he may better appreciate the blessings and glory of American citizenship.

Given under my hand and seal on the day above written. R. W. WATERMAN, Governor.

Attest: W. C. HENDRICKS, Sec'y of State.

Bounty for Artesian Wells in Nevada.

Following is a copy of the substitute Artesian Well bill, which has passed both houses of the Nevada Legislature:

SECTION 1. Section one of said Act is hereby amended to read as follows:

SEC. 1. Every person, firm, company, corporation or association that shall, after the passage of this Act, commence the sinking of artesian wells, shall be entitled for sinking such artesian well, where flowing water is obtained, the following specified sums: For the first 200 feet, $1.25 per foot; for the third 100 feet, $1.50 per foot; for the fourth 100 feet, $2 per foot; for the fifth 100 feet, $2.20 per foot; for the sixth 100 feet, $2.50 per foot; for the seventh 100 feet, $3 per foot; for the eighth 100 feet, $3.50 per foot; for the ninth 100 feet, $4 per foot; for the tenth 100 feet, $4.50 per foot; for all depths exceeding 1000 feet, $5 for each and every foot below the said 1000 feet, and an additional bounty of $1000 for every well sunk to the depth of 1000 feet or more, said well to furnish a flow of 20,000 gallons of water every 24 hours for 30 days successively. Said sums to be paid in the manner provided for in Sections 4 and 5 of this Act, provided that no bounty shall be paid on any well which does not furnish 7000 gallons of water in 24 hours, flowing continuously for 30 days; and provided, further, that no two wells should receive a bounty if located in the same county.

Running a Lathe Without an Engine.—In 1867, when R. Gluyas, now of Hot Creek, Nye Co., Nev., was chief engineer of the Gould & Curry Mining Co., on the Comstock, the engine that ran the machine shop broke down, and he had to fit up a new piston for it. The problem was, how to run the lathe without the engine. The boiler being all right, he got up steam and made a wheel almost exactly like the Pelton wheel. A jet of steam at 60 to 70 pounds pressure was turned on the buckets of this wheel through a fine nozzle. The lathe was run with this and the machine-shop engine repaired. Louis Janin was the superintendent at the time and congratulated Mr. Gluyas on his ingenuity and the success accomplished.

The following railroad companies have been merged into one company, to be known hereafter as the San Francisco and North Pacific Railway Company: San Francisco and San Rafael railroad, San Francisco and North Pacific railroad, Marin and Napa railroad, Sonoma Valley railroad, Cloverdale and Ukiah railroad.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

COAL MINE WORK.—Livermore *Herald*, April 12: The Pen Daren incline is now down 330 feet, and at 350, side drifts will be run and the taking out of coal begin at once. The incline is not now on the vein, the latter having changed its dip. It will therefore be necessary to run a drift back to it, some 15 or 20 feet, before beginning the lateral tunnels. The Co. is about to begin a 1200-foot tunnel on the Corral Hollow side, on the Coleman lands, to cut at right angles all the eight coal veins described in the report of Expert Atkinson, which we publish this week. This tunnel will begin near the O'Brien house, and run into the hill at an acute angle with the creek. It will be the great developing tunnel of the district, and open up this property as it never before has been opened. With the completion of this tunnel, not only the exact value of each vein can be determined, but all can be worked at once, and the coal can be taken out from one common tunnel.

Amador.

NORTH STAR.—Amador *Ledger*, April 13: The directors of the North Star Improvement Co. have succeeded in securing an extension of the bond, or rather in obtaining a new bond to the property to the sum of $27,000. The intention is to sink the present shaft from 200 to 300 feet deeper, and run prospect drifts as heretofore.

KENNEDY.—George Thomas has resigned as foreman of the Kennedy. He quit the position last week. J. F. Parks, the superintendent, is also attending to the duties of underground foreman at present. We understand it is the intention of the Co. to commence sinking the main shaft to a greater depth, shortly. The 40-stamp mill is kept going steadily.

MISCELLANEOUS.—The contract for sinking the Alpi shaft 50 feet deeper was completed early this week. The same parties have taken a contract to sink another ten feet, which will give the shaft a total depth of 110 feet. At this depth it is the intention to crosscut the ledge, with the view of ascertaining the grade of ore. At the Amador gold mine the work of putting up the new hoisting machinery is being energetically pushed ahead. Four men who have been working on the Loyal Lead claim for some time, stumbled across one of those rich streaks of quartz which are found in that neighborhood, and during last month extracted $1200, working the rock with a small arastra. Some parties working the Italian quartz claim, adjoining the Loyal Lead, have taken out a large quantity of quartz, which prospects well. They were in Jackson this week making inquiries about a Huntington roller quartz-mill, which they think of erecting on the claim. The last cleanup of the Wildman at Sutter Creek was the best yet made since work was resumed upon the property. The yield, including sulphurets, averaged something over $7 per ton. The ledge is 20 feet wide and it seems to be all of fine quality.

Calaveras.

MOKELUMNE HILL AND VICINITY.—Calaveras *Prospect*, April 12: The Fidelity mine at Glencoe is being reopened by Mr. Ennis. Several men are employed, and present indications are flattering, to say the least. Some very good rock has been taken out of the shaft lately. The Quaker City mine, owned by a San Francisco company, is looking better. A 10-foot ledge was discovered a short time ago. The South Star gravel mine, near Happy Valley, is prospecting well. The machinery from the A and B mine was transferred to the South Star mine last week, and the superintendent, W. H. Curnon, will commence operations in earnest as soon as the mill can be completed. About 20 men are employed in the Ilex mine at Rich Gulch. Supt. R. W. Petree intends to sink at least 400 feet on the vein and may possibly go down 600. The indications are better than they have ever been that the Ilex will yet be opened up and a paying mine found. The Cleveland mine was reopened about a month ago, by W. T. Robinson. This mine is about one mile above the Big Bar bridge on the Mokelumne river. From eight to ten men are employed at present, and a five-stamp mill is kept pounding away on good rock. The shaft is down about 100 feet, and things look flattering. The Allison mine on the Mokelumne river, near the Big Bar bridge, is paying well. A ten-stamp mill is kept running steadily night and day. The vein is from 10 to 15 feet wide, at a depth of 200 feet, and the proprietors, R. W. Petree and Tripp, are well pleased with the present prospects. Last month the dividends amounted to something over $4000. An air compressor and two Burleigh drills are doing good work in the tunnel. W. Hutchingson and John Brackett have discovered a rich streak of quartz near Mokelumne Hill. They are making on an average an ounce per day the last we heard of them, and the indications were favorable for a "good find," if the pay dirt holds out.

THE MCPHERSON MINE.—T. Lloyd and Nick Cusilege have relocated the McPherson mine on Adobe Gulch, near El Dorado. Mr. McPherson expended over $80,000 between the years 1880–82 in working this mine, and finally abandoned it. The present locators have discovered a body of quartz in a tunnel, close to the shaft. It is strange this vein was not prospected by the management when the tunnel was being run. The quartz contains considerable free gold, and it is considered an excellent prospect by parties who have examined the rock.

THE UNION MINE.—The ten-stamp mill at the Union mine was completed last week, and is now running night and day. One of the batteries of five stamps is crushing quartz from the middle shaft and the other battery is running on rock from the old Rathgeb shaft. Work will be resumed on the south shaft in a few days. The machinery is all on the ground for the hoisting works, and it will not take long to get ready to commence sinking on this shaft.

THE BLACK WONDER. — Calaveras *Chronicle*, April 13: We learn that the Black Wonder quartz mine, owned by Messrs. W. W. Cook and Aaron Cook, and located in the Blue mountain district, is showing good rock. The working tunnel is in 300 feet, tapping the lead at a depth of 150 feet. The ledge here shows a width of three feet and by crude process of working yields from $8 to $10 per ton. Ten men are employed and a five-stamp mill is kept running day and night. The prospects are very promising.

BALD HILL.—Angels *Record*, April 9: Mr. W. Boyle, one of the owners of the Bald Hill mine, reports favorable progress. A vein eight feet in width has been struck which shows up very rich. Ten men are employed and we presume that a mill will be built before many months.

GOOD PROSPECT.—Calaveras *Prospect*, April 12: The prospects are favorable for a boom in the Central hill gravel mines this summer. San Francisco parties are expected to look at several mines in that locality soon.

A MINE RELOCATED.—The Oro Fino mine, near Cave City, has been relocated by Henry Charles and Philip Harkins. They intend to open up the old tunnel, which is 212 feet long, and then go down into the winze, which is 60 feet deep. All the old miners who worked in the Oro Fino are confident that a good-paying ledge can be opened up at a very little expense.

GOOD ORE.—Some very rich rock was taken out at the Whittier mine, near Angels, last week.

Inyo.

PALMETTO DISTRICT.—Inyo *Independent*, April 13: There are many prospectors at work in Palmetto district and already several promising discoveries are reported. The district attracted a good deal of attention away back in the '60s, but was soon neglected, and almost abandoned, until quite recently. A few of the early prospectors never lost faith in the district; they staid with it, and these recent discoveries justify their faith. John Kensella is one of the fortunate prospectors in Palmetto district. He has taken out and shipped some rich ore and is reported to have a good claim and to be making money fast.

A REMARKABLE SALT DEPOSIT.—It is doubtful if there is elsewhere in the world a more remarkable deposit of salt than is found near Silver Peak. The salt is almost perfectly pure, the grade by chemical test being 98 per cent. It is shoveled into sacks where found and is ready for use in that state. It is as white as snow and of fine grain. It has been proved to be the finest salt in use for curing meat. When we have a railroad to Los Angeles, meat-packing will be one of the big items of Owens valley business; there will then be use for this fine salt. In Saline valley, across the Inyo mountains, is another vast deposit of salt. Indians gather this salt, pack it over into Owens valley, and exchange it goods.

Nevada.

NORTH STAR.—*Tidings*, April 13: The addition to the North Star hoisting plant will soon be ready for business. In the idiom of the miners, the Coe pump "is lost." A new pump is being put in with all dispatch. Objections have been raised against the traversing of a certain mining claim by the new ditch which is to supply the Omaha with additional water for motive-power. Alf. Tregidgo's bond on the Gold Hill mining property has expired. Mr. J. M. Lakenan has a 60-day bond on it and we understand he has good prospects for reopening the famous old mine. It was stated on the streets to-day that a number of North Star miners will be "let out" to-night, but will be informed that they will be given work at a stipulated price per foot. The miners fear this will prove a step to a reduction in wages, and if such proves the case a determined resistance to the movement will very probably be inaugurated. Three dollars a day is not a cent too much for the work done by the miners, to say nothing of the dangers to which they are exposed.

COE.—*Tidings*, April 12: A valve in the pump at the Coe broke Thursday evening at 4 o'clock, and it is not expected the damage can be repaired and the pump again started before late to-night—perhaps to-morrow morning. During the three days the pump was in operation, the water was lowered 136 feet, and it was expected that the mine would be clear of water in six days more. The East Eureka shaft is down 500 feet and a station is being made at that depth, from which drifts will be run. From indications it is certain that the ledge is close by. Thirty-five men are employed at the North Banner, and drifts are being run from the 100-foot level of the shaft in the lower tunnel. The ledge is of good size and quality. The ten-stamp mill is kept busy night and day.

WATER-POWER FOR THE OMAHA.—Grass Valley *Union*, April 3: Arrangements having been about perfected for a right of way for a ditch through Loutzenheiser's ranch to convey the water from the North Star to the Omaha mine, the work of construction will be commenced as soon as practicable. By this arrangement Mr. Loutzenheiser will secure a fixed amount of water for irrigating purposes, and the Omaha 200 inches of water additional to what it has now, and under considerably more pressure with which to drive its hoisting and pumping machinery. The water of the North Star has heretofore been running into Squirrel creek, but by the proposed diversion the waste water will go into Wolf creek, and will be that much in addition to what has been previously going down the creek, which has been utilized to a large extent for irrigation.

Placer.

GRAY EAGLE PUMPS.—Cor. Placer *Herald*, April 6: The Co. has put in some good machinery and everything is going all right. There is a big link-motion engine, 75-horse power, which runs the plunger pump. The plunger was set down 130 feet at first, and after pumping down a way steam pumps were put below to pump to a tank at the plunger. After getting down about 100 feet the steam pumps threw to the top and the plunger was lowered to the pump and stationed permanently. The steam pumps were then used to throw the water to this point till the bottom was reached, then they were hauled out and a jack-head bucket-pump put on the bottom. These pump rods were hung to the rods of the plunger so both pumps run on the same stroke. There are about 20 inches of water, which is handled on seven strokes a minute. All the steam pipes have been hauled out, new ladders put in from the bottom, the shaft boarded, rubbish cleaned out, and will begin sinking Saturday or before. They expect to sink about 20 feet, depending on the rock, and then commence drifting. Everything is in good shape and the indications are that this will be a good mine.

Shasta.

FLAT CREEK.—Redding *Free Press*, April 13: Andy Fife is talking of operating on Flat creek this summer. Flat creek is undoubtedly a rich mining camp, although the crude method of working the ore in the past, and the consequent loss of the gold, has given the mines of that section a black eye. The gold is very fine and floats off.

Sierra.

THE SUNFLOWER. — Sierra *Tribune*, April 12: The Sunflower quartz mine is situated at the town of Pike in this county. A. S. Winchester is superintendent and president of the company, which was organized by Oakland people, although a large part of the stock is held in the East. The Nevada *Transcript* says a tunnel has been run in from Texas creek a distance of 495 feet and is supposed to now be within 30 feet of the ledge. It is expected that banks of 190 feet will be obtained. A shaft was put down 75 feet from the brow of the hill, and in the bottom of the shaft is a ledge four feet wide and 11 inches thick, showing some gold.

ASSIGNED WORK.—*Mountain Messenger*, April 13: Some of the men, liberated by the draft, on the Buttes' force, at Sierra City, have been again assigned work by the company.

EXTENSION.—Twenty-eight feet were made by the Bald Mt. Ex. Co., last week, in their new main tunnel, near half a mile in the ridge, and the indications are that the tunnel is through the rim and under the channel, to which an upraise will soon be made.

San Bernardino.

BLACK HAWK.—San Bernardino *Courier*, April 11: Mr. J. B. Cook, of the Black Hawk mines, is in the city, and we glean the following mining news from him: Messrs. Hanchett and Freeman have leased the old Gold Mountain property (Baldwin) in Bear Valley, and are about giving the ore a thorough test, using concentrators to save the sulphurets. It is quite probable that the use of concentrators will enhance the value of the large ore body, so as to make it a feasible undertaking. A new superintendent will arrive in a few days from England to take charge of the Valley Gold property in Holcomb, Mr. Del Mar having resigned the management. It is said to be the intention of the company to push work during the coming summer. The Old Morongo patented mine is putting on a few men with a view to large developments. Judge Nichols has J. M. Miller and Mr. Jones of Los Angeles associated with him. This mine has lain idle for years with a considerable body of ore in sight. There are three shafts, one of 100 feet, one of 60 feet, and one of 30 feet in depth, showing fine ore in the bottom. They intend putting up reduction works in the near future. The Black Hawk mines are now open for the largest kind of reduction works. One of these mines is said to have been sold to an English syndicate, and the erection of a 40-stamp mill will be commenced at once at the mines. Adams, Driscoll & Co. have shipped and received their returns from Selby & Co., San Francisco, of a carload of gold ore from their mine, about 12 miles northeast of Victor, giving a result of $60 a ton. They have a shaft down 100 feet, with drifts 30 feet each way on the vein. It is the making of a fine mine.

Trinity.

EAST FORK.—Trinity *Journal*, April 13: Work is being steadily pushed on the Golden Chest in the way of development and taking out ore. The ledge in the main tunnel is about 18 or 20 inches wide, and in the breast four feet. There is plenty of good-looking ore in sight. The mill is running, crushing five tons a day. Tinsley's train is now packing 100 tons of ore from the Red, White and Blue mine to the Golden Chest mill, where it will be crushed. The Davis brothers on Yellow Jacket have a good prospect; they are running a tunnel on the ledge, which is about 18 inches thick, and is good-looking rock. In the Alaska, also on Yellow Jacket, stringers have been struck in the tunnel and indications point to finding the main ledge in a few days. The tunnel is now in over 100 feet. The Enterprise has plenty of good rock in sight, and work is progressing satisfactorily. The arastra is grinding away on $100 rock, and the mine turns out dividends as regularly as clockwork. The company will put up a stamp-mill as soon as the wagon-road is completed. Day & Greenwell are taking out ore from the Ozark; they are working on as good ore as ever and have about 30 tons on the dump, which they will crush shortly. Past crushings from the Ozark have yielded $100 to the ton. A drift has been run in on the Fountain Head, Barney gulch, and the ledge runs from two to four feet and prospects well. The rock is good milling ore, and the mine has a firm future. The Simmons brothers are running a new tunnel on the Webfoot, east of the old tunnel, to tap the ledge lower down. The Poor Man on East Fork has most excellent prospects. This mine joins the Enterprise and North Star mines and carries a large body of ore, the vein matter in places being 15 feet wide, and prospects for its entire width. Even the dirt and debris from the mine prospects. In cutting the new wagon-road, three veins of quartz were exposed on the Fritz mine, owned by Meckel & Day. Day & Otto Hippler have made a new strike on Rich gulch. The ledge runs from 20 to 30 inches in width, carries free gold and galena sulphurets, and the ore is estimated to go $20 a ton. The ledge is well defined, with walls of granite and porphyry. This was the first prospect found by Day in the camp, but he did not work at it until lately. On the whole, everything points to a busy and prosperous year in East Fork. The ledges increase in value as work progresses; several new mills will be erected on the completion of the road; a sawmill will be put up, and a well-stocked store be put in operation.

CANYON CREEK.—Cor. Trinity *Journal*, April 9: As the recent discovery of gold-bearing quartz on Canyon creek is causing quite a little ripple of excitement among the people of this locality, perhaps it would be about right to give outsiders a chance to know in what direction their future fortunes lie ready, waiting to be uncovered. Canyon creek, a branch of the Trinity, some 30 miles in length, rises in the Salmon range of mountains, flows in a southwesterly course, and empties into the Trinity river nine miles west of Weaverville. It has been one of the richest streams ever worked in the county; the high benches and low bars have long since been mined off, until nothing much else is left than unsightly mounds of boulders and bare rock. If the marvelous tales told by the oldest inhabitant are to be believed, men have been made rich by a single barrow-load of pay dirt. East Fork and Canyon creek both have their source in the same range of mountains, run parallel with each other, a dividing ridge between the two, in some places very low. While gold ore was found many years ago on East Fork, and for the last two or three considerable prospecting has been done on Canyon creek, nothing was found until six weeks ago, and since that time a number of veins have been discovered carrying free gold and galena sulphurets with a large per cent of silver. The lodes so far found are wider than those of East Fork, most of them being from 6 to 8 feet in width and are strong veins likely to hold out as they are developed. Fisher gulch, one-quarter of a mile above Canyon City, is where the first locations are met with; the next are on what is called Big East Fork, three miles above town; then comes Little East Fork, one mile further on. All of the prospects are found high on the mountains, showing conclusively that slides were the cause of depositing the gold in the stream below. Toward the headwaters of the creek a large body of magnetic iron is met with, causing considerable trouble to surveying parties who have, at different times, crossed those mountains. Some rich specimens of cinnabar float have been picked up on what is called Mogul Hill, one mile this side of town. No doubt an experienced prospector of that mineral could succeed in finding the vein whence came the float.

A NEW MILL.—Trinity *Journal*, April 13: Mr. Frank Peterson of San Francisco arrived Wednesday, and left for East Fork Friday. Mr. Peterson is interested with Capt. Trueworthy in the Fountain Head mine in that district, and visited the mine last week. He was so well satisfied with the prospect that he has purchased a Huntington mill with a Challenge ore-feeder and three concentrators. The mill has a guaranteed capacity of from 25 to 35 tons a day, and will be shipped from the city Saturday, and will be taken in as soon as the wagon-road is completed.

NORTH STAR.—Capt. Trueworthy of East Fork was in town this week and is quite jubilant over the North Star mine in which he is interested with Mr. Henry Junkans. There is a fine body of ore in sight and some very rich rock has been discovered.

Tuolumne.

NEW MILL.—Tuolumne *Independent*, April 13: A new five-stamp quartz-mill, with engine and boiler, has been purchased in San Francisco for Lyman Tibbit's Eagle creek mine. It is on the road and will be on the ground in a few days.

GOLDEN GATE.—At the Golden Gate mine grading has commenced for the new hoisting works, which will be of a capacity for sinking 1000 feet. They will be erected at the mouth of the old tunnel, at which point the present shaft is 170 feet deep, and a level extends 215 feet under the old works to a point beneath the old shaft, which extends from the ore shoot at the top of the hill. It is proposed to connect with this shaft later. As soon as the hoisting works are finished the new shaft will be sunk 100 feet and another level of 270 feet run. This will be at a depth from the surface croppings of more than 400 feet. It is known that the present shoot has a length of at least 800 feet, and the vein runs from four to six feet in width. There are two parallel veins—one on each side—within 60 feet, with a width of two feet, and several small cross veins. Some of the rock, sent below and tested by working process, yielded $169 to the ton, and the poorest went over $40. The property is owned by the Alaska Fur Co. of San Francisco. They intend to thoroughly develop the mine before erecting a new mill. Superintendent W. G. Long is confident o large results.

REOPENED.—Messrs. Richards & Knapp of Columbia have recently opened up the old Richards placer gravel mine, above Springfield. Some very rich diggings were in that neighborhood in early days.

TIOGA DISTRICT.—*Union Democrat*, April 13: Now that Senator Hearst has taken hold of some mining property in the district, it is probable that something will soon be done toward opening the mines. We have received information from a reliable source that there is already considerable machinery destined for Tioga ready for shipment in San Francisco, and that contracts will soon be let for hauling the same to the mines. This is an indication that Senator Hearst intends to commence operations at once. If this is the fact, Tioga will experience a lively mining boom the coming summer.

Yuba.

SMARTSVILLE. — Marysville *Appeal*, April 11: Daylight appears in the incline in the Blue Point mine, and as soon as a bulkhead is put in work will be commenced upon the hoisting works. The manner in which the company is pushing the work and making extensive and expensive improvements bespeaks the confidence they have in being amply repaid for this enormous outlay by the returns from the mine. The other companies who propose commencing operations soon are not idle. Preliminaries are nearly completed, after which the welcome ring of pick and drill, saw and hammer will be heard.

NEVADA.

Washoe District.

HALE AND NORCROSS. —*Enterprise*, April 13: On the 400-level north drift from No. 1 west crosscut now advanced 45 feet and continues in fine ore; in the south drift from joint west crosscut are stoping ore of good quality. In the south upraise are putting in ore chutes and preparing to take ore from this part of the mine. On the 500-level the northwest crosscut is now advanced 60 feet. The north and south upraises continue in excellent ore from the top of the south upraise. Have made an air connection with the winze south from the north drift, 400 level, which greatly improves the ventilation of the 500 ore stopes. On the 600 level are extracting ore of fair grade from the several stopes. On the 700 level the south drift is now advanced 35 feet and continues in good ore; have commenced putting in square sets in this new find. From present appearances it will produce a great deal of ore. During the week hoisted 1068 tons of ore and shipped to the Nevada mill 930 tons, and milled 1080 tons. Average battery assay, $30 per ton. Have shipped during the week $21,271.26 in bullion.

SAVAGE.—On the 500 level the upraise from No. 3 west crosscut was extended 18 feet and the face is

in quartz showing fair assays. From the south drift on this level are extracting ore from the old stopes, also from No. 3 east crosscut, 600 level. During the week hoisted 525 tons of ore, and shipped to Rock Point mill 508 tons and have milled 512 tons. Average battery assays $19 per ton. Shipped during the week $9211.83 in bullion, the total yield for the month being $28,588.02.

CONFIDENCE.—The joint Challenge-Confidence north drift on the 300 level now in 50 feet, 31 feet having been added during the week. Face in vein material. The joint Challenge-Confidence raise from 300 level is up 14 feet, having been commenced during the week. The top of this raise shows ore of fair quality. Shipped to the Brunswick mill during the week 34 tons of ore, the average battery sample of which shows a value of $25 60 per ton.

ALPHA AND EXCHEQUER.—On the 382 level the northwest crosscut is in 70 feet. Face in clay and porphyry. The northeast crosscut is in 68 feet. Face showing streaks of quartz, clay and a little water. On the 500 level the north lateral drift is in 427 feet. Face in quartz and clay, and the ground is very heavy, with a little water. The northwest crosscut is in 271 feet. The face is in hard blue porphyry.

SEG. BELCHER.—The west crosscut on the 1100 level is out 189 feet, having been advanced 36 feet during the week, or at the rate of over five feet per day. Have cut two more streaks of quartz from 12 to 18 inches wide, which yielded very fair assays. The face is in soft porphyry of the same character as they have been in for the past 50 feet.

BELCHER. — The 200 east crosscut was advanced 35 feet during the week; total length, 175 feet. No change in the material encountered. West crosscut advanced 20 feet; total length, 115 feet. Face in vein material. The 1100 east crosscut is out 66 feet. Have stopped it and started a west crosscut opposite it.

POTOSI.—West raise, 930 level, 400 feet south of the shaft, is up 42 feet; face in porphyry and low-grade quartz. South drift, 850 level, is out 143 feet; face in hard ground. South drift 750 level, is out 379 feet; face in porphyry. West drift, 650 level, is out 42 feet; face in low-grade quartz.

CROWN POINT.—The various stopes looking and yielding about the same as last week. Are engaged in cleaning out the 400 west drift to get into Nos. 1 and 2 crosscuts there. Shipped to the Mexican mill 763 tons of ore during the week, the average battery assay of which was $19.31 per ton.

ALTA.—Are still raising toward the 400 level, preparatory to crosscutting toward the Keystone vein and prospecting it. The usual quantity of ore is being extracted and milled from the 800, 825 and 925 levels.

CHOLLAR.—North drift, 850 level, is out 80 feet; face in very hard ground. North drift, 730 level, is out 131 feet; face in clay and porphyry. North drift, 550 level, is out 881 feet; face in low-grade quartz.

OVERMAN.—Extracted 240 tons and 1200 pounds of ore, and shipped to the Vivian mill 322 tons and 1760 pounds of ore. Shipped one bar of bullion valued at $7658.

CHALLENGE CON.—During the week shipped to the Brunswick mill 83 tons of ore, the average battery assay of which was $25.64 per ton.

SCORPION.—West crosscut on the 350 level advanced 15 feet the past week; total, 455. Face in porphyry.

BALTIMORE.—Work of exploration is progressing favorably on the 225 and 338 levels in drifts westward.

JUSTICE.—The mill is running steadily and the mine is producing the usual quantity of ore.

ANDES.—Still drifting on the 175 level to connect with the West Con. Cal. & Va.

YELLOW JACKET.—Prospecting is going on vigorously in the upper levels.

NEW YORK AND SILVER HILL. — Are still repairing shafts.

Columbus District.

CANDELARIA'S BOOM.—Esmeralda *News*, April 13: It now begins to look as if Candelaria, that old stand-by, was about to throw off the spell of gloom that has seemingly surrounded it the past few years, and resume its station in the ranks of the lively camps of the State. Col. Sutherland, in company with English capitalists, paid Candelaria a visit last week, and after spending a few days in examining the mines returned to San Francisco last Monday. From the meager reports received, it appears that the visit of these gentlemen means much for the benefit of the camp. It is understood that Mr. Sutherland, on behalf of English capitalists, has purchased considerable mining property situated in and about Candelaria, and he intends to begin operations on them immediately. Notwithstanding the fact that Candelaria, for the past year or so, has been considered a played-out camp, its bullion shipments have been as regular as the breaking of dawn. Certainly the shipments were not as large or as numerous as in days past, but the discount on silver is the sole cause for this. Our sister town does not depend solely upon one mine for support. There are the Mt. Diablo, Georgene, Lucky Hill, Chief of the Hill, Potosi and others too numerous to mention, which, with proper management, could be made sources of revenue. Should Col. Sutherland's plans materialize in a sale, which we have every reason to believe at this writing will be the case, the Georgene mill will be run to its fullest capacity, and it would not surprise us in the least to know that the big mills at Belleville had been overhauled and were busily crushing the ore hauled to them by the C. & C. from Candelaria. The Holmes is a big mine and to work it will necessitate the employment of at least 150 men, to say nothing of the fuel, water and the like necessaries.

Lodi District.

ILLINOIS.—Belmont *Courier*, April 13: A. J. Wilkerson informs us that Alfred Welsh is extracting rich rock from the Illinois mine. He shipped 52 tons of silver and gold ore to Reno during last month. Ore from the new strike goes as high as $500 to the ton. Mr. Wilkerson also informs us that the Downey Bros. are prospecting in Mammoth mining district near Downeyville.

ARIZONA.

VEKOL.—Florence *Enterprise*, April 13: Mr. A. H. Elliott has secured a bond on the Combination shaft and the three claims it is intended to develop at the Vekol camp, and will continue sinking for the ore body which it is believed will be encountered at a depth of 210 feet. The shaft is now down 167 feet, leaving but 43 feet of work to reach the ore body, which dips upon the adjoining claims toward it. The mill of the Golden West Mining Co. is being erected at the mine, below the Vekol, and will be in readiness to begin operations as soon as water is reached in the well. The new tunnel to tap the ledge at considerable depth is being pushed forward as rapidly as possible and when the ore body is reached it is confidently believed that a pleasant surprise will await the stockholders.

MOHAVE COUNTY.—*Miner*, April 6: Two carloads of ore from the Copper World were shipped from Yucca to Prescott this week. The Keystone mine, it is said, will soon begin active work. Twenty-five miners have been engaged to work as soon as everything is ready. If this be true it will be glad tidings to the citizens of Mineral Park. From Stockton Hill comes the following item: A strike was made in the Silver King, Stockton Hill, this week, of from 9 to 18 inches of ore that will go 150 ounces. N. C. Amer, the owner, is sinking a shaft and is working three shifts. In December last Mr. Fred E. Murray obtained a working bond on the Copper World, 12 miles south of Yucca, and the work of prospecting the property was begun under the supervision of Mr. H. C. Church, and a great deal of work has been done in running levels, sinking winzes, and like work. All the work done has been in ore, and on the upper level and winze large bodies of ore have been uncovered. All the work done has been with the view of finding the extent and richness of the ore. The ores are carbonate and sulphide, and are 35 per cent copper. The ore taken out in the workings is now being shipped to Copper Basin near Prescott, to be used in matting other ores at the furnace there. The Copper World is now the property of Messrs. Phelps, Dodge & Co. of New York City, who own large copper interests in this Territory.

MAYFLOWER DISTRICT.—Clifton *Clarion*, April 5: Mayflower district is situated on the eastern boundary line of this county, about 20 miles south of here, and although no apparent attention has been given to it, nevertheless there are leads of great value there. Ike Hahn and Tom Moss are the owners of one of the most valuable of these, upon which they have three locations, viz.: The Gazelle, Mount Vernon and Grand View. The ledge crops out boldly for the entire length of the claims (4500 feet) and is on an average eight feet in width. The ore is a carbonate, red oxide and copper glance carrying silver from ten ounces to over 100 ounces per ton. The formation is felsite and porphyry. There is plenty of wood and water adjacent and a splendid wagon-road has been built from the Gila river, eight miles distant on the line of the A. & N. M. railway, to the mines. A mill and smelter could be run by water-power and supplies could be dropped on the line of the railroad at the plant. Some exceedingly rich gold specimens have been shown about Morenci and Clifton of late from Campbell and Muir's gold strike in Gold Gulch, and reports are to the effect that the property is increasing in value as depth is attained.

BRADSHAW MOUNTAIN.—Cor. *Journal-Miner*, March 27: Since the last storm snow is fast disappearing, and work is being energetically prosecuted on a number of mines in this, Tiger district. Mr. Britingham, with a force of men, is taking out ore from the Eclipse. This mine has been known to be rich ever since its discovery, which was in the spring of '71, but owing to the enormous expense of transportation, chloriding was then out of the question. The Eclipse carries high grade ore, assays of which run up in the thousands. The character of the ore is horn silver and black sulphurets. Another valuable property is the Cougar and Eclipse, owned by E. J. Junior. These are the discovery claims of both Cougar and Eclipse. Mr. Junior has done a vast amount of work and developed large bodies of high grade ore. Owing to the great amount of rain and snow last fall and winter, water has retarded work somewhat, but Mr. Junior is now running a crosscut tunnel, which, when completed, will drain the mine to quite a depth and open up a large amount of rich ground for stoping.

PLACERS.—Prescott *Courier*, April 4: Placer miners of Lynx creek, near Prescott, are taking out about $300 in gold each day. Those of the Hassayampa, Big Bug, Turkey creek and the gulches are also doing well. Castle creek and Weaver contribute largely to the gold product. The railroad yard contains a great deal of coke for the Copper Basin Co., which will soon make its first shipment of bullion. It is the company's intention to run a large smelting plant in the Basin on ores from Slate creek and other adjacent camps. The Dixie Co. have everything in readiness for their mill. All miners say the Congress "takes the cake." It is opened nearly 700 feet, and the rich ore is abundant. Owners of idle mines should give leasers a chance to do development work. A big cleanup of gold will soon be made at the Howard mill, ten miles south of Prescott.

DAKOTA.

REDUCTION WORKS.—Mr. Hickok, cashier Deadwood bank, returned Sunday from an Eastern trip made in the interests of rebuilding the works, and on being interviewed stated that he had $30,000 pledged by responsible men, with a proviso that the remainder shall be raised here, and that when the works are rebuilt they shall be free from debt. Mr. Hickok estimates the balance required over the $30,000 at from $12,000 to $15,000. The directors have not yet had a meeting, and hence no plans adopted for raising the amount. There will be no doubt some little delay in rebuilding, awaiting the results of tests being made by Mr. Clark on a new roaster. The works will, however, be rebuilt, and profiting by experience gained in the erection of the works burned, the new ones will be nearer perfection. Those who have pinned their faith to and invested their money in Ruby mines, and erection of reduction works, will yet reap a rich reward. As an illustration of the amount of good ore in the district, there is $100,000 worth of ore on the mill dump (not at or in the mine), and this amount was taken principally from one mine—the Golden Reward— and yet that one mine has hardly been opened. The profits on this ore will alone pay for the works, but as every one knows, money in Deadwood is scarce, and to raise even $15,000 is no small undertaking, yet this is our only salvation, and we must raise it.

NEW LIFE IN AN OLD CAMP.—Deadwood *Pioneer*, April 13: Among the promising properties in the Garden City district is that owned by Dan Flickenger, being situated at the head of Blacktail and comprising four full claims, opened at different places and showing considerable high-grade ore. Further down the hill, toward Garden City, is the well-known property of Keith, Forrester and Clarke. Their property lies on the east side of Spearfish road, and embraces in all five claims. The Eva, on account of having been more carefully prospected and opened, is the most promising of the group. The ore throughout the entire group is said to average $25 in gold to the ton. Perhaps the best developed property in the camp is the Garden City, owned by the Garden City M. Co. The main tunnel is 65 feet long, with numerous crosscuts, exposing the ore vein the entire distance. At the mouth of Elk Horn gulch William Phillips has five claims, from which he has taken some of the richest ore yet discovered in the camp. The ore bodies on this property are extensive. Specimens showing both native gold and silver are frequently broken from the ledge. These discoveries have created no little excitement among the prospectors in the vicinity of Garden City, and many new locations are daily made.

LOWER CALIFORNIA.

THE PLACERS AND QUARTZ.—San Diego *Sun*, April 13: W. R. McFarland returned yesterday after having spent 33 days prospecting in the Santa Clara district. "I think the estimate that 2000 miners and prospectors are now in the district is about correct, and of that number I should say that 1000 are Americans. The camp in American gulch has been abandoned, and the camps in Mexican gulch and at Alamo only remain. A good many miners are employed on the placers. The water in Mexican gulch has partially given out near the middle, but near the source and mouth of the gulch the supply is plentiful. This gulch has been abandoned by all except those who hold good claims. The prospectors and hangers-on left it some time ago. Of those who remain nearly every one is making good wages. One party of three persons with whom I was personally acquainted, stated to me a few days before I left that they were making $12 apiece per day, and they are men perfectly reliable. Jno. Whitcher of San Diego has a claim on which he worked a long time and made nothing. At last he found gold and he told me that he had struck it rich. He was jubilant over his prospects and had taken out $44 in two days. Captain Friend worked a poor claim for three weeks, at the end of which time he found some gold and took out $20 in one day. It did not last, however, and Friend moved to the Alamo district, where he is now prospecting. At Alamo the miners are working both the mesa and creek bed. On the mesa for an area of two or three miles, gold is found in the first six or eight inches of earth. The gold dust is found in a kind of decomposed granite, which is taken down to the creek and washed. This is regarded by all old miners as a very peculiar find. It is such a singular thing that miners are unable to account for the presence of the gold on the mesa in the decomposed granite. The Alamo flat or gulch varies from a few yards to 200 yards in width, and the gold is found on the surface of bedrock, which is from 10 to 15 feet below the surface. One party has run a ditch in Alamo gulch for nearly 200 yards at a depth of from 10 to 15 feet. There is a great deal of gold in the surface rock about the ledges. One company are making it their entire business to gather up all the surface or float rock they can find. I saw two prospect holes that had been sunk 20 feet each, and at the bottom the quartz was just as rich in gold as at the surface and of the same character all the way down. Those sinking shafts will go on down 100 feet, and all the old miners say that if the quartz holds out at that depth, the fact will be established that the richest find in many years has been made. It is the opinion of the miners that the quartz will hold out and that the indications are excellent. I saw several prospect holes where quartz had been pinched out at a depth of four or five feet." Mr. McFarland said that there were a few coming into the mines and a number coming out.

MONTANA.

ANACONDA —*Review*, April 11: The exceptionally fine weather the past month has caused all who were interested in prospects and claims adjacent to Anaconda to start up spring work. Work around Silver Lake has started up fully six weeks in advance of last season. Johnson Brothers, who have a very promising silver claim called the Silver Wedge, located about a mile east of the lake, are taking out some good ore for shipment. The owners of the Silver Reef are sinking a new shaft from which they can more advantageously work the mine. Howard and Rice are working on a claim, just this side of the lake, taking out ore for shipment. At Georgetown the people are confident of a boom this season. An important strike was made last week in the Southern Cross, which is of a permanent character. The Red Lion folks will have their mill ready for work, they think, in about twenty days. They have one of the best looking properties in the district. The Pyrenees is still working along as usual, very little being said about it, though it is really a better property than ever. Supt. Moore does not care to say just what their plans are for the season. The Cable mill is not running just at present, but will start up again soon. There is a rumor that they have now struck another very rich pocket.

OREGON.

PINE CREEK.—Cor. *Union Scout*, April 11: The State mine is one mile north of town, and is the property of Bolles, Senor & Brown. The ledge is seven feet wide with three feet of solid ore. The ore is dark, like black silver sulphurets, containing, however, but little silver, but, using a common expression, is "lousy" with free gold. The wall rock of slate also carries gold in paying quantities. The average of all the ledge matter assays—or rather mills—$30 per ton. This ledge runs, in direction, a little east of north, directly over the mountain, and work can be commenced on the ledge, increasing in depth six inches from the surface to each foot of tunnel. It is most favorably located, as a good wagon-road runs to the mouth of the tunnel. Water-power in a small stream lies within 15 feet of the tunnel, with timber on the ground sufficient for an almost endless exploration of the mine. This location is about three-fourths of a mile from the O. G. M. Co.'s mill which drops 20 stamps. Its accessibility with its surroundings of wood and water-power make it really a bonanza for some one with capital. At the depth of 15 feet from the surface a "lime horse" was encountered, which is gradually diminishing in size, but has all the way carried gold on an average of $17 per ton, so it may be safely said that all inside the walls carries gold in paying quantities. The same description and remarks will apply equally well to other mines in its immediate vicinity, among which are the Comet, Way Up and George. The Comet is three feet between walls of solid quartz carrying gold, with sulphurets carrying $2 or $3 in silver. Twenty sacks produced $12 of free gold, besides the metal left in the tailings, which assays $20 per ton. It is generally shown that about one-half or one-third is saved on the plates. The ore from these mines requires roasting, but the working without roasting loses none of the gold. Parties are now putting in chlorination works similar to those now in operation at Deer creek, Nevada City, California.

BAD SEASON.—Jacksonville *Times*, April 11: The mining season is a comparative failure. Thomas Cook of Foots creek district has struck some very rich quartz, and recorded his notices last Friday. From E. Manville we learn that Messrs. Harvey & Hart have struck an old channel on Jackass creek which prospects as high as 25 cents to the pan. G. W. Bailey and son of Applegate precinct are prospecting a very promising quartz ledge, the ore from which is full of free gold and assays high. They are running two tunnels.

UTAH.

REVIEW.—Salt Lake *Tribune*, April 13: The week has been rather a slim one as regards the production of bullion. Receipts of ore have, however, been fair. For the week ending April 10, inclusive, the receipts of metals in this city aggregated in value the sum of $101,546.55, of which $23,040 was in bullion and $78,546.55 was in ore. For the previous week the receipts were $168,852 in the aggregate, of which $111,967 was in bullion and $56,885 was in ore. The Ontario product for the week was $36,702.10 from ore sales; no bullion. The output of the Daly for the week was $17,083.80 from ore sales; no bullion. A curiosity in the mining world has been the fluctuations of the Horn Silver stock, which has for a month now been quite active in New York; 630 shares of it selling last week at prices ranging from $1.35 to $1 50. No ore strikes have been made in this mine, but the change of management gave confidence that there would be no waste or extravagance, and this confidence has been justified. Limited ore production and economical expenditures have left a fair surplus in the treasury. Base bullion receipts in this city for the week were to the value of $13,700. The Hanauer smelter produced during the week, bullion valued at $9340. Ore receipts in this city for the week were to the value of $57,856.55 by Wells, Fargo & Co., and $20,650 by McCornick & Co.

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MECHANICAL PROGRESS.

How to Harden Thin Plates

The *American Machinist*, in reply to a correspondent who wishes to harden steel plates one-eighteenth of an inch thick, says the following process will meet with complete success:

Provide two pieces of iron about 6″x6″x1″, with one surface on each block planed, spread a liberal supply of good sperm oil on each planed surface, place the blocks near by in level position to insure an even thickness of oil, and keep the blocks cool. Immerse the steel plates in molten lead as far as they are required to be hardened; when a red heat is obtained, drop the piece quickly upon the oiled surface of one of the iron blocks, and simultaneously lay the other iron block upon the work; when cool they will be found true. This system has been used for years for hardening thin steel tools with universal success.

A correspondent of the same journal also suggests the following to accomplish the same end:

Sheet-steel of the dimensions stated can be successfully hardened between two cast-iron blocks placed in a screw press or any kind of hand press; holes should be drilled in the corners of the lower block for spiral springs of sufficient power to keep the blocks apart.

The steel should be heated (a small gas furnace is preferable), and quickly inserted between the blocks, and pressed hard until cool enough to insure against drawing temper.

A good plan is to have two pieces in the furnace at once, and allow one to cool when the other is heating.

To draw the temper, brighten part of the piece on an emery-wheel, and then run them together with sand in a sheet-iron tumbler under which is a fire (a few gas jets are the best), until the desired color is obtained.

MELTING ZINC.—Zinc is troublesome to cast, and more troublesome when small thin molds are to be cast. Lining the mold with whiting and water, which must be allowed to thoroughly dry, will often cause the metal to fill the mold well. Burning of the zinc (oxidizing) may be prevented by covering the metal, while in crucible or ladle, with a layer of common salt, a little muriatic acid, which amounts to the same, as a coat of zinc oxide is immediately formed on the surface of the melted metal, which effectually prevents further oxidation from action of oxygen in the atmosphere. It is an improvement to keep a layer of charcoal on top of the zinc, or any other soft metal which can be melted in a ladle; the coating of oxide forms a protection against oxidation to only a certain degree, while the layer of charcoal tends to reduce the oxide again to its metallic form. Indeed, it is possible to recover lead, tin, zinc and antimony from the "dross" or oxide which gathers in the ladle. It is only necessary to melt the oxide with charcoal, salt and soda to get it again into useful shape. The dross should be powdered, likewise the salt, charcoal and soda. Mix them together and melt. The soda and salt melt into a pasty mass and the carbon unites with the oxygen of the dross, leaving the metal free but burning off the charcoal. The salt and soda act simply as flux in reducing the oxides.—*Western Machinist.*

A STANDARD CAR AXLE.—The proposition for a new standard car axle for railroad cars of 60,000 pounds capacity is being agitated by the different railroad clubs of the country. Its necessity is recognized by all, but those interested are divided on the question of size. A standard axle was agreed upon in 1873, but the increase in the weight of carloads has been so great as to render this standard untrustworthy. The sizes for the contemplated axle vary greatly, but many 7 feet 2 inches long and 6 feet 4½ inches between centers are being used with fair success in carrying heavy cars. Many favor an axle 6 feet 11½ inches long and 6 feet 3 inches between centers, saying that it is really desirable to retain the latter distance, especially in the new standard axle. It is hoped that when the Master Car-Builders' Association meets next June the members will adjust all minor differences and hair-splitting distinctions, and agree upon a standard axle which will carry not only 60,000 pounds, but be capable of standing the much heavier strain of a constantly increasing freight business.—*Age of Steel.*

CLOTHING A SHIP IN STEEL.—Two or three months or less after the completion of the "fairing," the ship is probably "in frame," and looks like the skeleton of some Brobdignagian monster that has stranded on the bank of the river. The ribs have been hoisted into position at right angles with the keel, and strung together by "rib-bands," and already there are signs of the coming subdivision by decks and bulkheads of the hollow space within. You can still see through her, however; she is like, to make yet another comparison, a great oblong wicker basket, the supple willows being represented by the network of steel. The next step is the clothing of the ribs with plates. As they reach the yard the plates are square and flat, but they are passed through rollers of various kinds, from which they issue in any shape desired—hollow like a spoon, curved lengthwise or breadthwise or diagonally, as the contour of the ship may call for. A steam or hydraulic plane smoothe them down as though they were of the softest of whitewood; another machine trims the edges as easily as a woman cuts silk with a pair of scissors. Then, suspended by iron chains, they are thrust between the jaws of a punching machine, which has a resemblance to a sinister human face with a flat nose, a long upper lip and a small chin. The jaws close upon them and bite out, ten at a time, the holes for the rivets by which they are to be fastened to the frame.—*Scribner's for April.*

THE OLDEST SPECIMENS OF IRON in existence, now known, are probably a sickle-blade found by Belzoni under the base of a sphinx in Karnac, near Thebes; the blade found by Colonel Vyse, imbedded in the masonry of the great pyramid; the portion of a crosscut saw exhumed at Nimrod by Mr. Layard—all of which are now in the British Museum. A wrought bar of Damascus steel was presented by King Porus to Alexander the Great, and the razor steel of China for many centuries has surpassed all European steel in temper and durability of edge. The Hindoos appear to have made wrought iron directly from the ore, without passing it through the furnace, from time immemorial, and elaborately wrought masses of iron are still found in India, which date from the early centuries of the Christian era.

HOW TO COPPER IRON.—It is stated in the *Metallarbeiter* that iron can be coppered by dipping it into melted copper, the surface of which is protected by a melted layer of cryolyte and phosphoric acid, the articles to be thus treated being heated to the same temperature as the melted copper. Another process consists in dipping the articles into a melted mixture of one part of chloride or fluoride of copper, five or six parts of cryolite and a little chloride of barium. If the article, when immersed, is connected with the negative pole of a battery, the process is hastened. A third method consists in dipping the articles in a solution of oxalate of copper and bicarbonate of soda, dissolved in 10 or 15 parts of water, acidified with organic acid.

BRICKLAYING IN WINTER.—In Norway, building operations are carried on without interruption during the winter, unless the temperature falls less than 14° to 18° F. The whole secret of the matter is that the Norwegians buy their lime, not slacked, but only burnt, and, like the ancient Romans, mix their mortar only in small quantities for immediate use. The bricks are kept under cover prior to use, and the upper courses of bricks which have been laid are shielded from rain or snow by means of planks and mats during the night, or whenever work is suspended. By attending to these simple precautions, building operations can be carried on through the winter, to the benefit of all concerned.

A TEST OF AXLES.—Some time ago a superintendent of motive-power of one of the Pennsylvania proprietary roads, who interested himself in making the best possible record in the economical operating of his department, concluded that steel axles were not so valuable as they were reputed to be, so he made some very careful tests of the journal wear of iron and steel axles doing the same kind of service. The journal wear per 50,000 miles was found to be practically the same for the axles of both material. As the iron axle is considerably less in first cost, it was the cheaper of the two. An old iron axle is generally regarded as more reliable than an old steel axle.—*National Car-Builder.*

IMPROVED ANNEALING PROCESS.—An improvement in the operation of annealing wire is announced. It consists in coiling the wire upon a hollow metallic core or drum, imbedding the wire or core in sand or its equivalent, surrounding a central open space, subjecting the whole to heat with the wire thus imbedded, and then allowing the whole to cool before removing the wire from the imbedding material. While cooling, the vessel is dipped intermittently into cooling liquid.

SOLDER FOR ALUMINUM to be used for the blowpipe, 10 parts silver, 10 parts copper, 20 parts aluminum, 60 parts tin, 30 parts zinc. For solder with the common soldering iron, use 95 parts tin and 5 parts bismuth, or 97 parts tin and 3 parts bismuth. The flux to be used in all cases is either paraffine, stearine, vaseline or benzine. The articles must be well cleaned before soldering, and heated just enough to make the solder adhere.

STEEL WATER PIPES are still gaining ground, and a Scotch company is now making 20 miles of such pipe for use in Mexico. The diameter is not given, but the thickness of the steel plate is 1-10 inches, and the engineers say that previous experience shows them that corrosion need not be feared. The Sydney water works have lately issued tenders for 1600 tons of steel water mains of a larger size.

ZINC, of all ordinary metals, expands or contracts the most by the application or withdrawal of heat.

IT is said that the exhibit of steam engines at the Paris Exposition will be the finest ever seen.

IT is proposed to substitute electric welding for riveting, in the manufacture of boilers.

SCIENTIFIC PROGRESS.

What is Electricity?

Prof. Pedro G Salom contributes a paper on this topic to the *Electrical World* of March 23d, which places the question on a chemical basis—reducing all electrical action to a chemical origin, as follows:

The study of the subject of electrical accumulators, a paper on which I recently presented before the American Institute of Mining Engineers, has given rise to a number of speculations as to what electricity is, and one of which is so important, if true, that I feel inclined to state it at once, rather than wait for time to make confirmatory tests of its truth or falsity. I refer to the theory of lightning.

For a long time we have had in chemistry the names of two mysterious elements or compounds or forms of oxygen called ozone and antozone, and while there may be very good grounds for the belief in the existence of these elements or substances, I have never met a chemist in my 15 years' experience who ever saw an ounce of ozone, or knew how to prepare an ounce; and as to antozone, that is still more hypothetical.

Now I have a very simple theory in regard to this matter, which I think explains all the facts, or most of them, and which enjoys the great advantage over most theories, in that I believe it can be practically proved or demonstrated. My theory is, that the molecules of water by being expanded when dissolved in the air, and reaching a still further degree of expansion by reason of the heat absorbed when in the form of clouds and in the rarefied atmosphere of great altitudes, reach a point where the well-known phenomenon of disassociation begins; and that they are broken up into their original elements, hydrogen and oxygen, or into hydrogen and hydroxyl, which is the water radical having an affinity of one, or acting, in other words, like a monad element. This I believe is the mysterious ozone, so called, and furnishes the remarkable properties that ozone is said to exhibit, viz., a superior property or ability for oxidation over ordinary oxygen.

For example, if we take two molecules of hydroxyl and combine them, we form water and oxygen, thus: $HO+HO=H^2O+O$; or oxygen in the free or nascent state which exhibits superior oxidizing characteristics.

Now let us examine what takes place in thunder-storms, on a hot day in summer, when they usually occur. At that time the air is surcharged with moisture owing to its heated condition, and a degree of expansion takes place until the water is disassociated by rarefaction and we have instead of clouds mysteriously charged with positive and negative electricity, which we know nothing about, hydrogen and oxygen, which we do know something about, or hydrogen and hydroxyl.

We also know that the latter is a very unstable body, and will take up hydrogen to complete the water molecule, or two molecules of hydroxyl will give up one atom of oxygen and thereby form the water molecule. It is also a powerful oxidizing agent, like so-called ozone, and, under certain conditions, this remarkable substance, which has been so little studied, is a reducing agent.

This can be illustrated graphically as follows:

$$HO+H=H_2O;$$
$$HO+HO=H_2O+O;$$
$$M_nO_2+2HO=M_nO+H_2O+2O.$$

We have only to assume the energy of combination of these two gases to be set free as electric energy instead of heat, in a manner similar to the energy of combination of the elements of a galvanic battery. The molecules of gases, in other words, arrange themselves like little batteries, and we can assume by their polarization an almost indefinite number of them in series accounting for the high potential in lightning up to thousands of volts if necessary, and at the same time a relatively small amount of current, owing to the fact that the actual amount of water produced, or involved in the discharge, is really comparatively small. When we consider that E. M. F. derived from the chemical affinity of a single atom of oxygen for two atoms of hydrogen is 1 5 volt, or is equal to 7144 foot-pounds, we have all the necessary data to account for the gigantic force and destructiveness of lightning; we know, moreover, that after a very severe stroke of lightning, the rainfall for a short time is heavier.

Now to liberate .00001012 gramme of hydrogen requires one coulomb or one ampere-second; consequently one gramme of hydrogen will require 97,847 coulombs, and 454 grammes or 1 pound will require 44,422,538 coulombs, or 12,340 ampere-hours at 1 volt, or 18 electrical horse-power hours, or 25 640,000 foot-pounds.

One hundred cubic feet of air at 100 degrees Fahrenheit will hold a little over .25 pound of water vapor. Therefore, 400 cubic feet will hold 1 pound, and as water contains 11 per cent of hydrogen, it would take about 4000 cubic feet to furnish the hydrogen necessary to account for the energy.

The assumption of the existence of the hypothetical ether is unnecessary, and I believe mathematically unsound. It is the old phlogiston theory of Stahl bobbing up serenely after having been laid to rest for over 100 years by the brilliant discoveries of Lavoisier. Moreover, it does not help us in the least. The old question still remains. If ether is necessary for the conduction of light, heat and electricity, what is it that conduces between the atoms of ether? Surely the philosophers don't mean to tell us that ether is absolutely solid, or, in other words, not made up of molecules or atoms. If it were, where would poor, ordinary matter, which we so much despise, but which in reality we know so little about, come in? If space is solid ether, how can there be any room for matter? Is it not better to try to find out something more about the things we have with us than to invent mysteries absolutely inconceivable?

The above theory, in my judgment, establishes electricity on a thoroughly chemical basis. No ether, no mysterious fluids of positive and negative character, no *immaterial material* such as phlogiston or caloric (merely names invented to conceal our ignorance), is necessary any longer to account for the phenomena. Therefore, I can repeat more forcibly than ever the definition which I gave in a short lecture at the Franklin Institute two years ago, that "electricity (or perhaps more properly speaking, E. M. F.) is the mechanical expression of chemical affinity."

This is a subject of such far-reaching importance and of such a high scientific value that it would be presumptuous for me to indicate, even if I were able, the great questions involved in a true understanding of the subject.

WHAT WOULD HAPPEN?—In reply to the question, "What would happen if the plane of the earth's equator were coincident with that of the earth's orbit round the sun?" a writer says: Day and night would be equal all the world over. There would be no seasons in any latitude. The sun would always appear to travel in a vertical circle directly over the equator, and at either pole he would be seen bowling round the horizon every 24 hours. Daylight would there be perpetual; the sun would never set at all; for though his actual relative position would be such as to dip half below and rise half above the horizon, the effect of refraction would be to raise his visible orb well above the horizon altogether. All over the world one day would be as good as another, or as bad, for sowing or reaping. No granaries, no ricks, no stores of any kind of food would be required, as a daily succession of crops of anything and everything sowable and reapable in any latitude would be attainable. Even similarly successive crops of fruit might be obtained by a selection of trees and bushes. The requirements of human beings would be curiously changed, and the political economy of Adam Smith and Stuart Mill would be quite as absurd as Mr. Ruskin believes it to be; for the withdrawal of all the necessities for saving and storing would remove the chief necessity for capital and thrift.

NEPTUNE AND ITS SATELLITE.—M. Tisserand has presented a report to the Paris Academy of Sciences, concerning some remarkable observations of the satellite of the planet Neptune, which was discovered in 1847. The angle which the plane of the orbit of this satellite made at that date with the ecliptic was about 30°, but this angle has now been increased by at least 6°. The satellite moves round its principal in an opposite direction to that usually followed by other satellites, so that a question might be raised whether in course of time this variation in the inclination of the plane of its orbit might not end in its movement around its principal becoming normal. M. Tisserand shows that this variation of inclination was due to the oblate or flattened condition of Neptune at its poles and that it will complete its limit within a period of 500 years, at the end of which time it will again be as it was in 1847.

THE GREATEST OCEAN DEPTH.—The greatest known depth of the ocean is midway between the Island of Tristan d'Acunha and the mouth of the Rio de la Plata. The bottom was there reached at a depth of 40,236 feet, or 8¼ miles, exceeding by more than 17,000 feet the hight of Mount Everest, the loftiest mountain in the world. In the North Atlantic ocean, south of Newfoundland, soundings have been made to a depth of 4580 fathoms, or 27,480 feet, while depths equaling 34,000 feet, or 6½ miles, are reported south of the Bermuda islands. The average depth of the Pacific ocean between Japan and California is a little over 2000 fathoms; between Chili and the Sandwich islands, 2500 fathoms; and between Chili and New Zealand, 1500 fathoms. The average depth of all the oceans is from 2000 to 2500 fathoms.

GELATINE IN VARNISH.—A varnish made with alcohol will get dull and spongy by the evaporation of the alcohol, which leaves water in the varnish, as all commercial alcohol contains water. It is, therefore, says the *Carriage Monthly*, advisable to take a thin sheet of gelatine, cut it into strips and put it into the varnish; it will absorb in the thin sheet most of the water, and the varnish can be used clear and bright till the last drop. The gelatine will get quite soft. It can then be taken out and used again.

GREAT EARTHQUAKE DISTURBANCES.—According to M. Blavier's theory, the great earthquake disturbances of 1755, 1884 and 1887, are to be associated with the abnormal accumulations of ice about the north pole. He supposes such accumulations to have caused a deflection of the Gulf Stream away from Europe, producing great climatic changes and a slight disturbance of equilibrium in the sea bottom, followed by a possible local fracture along the line of least resistance.

Good Health.

Why Teeth Decay.

Microscopic Germs or Bacteria at the Seat of the Trouble.

Decay of the teeth (caries) is exceedingly common, especially so among civi ized people. The lack of power to resist this disease may be due to the depression of vital vigor through overtaxing the nervous system or through sedentary habits and luxurious living. In this, as in other matters, there are inherited tendencies, and the children of those whose teeth decay early themselves suffer the same evil.

But what is the immediate cause of dental decay? A paper on the subject was read by Dr. Geo. S. Allen, of New York, before a meeting of the Dental Union, lately held in Boston.

According to this paper the credit of solving the question belongs to Dr. W. D. Miller, an American residing in Berlin, Germany. The solution is found in the germ theory, which has already settled the origin of so many infectious diseases.

The microscopic germs, which are called bacteria, the smallest of organized beings, so small that it takes 100,000 of them placed lengthwise to measure an inch, belong to the plant family. They multiply both by division and by the formation of spores. The spores, which correspond to seeds, have great vitality, and are unaffected by the temperature that would destroy the parent plant. The multiplication by division is exceedingly rapid.

Thus the total eradication of the germs is almost out of the question, and in even a short time, if the pest be neglected, it becomes difficult to limit the harm they can do. That harm may be effected either by the growth of the bacteria at the expense of the cells of the body, or more probably, perhaps, by developing a poison in their waste products.

It must be remembered, however, that many kinds of bacteria are perfectly harmless, while it is possible that some aid in the vital processes of the organism.

The mouth is infested by several forms of innocent bacteria. The saliva is never free from them. Therefore, in order to ascertain if dental caries is due to bacteria, most rigorous tests were necessary. The bacteria must be found in the decayed matter of the teeth; be isolated from every other kind; cultivated outside of the body, and the pure cultivation must produce a similar caries when introduced into a healthy tooth, and this caries must show the same form of bacteria.

Dr. Miller's experiments have conformed to these tests. He found bacteria filling the tubules of the decayed teeth; obtained pure cultures from them, and, placing the latter in tubes with pieces of sound teeth, the microscope in from two to four weeks showed a similar caries, and the tubules distended with similar bacteria.

The Length of Life.

Life insurance men have made of the question of longevity almost a determined science, with an ample array of figures and rules. According to these, the average man who has reached the age of 60 has still a little less, and the average woman who has reached the age of 60 a little more, than 14 years to live. But the expectation of life does not, relatively, diminish with the advance of years, for at 80 the man's chance is somewhat less, and the woman's somewhat more, than five years and a half. According to the English standards, the persons who live longest are members of the clergy, while in other pursuits longevity ranks in the following order: Farmers, merchants, soldiers, clerks, teachers and physicians. The death-rate among the clergy of the Established Church of England is exceptionally low, being, in the years of active clerical service, only 10 in 1000 of population, whereas that of the English Catholic clergy is 50 per cent higher. The figures of the insurance companies, which are ample regarding every point involved, show that, the age of 50 passed, the expectation of life is more than twice as great for the temperate as for the inebriate, the proportion being as seven to three. The proportion of the rich as compared with the poor, over 70, is about four to one, and it is generally higher among women than among men. We suppose there is no country of the world where the science of long life, accompanied with good health, unimpaired mental faculties, good digestion and great activity, is better understood than in France, and there, of 1000 persons born, 120 reach the age of 70, and the percentage continues to be high until 85 is passed. The nervous, exciting, restless life of most Americans is not conducive to extreme longevity, and the steadily large immigration of those who have reached the years of manhood in other lands as emigrants tends to greatly reduce the standard of longevity in this country; but the tables of American insurance companies show that it is steadily rising. Should this increase continue, it may not be many years before the rate here will compare favorably with what long experience and repeated proofs have shown to be the normal rate in other lands.—*N. Y. Sun.*

How to be a Good Nurse.—Six things, says a doctor writing on the subject, are necessary to a good nurse; Strong, equable health; sound nerve; minute observation; a retentive memory; habits of neatness and cleanliness, and a calm, collected mind. A nurse must never disregard her health, because it is essential to her own well-being, and because, too, attendants on the sick should always be cheerful and hopeful. Sound nerve is often a matter of training, but its root lies in unselfishness. Any one who, in an accident or operation, forgets self in the desire to aid others, will not be troubled by trembling or fainting. The faculties of observation and retentiveness of memory can be developed by having interest in the work strong enough to make the nurse careful and patient in her observations. A calm mind is generally the result of organization. If a nurse has arranged her day's work beforehand, if she keeps everything punctually to this arrangement, and if everything needful is neatly disposed, she is not likely to be discovered in bustle and confusion at any time. The nurse should, furthermore, be mindful that she is under the doctor, and should respect and obey his directions, even if she differs in opinion from him. It is extremely important that those who are sick and suffering should be treated with unfailing gentleness and patience; nothing can ever excuse a nurse for losing her temper with her patient. No duty is too little or trifling for her attention, and no work that is for the good of the patient can be degrading. It is further a good rule never to approach a case fasting, but always have a good meal before going on duty. —*Science Monthly.*

The Massage Treatment.—Fe jean doctors are said to have great faith in massage, which they have practiced from time immemorial, and have taught to the Samoans and the Tongans. The rubbing and kneading of the affected part is sometimes continued for hours, stimulating the circulation and relieving the pain.

European Health Resorts.—Some of the "cures" at a European resort are mineral-water cure, grape cure, whey cure, cold-water cure, massage cure, pine-needle baths, Russian, Roman, Irish, mud, steam and electric baths. All ills are met by "cures."

Smothering Infants.—An English medical journal declares that the number of infants smothered to death in England by half-tipsy parents, between sunset on Saturday and sunrise on Monday, exceeds the mortality of any other night in the week.

To Fumigate a Room.—The simplest way to fumigate a room is to heat an iron shovel very hot, and then pour vinegar upon it, drop by drop. The steam arising from this is a disinfectant. Doors or windows should be opened that it may escape.

Useful Information.

A Substitute for Coffee.

A discovery of a curious nature has been made recently in the island of Reunion, and is considered by alarmists a serious danger to the coffee trade. The island in question abounds in the wild orange. This plant produces a fruit which in its first stages is of a green color, which is gradually metamorphosed into something approaching blue, while the first stage of maturity and ripeness is signalized by a purple tint. Though its possible utility from a commercial standpoint has been hitherto wholly unknown, it was, for some unstated purpose, recently subjected to a certain test, by which it has been discovered to possess every quality which could be required in an excellent substitute for coffee. It is equal in its flavor to the time-honored berry, even in its best condition, and the small cost of its production will place it within the reach of many for whom ordinary good coffee is an expensive luxury. The colonial Government of Reunion is examining the facts of the case, and 24,000 acres in the most elevated parts of the island are sold to be devoted henceforth to the cultivation of the wild orange. A return of 3 000,000 kilogrammes is expected annually. One result of the discovery will be in all probability a tremendous fall in the chicory trade. Two million kilogrammes of this wholesome substance are annually blended with French coffee, which is now imported in enormous quantities into England. Mussaenda is the curious and not euphonious name which has been conferred on the produce of the wild orange, and it is confidently declared that it can compete with pure coffee, and when mixed therewith it improves it in a marked manner, alike in taste and fragrance.

Secrets Read in the Face.—A man's occupation or condition has a good deal to do with his facial expression, remarks the *Herald of Health.* Intellectual pursuits, like the studies of the scholarly profession, when coupled with temperate and moral habits of life, brighten the face and give a person a superior look. Magnanimity of nature, or love of studies and art, will make a bright, glad face; but, contrary to this, a man may have a face that does not please anybody, because of a love of self to the exclusion of all others, notwithstanding his learning and worldly shrewdness. Soldiers get a hard, severe look; overworked laborers constantly look tired; reporters look inquisitive; mathematicians look studious; judges become grave, even when off the bench; the man who has had domestic trouble looks all broken up. An example of the ludicrous side of this subject is to see a third-class lawyer stalking around a police court looking as wise as an owl. The business makes the face, I say. There's the butcher's face, the ministerial face, the lawyer's face, the doctor's face, the hoodlum's face, all so distinct each from the other and singly, that I seldom fail to recognize those callings showing through the faces. And what city boy cannot recognize a genuine farmer on the street, as a farmer, the moment he sees him?

Why Paper Becomes Brittle.—A German writer in *Papier Zeitung* recently gave a description of certain observations on the above subject, which the writer had made extending over a period of ten years. His observations led to the conclusion that neutral or basic sulphate of alumina, which is often used in the manufacture of writing papers, exercises no decomposing influence on paper at ordinary temperatures, whether "size" be present or not, but that sulphate of alumina has a strongly caustic action if chlorides—such as those of sodium (common salt)—and calcium be present, especially at high temperatures. In this case an injurious action on the paper arises from the formation of aluminium chloride, or free hydrochloric acid, which acts by abstracting the elements of water from the cellulose. The advice given by the author (Herr C. Wurster) is, therefore, that the manufacturers should endeavor to remove, as far as possible, by washing, from the fabric any sodium or calcium chloride resulting from the bleaching powder. It is, accordingly, not advisable to kill the bleach by anti-chlor, without subsequent washing. The author concludes, from these considerations, that the testing of paper should include a qualitative or quantitative examination of the chlorides present, which have hitherto been looked upon as being quite harmless.

Drowned Bodies and a Loaf of Bread.—There is a curious and widespread belief that the whereabouts of a drowned man may be ascertained by floating a loaf of bread down a stream, when it will stop over the spot where the body is. A curious account of a body thus recovered near Hull appeared some years back in the *Gentleman's Magazine.* "After diligent search had been made in the river for the child, to no purpose, a two-penny loaf, with a quantity of quicksilver put into it, was set floating from the place where the child was supposed to have fallen in, which steered its course down the river upward of half a mile, when, the body happening to lie on the contrary side of the river, the loaf suddenly tacked about and swam across the river and gradually sank near the child, when both the child and the loaf were brought up with the grapplers ready for the purpose." A correspondent of *Notes and Queries* maintains that it is a scientific fact that a loaf and quicksilver indicates the position of the body, as the weighted loaf is carried by the current just as the body is. This practice, too, prevails on the continent; and in Germany the name of the drowned person is inscribed on the piece of bread, while in France loaves consecrated to St. Nicholas, with a lighted wax taper in them, have generally been employed for that purpose.

The Future of China.—Baron Richthofen, in describing the northwest of China, says that the Shansi district is one of the most remarkable coal and iron regions in the world, and he estimates that at the present rate of consumption the coal of this district would supply the world for thousands of years to come. It is claimed by some writers that Shansi, when more thoroughly explored, will bear away the palm from Pennsylvania, whose 20,000 square miles of coal land have been heretofore considered as the greatest single deposit in the world. Richthofen says further that this coal can be very easily and cheaply extracted on a large scale, and that iron ore of excellent quality is found in quantities in the immediate vicinity of the coal fields. Be this as it may, mineral wealth is abundant, and when it comes to a question of labor, the Chinese can furnish this to an almost limitless degree, and recruit it from a class that is naturally patient, skillful and content with small gains.

A Race of Giant Rats.—Stonington, Conn., it is stated, has a new kind of a rat which stole a ride in a schooner that recently came from Cape Horn. Twenty or 30 of them came in the vessel as samples and to inspect this country to see whether it will do. They landed at once, fell in with the New England seaboard rats, got acquainted, and are now on good terms with them. The Cape Horn rat is an entirely new thing in North America. He has very long ears, an extremely long tail, and in every way is built on the liberal plan peculiar to the Patagonian fauna. It was a surprise to Stonington that he fellowshiped with the native Norway rat, as no other living thing will associate with that animal, which drove the old-fashioned black rat that was indigenous there 40 miles back from the coast.

Water-Pipe Discharge.—In a paper read before the Royal Society (England), Henry Hennessy, F. R. S., says the maximum discharge of water through a pipe of circular section, when the head is due only to the inclination of the pipe, is not when the pipe is full of water, but when filled to about nineteen-twentieths of its diameter.

The New Land Law.

The Register of the Land Office has received a copy of the new Act of Congress, approved March 2, 1889, affecting settlers on public lands. It is as follows:

Be it enacted, etc., Section 1. That from and after the passage of this Act no public lands of the United States, except those in the State of Missouri, shall be subject to private entry.

Sec. 2. That any person who has not heretofore perfected title to a tract of land of which he has made entry under the homestead law may make a homestead entry of not exceeding one-quarter section of public land subject to such entry, such previous entry or filing to the contrary notwithstanding; but this right shall not apply to persons who perfect title to lands under the pre-emption or homestead laws already initiated; provided that all pre-emption settlers upon the public lands whose claims have been initiated prior to the passage of this Act may change such entries to homestead entries and proceed to perfect their titles to their respective claims under the homestead law notwithstanding they may have heretofore had the benefit of such law; but such settlers who perfect title to such claims under the homestead law shall not thereafter be entitled to enter other lands under the pre-emption or homestead laws of the United States.

Sec 3. That whenever it shall be made to appear to the Register and Receiver of any public land office, under such regulations as the Secretary of the Interior may prescribe, that any settler upon the public domain under existing law is unable by reason of a total or partial destruction or failure of crops, sickness or other unavoidable casualty, to secure a support for himself, herself, or those dependent upon him or her, upon the lands settled upon, then such Register and Receiver may grant to such settler a leave of absence from the claim upon which he or she has filed for a period not exceeding one year at any one time, and such settler so granted leave of absence shall forfeit no rights by reason of such absence, provided that the time of such actual absence shall not be deducted from the actual residence required by law.

Sec. 4. That the price of all sections and parts of sections of the public lands within the limits of the portions of the several grants of lands to aid in the construction of railroads which have been heretofore and which may hereafter be forfeited, which were by the Act making such grants or have since been increased to the double minimum price, and, also, of all lands within the limits of any such railroad grant, but not embraced in such grant lying adjacent to and coterminous with the portions of the lines of any such railroad which shall not be completed at date of this Act, is hereby fixed at $1.25 per acre.

Sec. 5. That any homestead settler who has heretofore entered less than one-quarter section of land may enter other and additional land lying contiguous to the original entry, which shall not, with the land first entered and occupied, exceed in the aggregate 160 acres without proof of residence upon and cultivation of the additional entry; and if final proof of settlement and cultivation has been made for the original entry, when the additional entry is made, then the patent shall issue without further proof; provided, that this section shall not apply to or for the benefit of any person who at the date of making application for entry hereunder does not own and occupy the lands covered by his original entry; and provided, that if the original entry should fail for any reason, prior to patent, or should appear to be illegal or fraudulent, the additional entry shall not be permitted, or if having been initiated shall be canceled.

Sec. 6. That every person entitled, under the provisions of the homestead laws, to enter a homestead, who has heretofore complied with, or who shall hereafter comply with the conditions of said laws, and who shall have made his final proof thereunder for a quantity of land less than 160 acres and received the Receiver's final receipt therefor, shall be entitled under said laws to enter as a personal right, and not assignable, by legal subdivisions of the public lands of the United States subject to homestead entry, so much additional land as added to the quantity previously so entered by him shall not exceed 160 acres; provided, that in no case shall patent issue for the land covered by such additional entry until the person making such additional entry shall have actually and in conformity with the homestead laws resided upon and cultivated the lands so additionally entered, and otherwise fully complied with such laws; provided, also, that this section shall not be construed as affecting any rights as to location of soldiers' certificates heretofore issued under Section 2306 of the Revised Statutes.

Sec. 7. That the "Act to provide additional regulations for homestead and pre-emption entries of public lands," approved March 3, 1879, shall not be construed to forbid the taking of testimony for final proof within ten days following the day advertised as upon which such final proof shall be made, in cases where accident or unavoidable delays have prevented the applicant or witnesses from making such proof on the date specified.

Sec. 8. That nothing in this Act shall be construed as suspending, repealing or in any way rendering inoperative the provisions of the Act entitled "An Act to provide for the disposal of abandoned and useless military reservations," approved July 5, 1884.

The Santa Cruz *Surf* is authority for the statement that a new lumber line is soon to be built from Corvalitos to Moss Landing. The proposed line will start from a point in the bay shore, about half a mile below Capitola, and will extend up the easterly side of the Soquel canyon, and into an immense timber belt, owned by private parties who are behind the scheme. Where the line joins the Southern Pacific a large sawmill is to be built. The road will be operated in connection with the Southern Pacific. Surveys have been made, right of way procured and the line located for the greater part of the distance. It will be a broad gauge.

Sawdust is being used as fuel in factories and mills on this coast to a greater extent than ever before, owing to the high price of wood and coal.

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TABLE OF CONTENTS.

EDITORIALS.—California Salt, 275. Passing Events; Marine Engines; Displacing a Stamp-Mill; A New Ore Feeder; Foundry Notes; The El Paso Ore Works, 282. Lodes on the Comstock; A New Steel Whim, 283.
ILLUSTRATIONS.—Salt Pond at Alvarado; California Salt Works, Alameda Co., 275. Common Sense Whim; The Annie Gold Lode and Geology, Salmon River, Idaho, 283.
CORRESPONDENCE.—Tuolumne Mines; Calaveras County Mines, 276.
MISCELLANEOUS.—The Plumas-Eureka; Notes on Leaching Silver Ores, 276. The Government Surveys; Wild Ginger; Esmeralda Borax Mines; The Washington Centenary; Bounty for Artesian Wells in Nevada, 277.
MECHANICAL PROGRESS.—How to Harden Thin Plates; Melting Zinc; A Standard Car Axle; Clothing a Ship in Steel; How to Copper Iron; Bricklaying in Winter; A Test of Axles; Improved Annealing Process, 280.
SCIENTIFIC PROGRESS.—What is Electricity; What Would Happen; Neptune and Its Satellite; The Greatest Ocean Depth; Gelatine in Varnish; Great Earthquake Disturbances, 280.
GOOD HEALTH.—Why Teeth Decay; The Length of Life; How to be a Good Nurse; The Massage Treatment; European Health Resorts, 281.
USEFUL INFORMATION.—A Substitute for Coffee; Secrets Read in the Face; Why Paper Becomes Brittle; Drowned Bodies and a Loaf of Bread; The Future of China; A Race of Giant Rats; The New Land Law, 281.
SAWMILL NOTES.—A Double-Acting Band-Saw Mill; Lively Demand for Sawmill Machinery; Miscellaneous Items, 284.
THE WOOD WORKER.—Aboriginal Wood-Workers; Various Notes, 284.
MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 278-9.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 280.

Business Announcements.

[NEW THIS ISSUE.]

Mining Machinery—F. A. Huntington.
Russell Process Co., New Haven, Conn.
Harvey's Mining Code, New York.

See Advertising Columns.

Passing Events.

Reports from all over the State give the outlook as most encouraging for this year's season. Crops are expected to be unusually large, owing to the very favorable climatic conditions.

The quartz industry of California is now very prosperous. More quartz mines are being worked than ever before in the history of the State. Those which were known but which would not pay 20 years ago are now profitable.

A new 120-stamp mill for an Alaska mine is the third of the same size sent from here to that Territory. The quartz deposits there are of low grade, but very large, being, in fact, almost quarries. There is an immense area of territory in that region yet unprospected.

NOTWITHSTANDING the fact that all the necessary stores have been placed aboard the cruiser Charleston and a captain appointed for her trial trip, the date of that event has not been determined upon.

THE executive committee having in charge the centenary celebration of Washington's inauguration are making preparations for a monster demonstration on April 30.

Marine Engines.

It is pretty evident that the success of the warship of the future will depend just as much on the power of her engines as on the form or style of the vessel itself. The armament is, of course, a very important feature, but if the engines cannot properly bring the vessel and armament where it is wanted, and at the proper time, neither vessel nor armament will amount to much.

The navy now depends entirely on steam, but steam must be properly used and there must be plenty of it. We have been for a long time putting "nine-cat power" engines into big vessels which have had difficulty in getting out of their own way. The navy has by no means kept pace with the merchant marine in the matter of speed or power. Probably the trouble has partly been that the navy has stuck to old designs and old ideas too long. It has not been as progressive as should have been the case.

In addition to the sorrow which the American people feel at the loss of so many lives during the hurricane at Samoa, there is also a feeling of disgust that our ships were not sufficiently provided with power to enable them to escape from the dangers that finally caused their destruction. This feeling would have been lessened had it not been apparent that other ships were so provided and escaped. One vessel, the Calliope, steamed out of the dangerous anchorage in the teeth of the hurricane and took to the open sea, escaping all damage or loss of life.

This vessel was provided with most powerful modern engines and even then could make but half a knot an hour against the wind and sea. Had the engines been a trifle less powerful, she could have made no headway and would have gone astern and to destruction with the rest. Her commander took chances; but he would not have dared to take them had he had less confidence in his steam-power. Having this confidence—not misplaced—he succeeded in saving his valuable ship and crew, where others lost theirs.

There is a lesson in this that the American people will not forget, and it is sure that the officials who have such things in charge will not be excused when vessels are designed which have less power than they should. In these days of advanced steam-engineering knowledge there is no excuse for equipping our Government vessels with poor engines or other machinery. If there is not sufficient talent in the Naval Department to produce what is necessary and proper, it should be compelled to call upon the skilled civilians to design, as they already construct.

Here, near as we are to a Government navy-yard, those familiar with nautical matters hear more or less to the detriment of the steam machinery of Government vessels. The men-of-war have poor boilers or engines that are constantly breaking down or coming to grief in some way, in a manner that private individuals would not stand for a moment, and would see remedied at once. The officers of the vessels seem powerless to effect a change and use the machinery under silent protest. It is time a change should be made for the better. Government engines should be better if possible than those of private owners, not worse, for expense is no object. The Government steam machinery has come to be a laughing-stock all over the country.

Clarke Russell, the best writer on sea topics that ever lived, tells a story of a ship-owner that habitually overloaded his ships, notwithstanding the remonstrances of his officers. He always contended that a ship could not be overloaded. Finally he had to make a short voyage in one of his own steamers, which was loaded in the usual way. Then he had an experience which he never forgot. He feared for his life for days, though the weather was by no means as bad as might have been the case. It resulted in a complete change of his system of loading. It is a pity that some of the contractors or designers, or whatever class of persons are responsible for our weak-engined ships, were not on board in that Samoan hurricane instead of the poor fellows who were sacrificed to their ignorance, stupidity or greed. Some of the arm-chair critics at Washington now presume to contradict the officers who were in the hurricane as to the facts and causes of the loss, by which it would appear that instead of feeling grateful at having defects of design pointed out after experience, they prefer to justify their lack of practical knowledge. It is just such senseless official stupidity as this which gives us poor vessels in the navy instead of good ones.

The El Paso Ore Works.

Some five years since Mr. Robert S. Towne established in El Paso a sampling works, under the name of the "Mexican Ore Company." In its incipiency the object of these works was to draw from Mexico a supply of the high-grade rebellious ore for which that country is noted. The sampling works were run in conjunction with the "Kansas City Smelting & Refining Company."

The business of the Mexican Ore Company increased to such proportions that Mr. Towne and three other gentlemen united in the construction of the El Paso plant. Quite recently the Kansas City corporation has united with the El Paso outfit, forming one company, with the central offices at Kansas City.

The El Paso plant is located on the American bank of the Rio Grande, some 2½ miles above El Paso. The works are so located that the Atchison, Topeka & Santa Fe and Southern Pacific railroads run through the yard. The smelting company own some 1300 acres in the immediate vicinity of the works.

Switches from the railroad deliver the ore directly into the sampling-house; from here it goes either to the furnace-bins or to the roasting-furnaces. The roasting-plant consists of four four-hearth reverberatory furnaces, with a capacity of 12 tons per day each. There are five smelting-furnaces of the "Rachette" type. The inside dimensions of the furnaces are 36 by 100 inches at the tuyere. The furnaces are all water-jacketed; the combined capacity is 200 tons of ore per day.

There are employed in and about the works some 300 men, principally Mexicans; the pay-roll amounts to about $14,000 per month. About two-thirds of the ore smelted comes from Mexico, the remainder coming principally from Arizona and New Mexico. The works are under the general management of Mr. Henderson, Mr. Allen being the metallurgist.

A New Ore-Feeder.

George Johnson of the Little Nelly mine, Shasta, Shasta Co., has just received, through the MINING AND SCIENTIFIC PRESS, a patent on an improved ore-feeder. The operation of this feeder is as follows: The ore passes down through the mouth of the hopper and rests upon a horizontal cylinder. The rotary motion of the cylinder carries the ore against an inclined scraper or feed-flange, which serves a purpose similar to that of the thread of a screw, carrying the ore forward on the cylinder and directing it into a discharge plate at the end. The ore is kept on the cylinder by a guide flange on the other side. But a small portion of the ore at a time can fall upon the cylinder, and the cylinder being horizontal, the ore cannot run down it by gravity to any extent, but must be fed off directly by the scraper flange. This results in a uniform and regular feed, and as but a stated quantity of ore can come from the hopper, the service to the cylinder is regular, and but small power is required to impart to it the necessary movement; nor is there any liability to choke or clog. Having the cylinder horizontal, the inventor finds to be advantageous in preventing the ore from rolling down over and from it, as it would have a tendency to do if the cylinder were mounted at an inclination. Being horizontal, the feed is wholly dependent upon being carried against the fixed scraper, and therefore is more uniform in its passage from the hopper (for only a certain amount can come from the hopper on to the horizontal cylinder) and in its discharge from the cylinder.

IT is said a Japanese line of steamers will shortly run to the Pacific Coast in opposition to the Pacific Mail. Agents have been appointed to make arrangements with the various republics, and are already in possession of several concessions.

THE Nanaimo *Courier* says: Owing to the accumulation of bad air in No. 3 mine, Roslyn, Wash., it has been shut down. This mine has been employing negroes exclusively, and about 200 of them are thereby thrown out of employment.

Foundry Notes.

The Risdon Iron Works are now running to their full capacity, especially in the boiler-shop, where there is enough work to keep it going for the next six months. Superintendent Moore reports business unusually brisk. The large boilers for the steamship Australia, the heaviest ever built on this coast, have been finished, and work is now under way getting the ship ready to receive them. In addition to their main work, they have just contracted for a 120-stamp mill for the Alaska Gold-Mining Company of Alaska Territory, to be run by steam-power and to contain all the latest improvements, this making the third 120 stamp mill built by the Risdon for Alaska.

The Bryan roller quartz-mill, which is a specialty at these works, is selling very rapidly. They have disposed of at least two dozen within the past month and have orders in hand for 14 or 15 more. They are going to all parts of Mexico, Australia and British Columbia, and give universal satisfaction wherever sent. Quartz operators should examine the Bryan mill, which has many features to recommend it.

Pelton Water-Wheels.

The Pelton Water-Wheel Co. reports a very active business and the demands for their wheels covering a very wide extent of country. The extraordinary results obtained from them under all ordinary conditions, as well as under exceptionally trying ones, as in the Chollar shaft on the Comstock, where they are working under a head of over 1600 feet, is attracting much attention, not only in this country, but in foreign parts as well.

Among the companies recently supplied with wheels are: The Roaring Fork Electric Power Co. of Aspen, Colorado, to whom six were recently sent to enlarge their plant, two having been in use for the past year; one to the Revenue Tunnel Co. of the same place; one to the Adams mine at Rico, Colorado; four to the North Banner mine and four to the Pittsburg mine, Grass Valley; two to the Golden Queen mine and one to the Gold Bank mine in Butte county; one to the Hathaway mine in Placer county; two to the Sierra Nevada Land and Water Co. and one to the Gigmag Gravel mine in El Dorado county; one to the Calaveras Consolidated Mining Co. and four to the Utica mine, Calaveras county; two to the Eureka Con. mine and one to the Golden Gate mine, Tuolumne county; eight to the Amador mine and two to the Kennedy mine, Amador county; one to the Tiger mine, Canyon Creek, Idaho; one to the Central American Reduction Co., Honduras, C. A.; one to the Olancho mines, Honduras, C. A.; one to the Baker flour-mills, Charlemont, Mass.

Most of the above, it may be stated, are large-sized wheels, calculated to develop from 50 to 75 and 100 horse-power each.

ELECTRICAL SOCIETY.—At the last meeting of the California Electrical Society the subject of the evening, "Electric Motors and the Electrical Transmission of Power," was opened by a talk, illustrated with blackboard diagrams, by J. L. Jayne of the Sprague Electrical Company. A more perfect system for the economical subdivision of a high voltage among small, efficient and harmless motors was predicted for the near future. President Keith followed, and spoke forcibly of the crude and wild ideas of electric possibilities which are current. On the utilization of Niagara by electric transmission, he said it was easily demonstrable that under present conditions, the first cost of a plant and cable to transmit 1000-horse power even 30 miles, to Buffalo, would be so great that the interest upon it would more than pay for the production of the same power from coal in the steam engine.

ARIZONA MINE SOLD.—Claflin & Co. of New York have purchased the Yellow Jacket gold mine of the Oro Blanco District, 40 miles south of Tucson, for $20,000. The final payment of $10,000 has been made on the Ploma lead and silver mines of the Tyndal District, 60 miles south of Tucson.

THE Southern Pacific Company has closed the bar at its mole at Oakland Point, and those in the eating-houses along its lines.

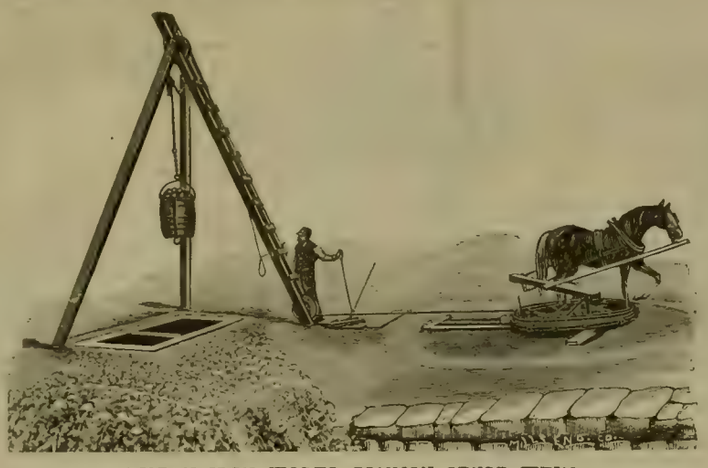
MONTEREY expects, as soon as a suitable road is built, to get the bulk of her fuel from the Sur Chiquito mines.

Lodes on the Comstock.

In the "Local Markets" and also in the "Mining Share Markets," the MINING AND SCIENTIFIC PRESS has consistently advocated the theory that lying west of the Comstock lode there were other important valuable lodes, and now we are pleased to see that the Virginia City papers are coming to the front in advocacy of this position, which begins to lose its look of theory and assume that of an actual fact. There can be no doubt but the work in West Con. Virginia did much in developing the two-lodge theory which has been still further strengthened by the developments west in Hale and Norcross, Con. Virginia and Best and Belcher, more particularly in the former. The latest improvement in the Hale and Norcross is reported to be 700 feet west of any former development, besides being of a different formation. While the MINING AND SCIENTIFIC PRESS is well pleased with its expressed views on the Comstock being substantiated by the work now going on, yet we fail to see the justice of some of the daily papers advocating the extension of the Sutro tunnel further into Mt. Davidson, the expense for which is to be borne by the leading mines on the Comstock lode. Sutro tunnel should be extended and work begun at an early day, but there can be no good reason why such mines as Hale and Norcross, Savage, Best and Belcher, Con. Virginia, Ophir and others on the Comstock lode should bear the expense. The Tunnel Company should prosecute the work and make similar arrangements for royalty with the mines located west as it has with those now paying royalty on all ores extracted and milled. The work now being done in the mines has demonstrated the richness of the vast ore bodies lying west of the Comstock lode, and has also shown the importance of extending the tunnel still further into Mt. Davidson, and demonstrating beyond the question of a doubt its richness, besides laying at rest the theory that no valuable mineral-bearing lode lies west of the Comstock.

In running the Sutro tunnel the company cut through several distinct and important lodes. These lodes are parallel with and have about the same dip as the Comstock, but their extent and value have not been fully determined, although one, the Brunswick or Occidental, is reported by the United States Geological Department to be quite large, and is liable to prove by extensive exploration work to be as rich in valuable mineral ore as has the Comstock. As laid down in Rose's map of the Comstock mines and Sutro tunnel, published in 1878, the tunnel cut through six lodes before reaching the Comstock. They were passed through in the following order: Great Flowery, Silver Star or Bella Union, Brunswick or Occidental (which is also called Monte Cristo), Solferino, Reno and the East lode. Rose's map also shows that west of the Comstock there are two lodes, but well informed mining engineers claim that there are four, perhaps five. This can only be proven correct by extending the Sutro tunnel, but that there is one, and perhaps two, the work to the west in the leading mines on Comstock, and also that now going on in West Con. Virginia, clearly proves; yet its extent and richness time can only show, but that it is proving to be more important than ever before conceived is now an admitted fact.

In this connection, it may not be out of place to state that persons who are reputed to be well informed on the Comstock aver that moneyed men are picking up titles to as many of the claims or mines located west of the Comstock lode as they can possibly secure.



RISDON IRON WORKS COMMON SENSE WHIM.

Salmon-River Gold Mines, Idaho.

[Written for the PRESS by CHAS. F. BLACKBURN.]

In the Eureka mining district, Lemhi county, Idaho, is located the Annie gold lode, a large contact vein of quartz that shows well and is without doubt a bonanza.

Herewith is given a geological chart of a section of the lode showing the adjacent formation and dip of vein.

The Annie is a porphyry-slate contact lode, striking north and south, and dips west 40° directly into the mountain range. In the chart, No. 1 represents the Annie gold lode; *A* is porphyry (footwall); *B*, chloritic talc slate (hanging-wall); *C*, block slate and gneiss; *S*, Salmon river.

The Annie gold lode is a well defined vein showing a continuous outcrop for several thousand feet. The ore body is six to seven feet in width, consisting of a fine sugary or agate-grained free-milling gold quartz that will sample $10 to $30 per ton in gold. Some of the ore, a brown honey-combed stuff, will go over a thousand dollars per ton. According to the way the quartz prospects, it will all pay to mill. It is difficult to get ore from the vein that will go less than $10 a ton.

The quartz contains very little sulphurets, and but very little is looked for until water-level is reached, which will be from 500 to 800 feet or more below the croppings, owing to "canyon drainage" near by. Several canyons cut through the lode, and one on the north, at north end of the Red Bird extension, has eroded, or cut down into the formation, to a depth exceeding 2000 feet below the Annie croppings. The property is splendidly situated for tunnel development. There are several extensions located on the Annie—the Red Bird on the north and Katie and Comet on the south. Considerable work in the way of tunnels and open cuts has been done on the property, and all the work in ore. Thousands of tons of quartz are in sight, but the owners are unable to put on a mill and develop the property. The formation is permanent, and the lode showing such a long outcrop, is bound to go down. The development of this gold lode is bound to prove a financial success, from the fact there is so much good ore exposed that failure is practically a geological impossibility.

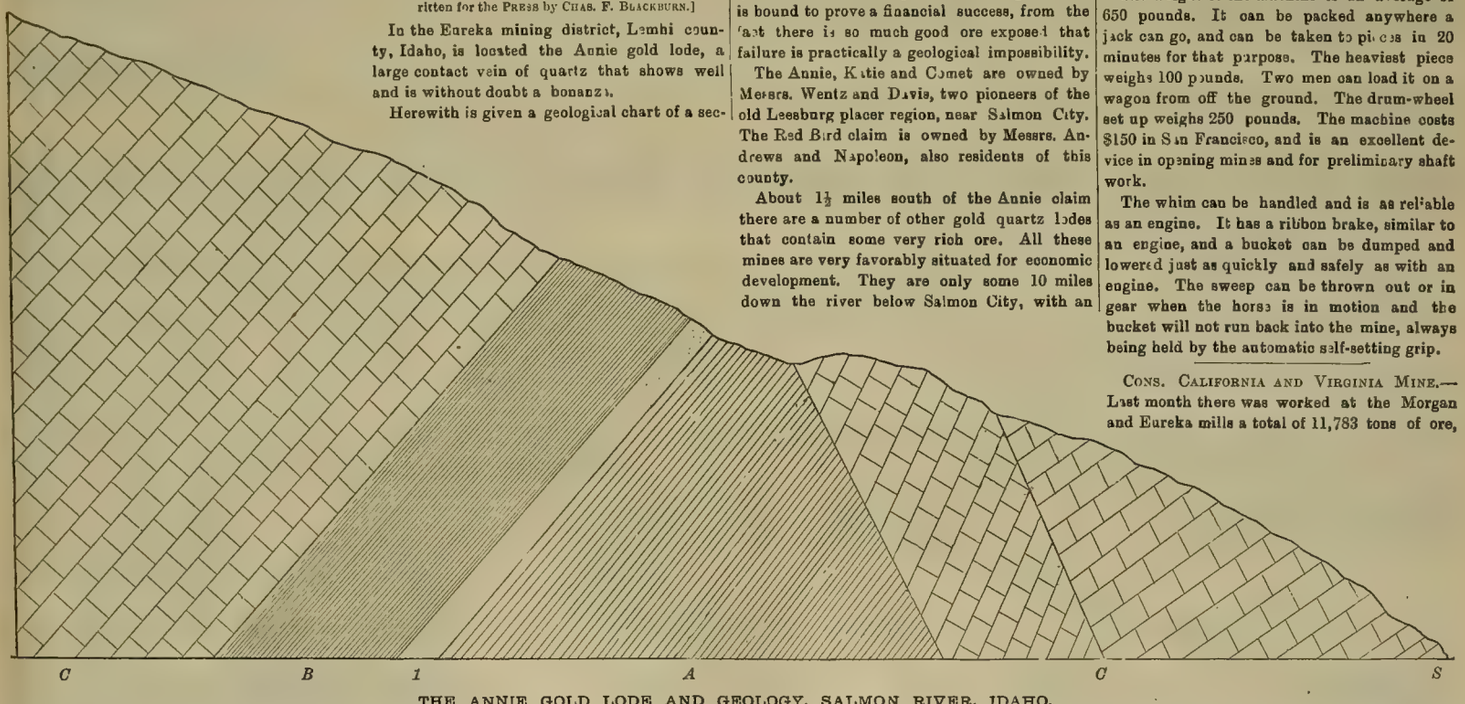
The Annie, Katie and Comet are owned by Messrs. Wentz and Davis, two pioneers of the old Leesburg placer region, near Salmon City. The Red Bird claim is owned by Messrs. Andrews and Napoleon, also residents of this county.

About 1½ miles south of the Annie claim there are a number of other gold quartz lodes that contain some very rich ore. All these mines are very favorably situated for economic development. They are only some 10 miles down the river below Salmon City, with an abundance of wood and water on the ground.

Were mining capitalists seeking good free-milling gold quartz properties to visit this region they could certainly find what they want and secure some rare bargains. The veins are numerous, rich, and show an abundance of ore, considering the amount of work done.

The snow is now off except on the high ranges. The grass and wild flowers are up. Salmon trout are coming up the river by the thousand. A man can catch more trout here in one hour than he can pack. These fine, large trout are a bonanza for the bear and Indians.

The placer miners and quartz prospectors are beginning their annual "rustle," and this promises to be a busy and profitable year for both parties in this region. The Salmon river country is a great field, rich and rough, and even 50 or 100 years hence there will be good mines found in this at present almost terra incognita. The mining future of this region is indeed bright. The day is approaching when the stream of gold and silver pouring from these mountains will amount to tens of millions yearly. This conclusion is based upon irrefutable geological evidence.



THE ANNIE GOLD LODE AND GEOLOGY, SALMON RIVER, IDAHO.

A New Steel Whim.

The "Common-sense" whim made by the Risdon Iron Works of this city is all made of metal. The arms of the wheel are bolted to the hub and to the rim of the drum and can be taken to pieces for transportation on pack-animals. The one-horse whim has a drum six feet in diameter and will wind 500 feet of rope. The sweep is thrown up out of gear by forcing a wedge shaped piece of iron under the shaft; this gives great power, and when the horse gets the bucket up to the sheave and *won't stop*, it can be thrown out of gear, allowing the horse to go on around the circle, the automatic grip holding the load.

In the new steel whim illustrated on this page, the makers have done away with about one-half of the castings used in the former whim and substituted wrought iron and steel for them. This brings the chances for accidents down to a minimum. The one-horse whim will raise the weight of an oil-barrel filled with horseshoes.

This whim runs lightly, less than one-pound pressure on the end of the sweep turning the empty drum-wheel when no rope or brake is attached. When the kingpost is bolted down, put the drum-wheel on, give it a whirl and it will run around five or six times without stopping.

The speed at which it can hoist is, with an ordinary-gaited horse, about 80 feet per minute. A day's work of ten hours is about 100 buckets from a depth of 300 feet. A horse has three to one leverage; a 200-pound pull on the single tree will raise a 60-pound bucket.

The weight of the machine is an average of 650 pounds. It can be packed anywhere a jack can go, and can be taken to pieces in 20 minutes for that purpose. The heaviest piece weighs 100 pounds. Two men can load it on a wagon from off the ground. The drum-wheel set up weighs 250 pounds. The machine costs $150 in San Francisco, and is an excellent device in opening mines and for preliminary shaft work.

The whim can be handled and is as reliable as an engine. It has a ribbon brake, similar to an engine, and a bucket can be dumped and lowered just as quickly and safely as with an engine. The sweep can be thrown out or in gear when the horse is in motion and the bucket will not run back into the mine, always being held by the automatic self-setting grip.

CONS. CALIFORNIA AND VIRGINIA MINE.—Last month there was worked at the Morgan and Eureka mills a total of 11,783 tons of ore, yielding bullion of the gross value of $338,456 02, of which $152 300.95 was in gold and $186,155 07 was silver. The average yield of the ore in bullion per ton was $28 72, and the average assay value of the battery samples was $33.89 per ton.

THE report of the Standard Consolidated mine for the fiscal year ending February 1st shows $127,341 in bullion and $40,000 paid in dividends. The disbursements for the year were $231,686, and the amount charged to profit and loss $88,962. A cash balance of $20,064 was carried forward to the account of the new year.

REDUCTION WORKS CONSOLIDATION.—At a meeting of the directors of the reduction works, held at Deadwood, Dakota, it was decided to consolidate with the Golden Regard Company, the stock of both companies being changeable into the stock of the new company.

SAWMILL NOTES.

A Double-Acting Band-Saw Mill.

A couple of Michigan men have taken out patents upon a band-mill carrying two saws, which is designed to cut in both directions, so that no time is lost in the process of gigging back. A board is cut from the log in running one way by one of the saws, and another by the other saw in returning. It was a Chicago lumber trade journalist who suggested some months ago that the ultimate function of the band-mill would be to do some such thing as this.

Naturally the increase in the number of saws and in the necessary amount of gearing is calculated to require increased power to propel it, but if the capacity of the saw is doubled this should not be a serious drawback. In a machine shop in this city there still stands a band-mill carrying two saws, in the success of which the intrepid inventor had much confidence, but this confidence has not yet been shared by any millman by the practical application of the invention.

Sawmill men are chary of new things in the band-mill line. In some quarters the mills which have been proven successful are looked upon with suspicion even yet, and innovations have as much difficulty in getting an opportunity as the stage struck maiden to get an engagement as leading lady in a first-class theatrical company.

Still it is entirely probable that the capacity of the band-mill will be increased, and that the attention the principle is receiving at the hands of inventive minds will result in many changes and improvements.

The idea contained in the latest invention is not a bad one, and a double band-mill, saving time chiefly which would otherwise be consumed in gigging, would not be open to the objection which a mill cutting two boards at one time might be, for obvious reasons.—*Mississippi Valley Lumberman.*

Lively Demand for Sawmill Machinery.

There is a lively demand for sawmill machinery all through the Western and Southern States. In addition to new mills and machinery there is also a great demand for reconstruction and for improved machinery. Time was—and that not long ago—when the builder of sawmill machinery contented himself with looking after new mill enterprises and incidental repairs here and there. Of course there were additions of new machinery now and then, but no such revolutionary reconstruction as is now going on in a great many mills. The sharp competition in the lumber trade has proven a friend to the machinery-maker. The best inventive genius is taxed to keep up with the demand for first class machinery, and the millmen are showing a commendable disposition everywhere to keep up with the times.

This branch of manufacture has gradually developed from small beginnings, until the best saws in the world are now made in the United States. In this direction American industry has achieved a signal triumph, and while the foreign producer is beaten at every point, a growing important export business has sprung up in American saws of late. A St. Paul journal says that there is something of a hitch in the business, just at this time, in the South. It claims that a good many of the manufacturers of sawmill machinery who have enjoyed a generous trade in the South, are not finding their experience an altogether happy one. They find plenty of trade, but there is internal evidence that the Southern lumbermen, as a class, have not made money. It is easier to sell the machinery, then, than to collect pay for it.

A LARGE SAWMILL.—A sawmill has lately been erected at Brewton, Ala., which is a monster in size. Over 3,000,000 feet of lumber were used in the erection of the mill and the buildings connected with it. The logging ditch is 14 miles long. One mile of rails are used in the drying-kilns and transfer-tracks. The gang of 36 saws, with rotary, edger, cut-off, lath and shingle machines, etc., will be driven by two engines, 24x36 and 20x30, which are fed by four 60-inch by 16-foot tubular boilers. More than 6000 cubic yards of earth have been removed from the creek to prepare a suitable and satisfactory log pond, from which will be drawn 1000 logs a day when the mill is in operation. In the planing-mill, which is 164x288 feet, ten cars can be loaded at one time, regardless of wind or weather. In front of the planers 24 trucks of lumber can stand ready to be pushed through the four flooring-mills, or surfacers—and at the end of these flooring-mills the board lands on an endless chain, which carries it to any of the cars, or to the pile where it is intended to place it. A million and a half feet of dressed lumber can be stored without infringing upon the loading space.

SAWMILL FOR SMALL POWER.—The Salem Iron Works of Salem, N. C., are putting on the market an improved sawmill for small power, having been specially designed for farmers—for example, who have a small water or steam power, but do not care to invest in an expensive mill. It is not intended for doing a large lumbering business, or for sawing long and large logs, but for those who want a good, cheap mill for their own use and do not care to saw logs over three feet in diameter or 16 feet in length. Each mill is provided with an improved double eccentric friction feed, adjustable mandrel-boxes, wedge-wheel, long rest, saw guide, and enough improved conical rollers and boxes to go on ways twice the length of carriage.

COSTLY FUEL.—Very few people, says an Eastern exchange, have ever estimated the value of the fuel which feeds the sawmill furnaces in the form of sawdust, which moves directly from the saw to the fiery gulf into which it is dropped by the automatic sawdust feeders in the mills. Rating it at the price it would bring provided it could be saved in the form of inch lumber, one would stand appalled at the figures. For every million feet of lumber piled on the docks coming from the circular saw, about 200,000 feet of the best portion of the timber passes into the "fiery furnace" as fuel in the form of sawdust. Or, to make it more comprehensible, in the year 1882, the mills on the Saginaw river cut over 1,000,000,000 feet of white pine lumber, which was the turning point in the output. During that year 200,000,000 feet of pine timber passed into the seething receptacles which produced steam, and was consumed for fuel. Suppose we estimate the cost—200,000,000 feet at $14 per thousand "straight measure," and we have the enormous sum of $2,800,000! This looks like a pretty expensive fuel account for the mills on the Saginaw river; but that is what it would amount to in the form of lumber instead of sawdust. As before stated, it is no great wonder that the lumber manufacturers of the country are looking anxiously for relief, at least partly in the direction alluded to. Even if 20 per cent of this could be saved, it would amount to over half a million dollars, and this would be the actual saving between one billion feet of lumber cut by an ordinary kerf circular saw and a thin band saw, and it looks as though it would be worth saving when pine stumpage is as high even as $10 per thousand in some instances

WORN-OUT SAWS PUT TO GOOD USE.—Says a New York journal of recent date: A wagon heavily laden with a nondescript assortment of old saws in every stage of decrepitude was slowly wending its way along Greenwich avenue the other day. The curious collection caught the eye of a reporter, who, hailing the driver, inquired whither he was bound with his unique load. "Jump aboard and I will show you." The reporter clambered to the lofty seat and there obtained a closer view of what appeared to be the most valueless rubbish imaginable. There were hundreds of saws in the load of every kind, from the long and broad two-handled instrument of the lumber camp to he delicate scroll saw of the cabinet-maker, and there was not a whole one in the wagon. Proceeding slowly to a neighboring street, the driver turned in the yard of a large factory, where the broken and rusty relics were dumped upon the ground to be sorted into separate piles according to their worth. "You will be surprised," said one of the proprietors of the establishment, "when you learn the use to which these old saws are put after they leave our hands." Then, leading the way into the exhibition-room of the place, the reporter's attention was called to a show-case containing a collection of engineering tools of delicate make and exquisite finish, including rules, sextants, quadrants, compasses, lancets and knives of the finest manufacture and all highly polished. "Every one of these scientific instruments," said the proprietor, "is made from the same stock which you saw dumped upon the ground a few minutes ago. We make a regular business of buying used-up saws from carpenters, cabinet-makers and others all over the city, which we transform into these delicate tools, and they are the best materials for our purpose We get them for prices usually paid for junk."

CHOOSING HAND SAWS. — Stiff blades are made of better material than thick ones, and are less liable to "buckle" or "twist," and are not so apt to break. They require less set, will stand an edge longer, and are not so tiresome to work. They should be hung in plain beech handles with rivets flush or countersunk. The blade should be of a dark color and have a clear bell-like ring when struck with the ball of the finger. Blades of a light iron-gray color are not so good. Never take a saw that jars or trembles in the handle. The first point is to grasp it by the handle and see that it *hangs* right, and that the handle fits the hand properly. Then try the blade by springing it and see that it bends regular and even from point to butt. See that it has a good crowning breast. Hold it at a distance and get a proper light to strike on the blade and you will see if there is any imperfection in grinding or hammering.

INVENTION OF THE CIRCULAR SAW.—Mr. J. E. Emerson, the Beaver Falls (Pa.) saw manufacturer, writes the *Bulletin* of the American Iron and Steel Association: In reply to your recent inquiry concerning the invention of circular saws, I will say that Jack Coop was probably the inventor of the circular saw. I will give you briefly his history, which I think you will find to be very interesting. In 1870, while I was making my patent inverted toothed saws in Pittsburg, Pa., a very sprightly, intelligent and well-educated old man, who said he was then 92 years of age, came in with an old rusty circular saw, about 18 inches in diameter, to get it polished up. I at once became interested in it. The old man told me that in 1799 he made that saw while in the British navy, by filing the teeth into it, and then got a hand-saw maker to straighten and polish it for him, and had a mandrel made and used the saw in the navy. At that time I gave an account of the incident to the *Scientific American*, and it was published in that journal, the editors then claiming that in all probability this was the first circular saw ever made. Mr. Coop was then living in Pittsburg, Pa. He was a very curious old man and much of a crank in many ways. Knight in his Mechanical Dictionary says the circular saw was described in an English patent in 1777—22 years prior to the claim made by Coop.

THE WOOD WORKER.

Aboriginal Wood-Workers.

At the Smithsonian Institution in Washington are collected as many of the aboriginal tools of America as the officers have been able to gather. The Indian and the mound-builders had a very good idea of wood-working. The best, of course, were Aztecs, who had arrived at quite a high stage of the art, and whose tools, although they knew nothing of steel, are really excellent. We have a few of their tools at the Smithsonian, but the best collection is of course in the City of Mexico. The material used was almost wholly glass, especially for the finer parts of their wood-cutting. To chop trees they used flint axes, and for the rough hewing out of logs the same, but when it came to the accurate fitting in of the hewn timber, they handled glass knives, chisels and saws very deftly and with beautiful results. There is a ceaba-wood post in Washington with hieroglyphics and faces cut upon it, all with glass. There are bits of the aboriginal chisel still sticking in a corner of the wood, where it broke off three centuries ago under the hand of the workman. The Aztecs knew how to make a very good and manageable glass, and their best cutting blades, swords, daggers and spears, saws, chisels and axes were made of it. When the edge dulled, they broke it from the end instead of sharpening it, and got a new cutting-line.

A great deal of aboriginal carpentry is still in use among the Moqui Indians of the United States. Of course they use our tools now, but they follow their old patterns. They know how to make ladders, and they swing their doors on hinges from the top, and they know how to mortise timbers—knew how long before Columbus landed in America. Of course they use our tools differently from our way. The chisel they push rather than hammer, and they work the board up and down on a fixed saw rather than the saw on the board, but withal they get very creditable results. The framework in the Pueblos is quite as honest as anything in Chicago.—*Chicago News.*

WOOD FOR DECORATIVE PURPOSES.—It is evident that much as we know about woods, there yet remains much to learn that may be of value in the arts, says an exchange. The secret of making good veneers which will not warp is only now becoming known, and until lately it was considered impossible to emboss wood; but now beautiful embossed panels, whose work resembles carving and whose richness compares favorably with the most costly art, are found in many places. In these the original patterns are carved by hand, and from these molds are made on which the wood is placed after being properly softened. The wood in these molds is then submitted to 250 degrees of heat and subjected to great pressure. Such a pressure effectually prevents all shrinkage. Wood may be cut as thin as the 300th part of an inch, but in this state is not useful. That which is cut to the thickness of the 100th or the 150th part of an inch, and lined with paper, is used for the decoration of walls and ceilings. This neither shrinks nor swells, there not being enough of it for the atmosphere to lay hold of. If it is desired to place such a veneer upon a wall, all holes and cracks must be filled with plaster of Paris, and being glue sized, the wall is ready for the wood in panels. The veneers are made damp with a preparation of glycerine and water, which softens them and, when dried, leaves them pliable. A checkerboard pattern of curled maple is about as thick as a piece of cardboard. To produce this, strips of wood are first woven in and out and then subjected to heat and pressure, which makes a smooth body, varied in hue as if it were made of two kinds of wood.

AN IMMENSE MACHINE for working of waste wood into the material known as "excelsior" has recently been put up at Gardiner, Maine, and is described as follows: W. H. Moore has now put in operation a machine which will work up any kind of wood, and particularly the waste edgings which have accumulated about the lumber-mills. It is a stationary upright frame 50 feet long, 6 feet high and about 2 feet wide. About on a level with a carpenter's bench is a table upon which rest 95 individual knives or planes, each of which is set in a block or frame of iron. Any one of them may be removed while the machine is in operation and replaced by another, should a dull knife require to be replaced or should an accident occur. When in operation the spruce edgings are inserted at one end of the machine, and are constantly fed by the operator. They pass the whole length of the machine, the slitting rule of each one of the knives or planes taking out a slit of thin, narrow, fine fiber, curling it more than the other machine, and delivering it all along the table of the machine in a perfect mass or bunch of curls. It has a fineness, softness and elasticity not possessed by soft fibered excelsior. The capacity of the machine is about five tons per day. The product is packed for transportation in bales two by three feet.

HOW TO STAIN FLOORS.—Have the floor well scrubbed, and let it dry. Then apply one or two coatings of size; this must be done thoroughly, for on the sizing will depend the success of the staining and varnishing. An oak stain can be obtained at any good oil and color shop, in tins, at low prices, varying according to size. If the darkest shade is used, one coating may suffice, but that depends on personal taste. When the oak stain is quite dry, apply the varnish with a thick, clean brush kept for the purpose. The broad brushes are better than the round ones; but that again depends on the worker. Apply the varnish carefully and smoothly, and buy a preparation that has been well mixed with quick dryers. Any painter or decorator will prepare the varnish. Let this dry very thoroughly before using the room; if not, all the trouble taken will be absolutely in vain. When the process is complete the floor can be kept smooth and polished with very little trouble; a soft cloth or broom will remove all dust, and a few drops of oil or beeswax and turpentine rubbed on occasionally will maintain the shiny appearance of the boards.—*Ladies' Home Visitor.*

BLACK WALNUT.—This very superior wood has nearly disappeared from the Western forests; but so earnest is the inquiry for it that its cultivation is becoming a matter of great desirability. To that end Daniel B. Emerson of Beloit, Wis., has given his experience in its culture as follows: He prefers shallow planting, seven feet apart each way, if planted in a field, or sixteen feet apart if planted around fences, as wire fences can be attached to the trunks without injury. Under favorable circumstances, the trees begin to bear in about seven years. One bushel contains from 400 to 600 nuts, or fifteen pounds of kernels, which will yield seven and one-half pounds of oil. He has trees fifteen years old which are 30 feet high and a foot through at the base. They yield ten bushels of nuts each annually, worth $4. The leaves and the husks, when boiled, furnish a liquid which will kill worms and insects on lawns, without injuring the grass.

WELL SEASONED WOOD.—If you cut down a tree in the month of its growth, and cut it right off at the butt and not trim it out any, in a few days that tree will be seasoned. "I do that," says an expert, "when we cut oak timber and leave the limbs on. When it is cut in June we find it seasoned in December when we go to take up the winter's firewood. We find if it is cut when the sap is out of the wood that it soon becomes sap-rotten. If you cut beech, poplar or birch for rails or posts, cut them in June or July and let them lie with their limbs on. You will have wood then that is not rotten. You will have fine poles of the birches or poplars, for they will be seasoned."

ROSEWOOD.—It has been a great mystery to many young persons why the dark, rich-colored wood so much used for furniture should be called "rosewood." Its deep-tinted, ruddy-streaked surface certainly does not resemble the rose, so we must seek some other reason for the name. Here it is: When the tree is first cut, the fresh wood exhales a very strong, rose-like fragrance, which soon passes away, leaving no trace of the peculiar odor. There are several varieties of rosewood trees; the best, however, are those found in South America and the East Indies and neighboring islands.

AN IMMENSE BURL.—One Chicago veneer firm, according to the *Lumber Trade Journal*, has in its possession a single burl of French walnut, weighing less than 400 pounds, out into veneers measuring 8500 feet and valued at $1400, or nearly $4 per pound, being more than four times as valuable as amaranth or ebony; and its high price does not prevent it being used quite extensively in Chicago by wood-working manufacturers of fine goods.

VERMILION WOOD has recently been used to some extent in decorative-art work. This wood, which is a product of Sumatra, is of a finer grain and darker color than mahogany and takes a finish equally beautiful. It does not grow to a very large size, and only a limited supply can be obtained. This latter fact, although it does not render it any more desirable as a decorative material, is likely to enhance its value commercially.

WOOD-POLISHING MACHINERY in these times of labor-saving is receiving much attention. No well-equipped factory is now considered complete without a sand-papering machine, and the various machines for this purpose are, some of them, marvels of ingenuity and simplicity.

EASTERN WOOD-WORKERS are using naphthaline as a wood preservative. It is said to be very effective, leaving the wood dry and with only a faint aromatic smell.

WM. H. TAYLOR, President. R. S. MOORE, Superintendent.

Risdon Iron and Locomotive Works,

S. E. Corner HOWARD and BEALE STREETS, SAN FRANCISCO,

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Best in the World,

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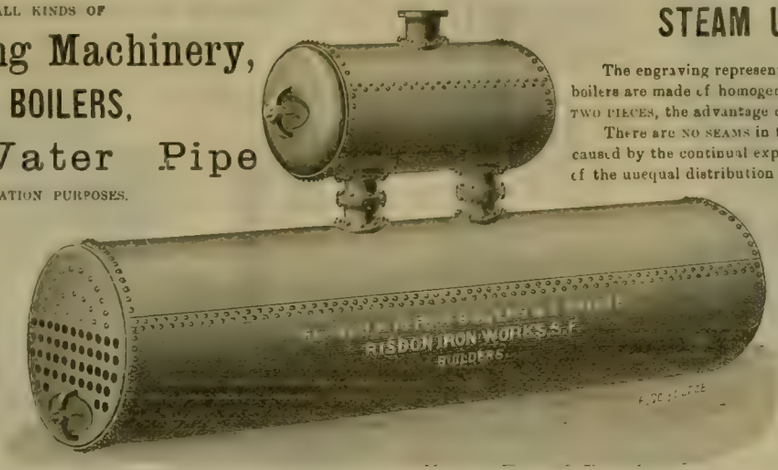

54-INCH BY 16 FEET STEEL BOILERS IN 2 SHEETS.

STEAM USERS, ATTENTION!

The engraving represents our standard 54 in. x 16 ft. Boiler. These boilers are made of homogeneous STEEL, and the shell, as shown, being in TWO PIECES, the advantage of this will be readily appreciated by steam users. There are NO SEAMS in the fire to leak, nor loose rivets to contend with, caused by the continual expansion and contraction of the plate on account of the unequal distribution of the heat under the boiler, the bottom presenting a smooth, even surface which can be easily cleaned. We place a manhole at the back end above the tubes, and one in the front end under the tubes.

The FRONT MANHOLE gives free access to the sheet over the fire, THE VITAL PART OF EVERY BOILER. This point is often overlooked by purchasers, and boilers are supplied with a small hand hole, and the remaining space filled with tubes which allows absolutely no access for cleaning, and in a short time tubes and sediment are one solid mass, and instead of gain in efficiency by a few feet of tube surface, the result is a positive loss.

SPECIFICATION OF BOILER AND FIXTURES:

1 Boiler, 54 inches diameter by 16 feet, with 46 3½ inch tubes; Shell, 5 16; Heads, 7-16.
1 Steam Drum, 36 inches diameter by 72 inches long.
1 Breeching.
1 Smokestack, 30 inches by 60 feet, Nos. 12 and 14 Iron.
300 feet galvanized strand for Guys.
1 C. I. Front, complete.
1 Foundation Plate for front.
1 Set Grate Bars for coal or wood.
1 Back Bar Bearer.
1 Ash Cleaning Door and Frame.
1 Back Arch Plate.
1 Set Binder Braces and Bolts for Brickwork.
1 Stand for back end of Boiler.
1 Steam Gauge and Syphon.
1 Glass Water Gauge, complete, with column and 3 Gauge Cocks.
1 Safety Valve.
1 Stop Valve.
1 Feed Valve.
1 Blow-off Valve.
1 Check Valve.

These Boilers are tested to 150 pounds hydrostatic pressure and are intended for a working pressure of 100 pounds. Total weight of Boiler and fixtures, 17,000 pounds.

☞ BOILERS ON HAND READY FOR SHIPMENT. ☞ SEND FOR CIRCULARS.

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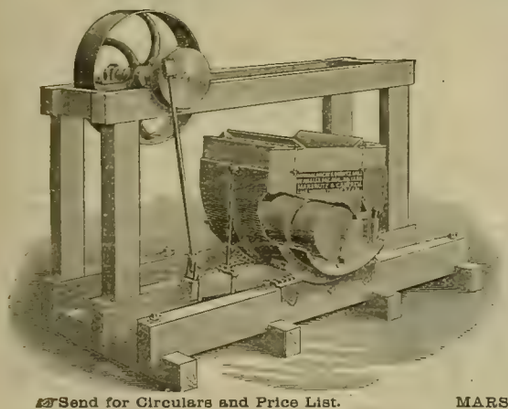
KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 3 H. P.

MARSHUTZ & CANTRELL, Sole Manufacturers.



The Patentee and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity
2. The freight to mine is less than one-half of stamps.
3. The cost of erecting is less than one-fourth of stamps.
4. The power to drive it is less than one-half of stamps.
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6. There is no wear except on shoes and dies.
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Of the Machine-Mined Mineral in the U. S., in 1887, three-quarters of the Iron Ore and two-thirds of the Copper Ore were mined with Rand Drills.

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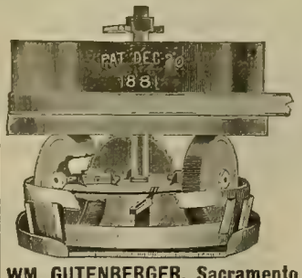
Crush 8 to 10 Tons per Day.

PORTABLE and DURABLE.

WEIGHT, 4 TONS.

It is a Full Fledged Quartz Mill without Gearings, Cogs or Pulleys.

Power applied direct. Works Ore at Low Cost. More or less weight on Crushers as desired.



Very little friction. Beats other machines in reducing and amalgamating ore, and costs less. All who have used this mill recommend it highly. Splendid for low-grade ore on account of low cost of working. The first ore crusher used in Durango, Mexico, was built at my shop in Sacramento, and under my patent.

☞ Any Infringement on this Patent will be prosecuted to the full extent of the law.

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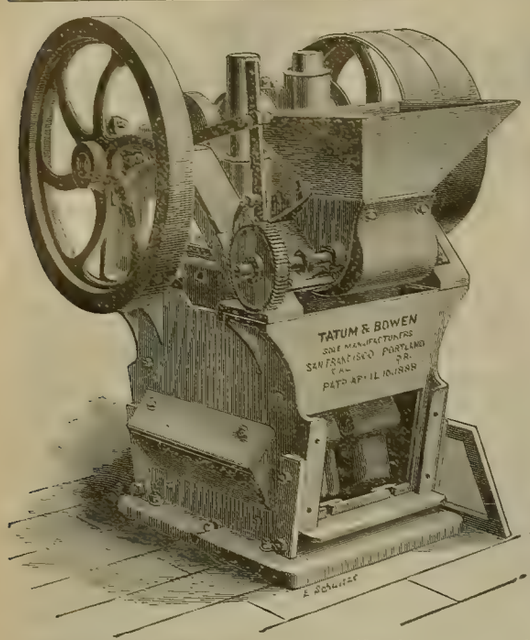

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THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

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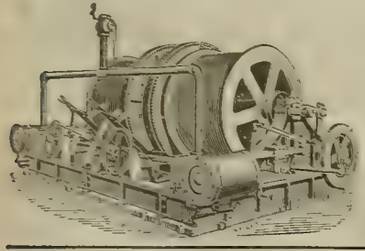

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New Catalogue for 1889 now ready.

COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for $2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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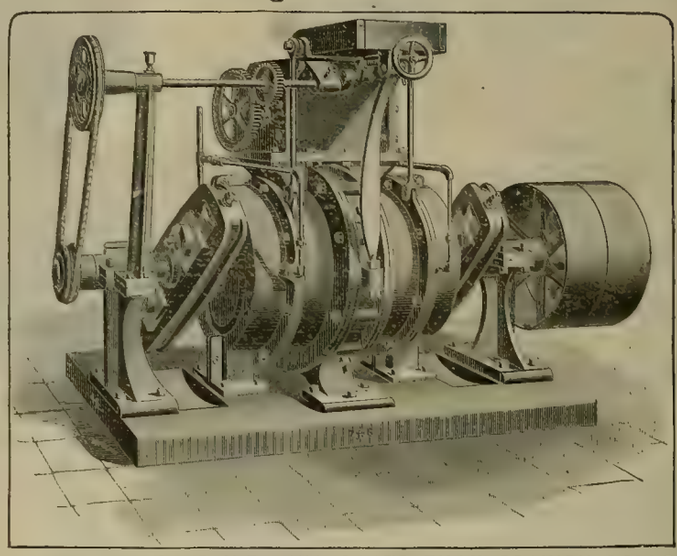
FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; has been thoroughly tested; we guarantee its work as represented, and we will give long time trial.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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Timber and Tools.

It is a fact well known to millmen that it is not always the harder woods, in the ordinary acceptation of the term, that are most wearing to the saws. Many practical persons marvel at this and wonder to themselves why a piece of timber showing small crushing tension and other strengths, requires more power to work into lumber, and at the same time wears out the saws and cutting tools faster, than other varieties of timber, the strength of which, in most respects, is greater.

A log of black walnut and one of burr oak of the same size worked into the same sized stuff will show widely different results on both saws and machinery. If we attempt to rive or split these logs the walnut will work much easier than the oak, and so far as the various strengths are concerned the oak is superior by far; but when cut into by tools of any description the walnut will present much greater resistance than the oak, and the same is true as regards many other varieties of hard and soft timber.

If we take a longitudinal section of these comparatively soft timbers which are so hard on the cutting edges, we will find the minute pores or interstices filled with minute glistening particles or crystals, and subjected to chemical analysis we will find them composed of silica, one of the very hardest minerals known, while with the hard easy working woods they will be found nearly or quite absent by both the microscope and analysis. These little particles, so finely divided as to be insusceptible of ordinary touch, are really a better grit than ordinary sand, and are the means of cutting off the fine edge of cutting tools, as saw teeth, plane irons, and the like.

Two plane irons, made of a fine quality of steel, as near alike as it was possible for a skilled mechanic to make them, were each hardened in our laboratory by means of mercury, then finely sharpened, so that the edges of each presented precisely the same appearance beneath the magnifier. These were each inserted in an ordinary plane and one placed on the oak, the other on a piece of walnut, both pieces of wood having been previously dressed. At the rate of 100 pounds pressure, each iron was crowded forward four inches. On the oak stick, the pressure from the rear indicated 809.5 pounds, while with the walnut the indicator showed a pressure of over 1000 pounds. The irons were both now withdrawn, and first placed beneath the microscope; the one used on the oak presented a general upset appearance, the edge of the iron showing a slight tendency to turn downward, there being sufficient heat generated by the friction to partially draw the temper along the minute edge, which, however, would not extend back sufficient to materially affect the wearing and cutting properties of the iron if in constant use.

The iron used on the piece of walnut showed a scratched, notched appearance all along the minute edge, and by the aid of the most accurate means of measurement at hand, these notches were all of the same depth, but different distances apart, proving conclusively that the particles of grit or crystals which caused them, by being harder than the best mercury-hardened steel, were all of the same size, and evenly distributed, as far as regards depth of deposit in the grain of the wood. The small spaces of the iron edge between these notches or scratches were found nearly as the entire edge appeared originally, showing again that the cellular tissue of walnut outside its mineral deposits was really softer than that of oak; hence, were it not for these deposits the timber would cut much easier. Of course, if the iron had been drawn back, and again shoved through, the notches would have been more apparent and general, increasing each time, and distance showed until the entire cutting edge had been of itself cut off.

Consulting the law governing plant or vegetable growth, we are told that all food before becoming fit for assimilation must be reduced to its gaseous state. If this be so, the question arises, how, or by what methods of plant-growth and assimilation, is it possible for silica to appear in its original crystalline state among the tissues of the growing or matured tree? while it is universally known that this variety of wood grows only where this mineral is abundant in some of its modified forms. This, however, is not of great interest to manufacturers just how it gets there, but that it is present is shown conclusively. To get rid of it, even were it possible, would destroy the beauty and general characteristics of walnut, and to overcome its action on tools, rapid motion and softer iron is the best, safest and most efficacious method.—*Lumber Trade Journal.*

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

DIVIDEND No. 52 was paid by the Granite Mountain mine of Montana on the 10th, making $600,000 this year and $6,000,000 in all.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING APRIL 9, 1889.

400,992.—LINIMENT—John A. Achard, Lodi, Cal.

400,993.—FRUIT-DRIER—F. Altman, San Jose, Cal.

401,109.—PRESERVING FRUIT—W. R. Baker, Pasadena, Cal.

401,000.—ELECTRIC TIME PIECE—Carranza & Tinoco, S. F.

401,258.—VAPOR STOVE—C. S. Drake, San Rafael, Cal.

401,033.—ORE-FEEDER—Geo. Johnston, S. F.

401,283.—LATCH-COVER FASTENER—Knapp & Thompson, San Jacinto, Cal.

401,039.—CAN-LABELING MACHINE—Willard Lee, Los Gatos, Cal.

401,041.—ELECTRO-MEDICAL APPARATUS—J. J. Lewin, S. F.

401,044.—NUT LOCK—Benj. Marshall, S. F.

401,040.—CAR COUPLING—C. A. McDougal, Alameda, Cal.

401,106.—MAIL POUCH—C. W. Miller, Clifton, A. T.

400,967.—OINTMENT—Caroline V. Sutherland, Lathrop, Cal.

400,981.—DRIVING GEARING—J. C. Whitford, Stockton, Cal.

401,095.—LIGHTNING CONDUCTOR FOR WIRE FENCES—F. E. Wood, Yucca, A. T.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CAR COUPLING.—Chas. A. McDougall, Alameda. No. 401,046. Dated April 9, 1889. This automatic coupling and uncoupling device for railway cars consists of a bumper and drawhead, having leaves or gates within the cavity or opening of the drawhead, these leaves opening automatically to receive the head of the link and being opened by suitable mechanism to release the same when desired.

ELECTRO-MEDICAL APPARATUS.—John J. Lewin, S. F. No. 401,041. Dated April 9, 1889. The invention relates to certain improvements in electro-medical apparatus, and consists especially in a novel construction of a primary coil, a contact-breaker with its adjustment, and the regulator, together with one or more electrodes which may be applied in various ways.

MACHINE FOR LABELING CANS.—Willard Lee, Los Gatos, Santa Clara Co. No. 401,039. Dated April 9, 1889. This machine for applying labels to cans consists in a cylinder having chambers around its periphery into which the cans are received from the feed-chute, a means for applying paste to the labels in a continuous sheet and leading said sheet to a point where it is applied to the cans, a means for severing the labels from the sheet at the proper point and pressing the ends around the can, together with certain details of construction.

ELECTRIC SELF-WINDING TIMEPIECE.—Manuel Carranza of Guatemala, Guatemala, and Jose M. Tinoco, S. F. No. 401,006. Dated April 9, 1889. The invention relates to the class of timepieces including clocks; and it consists in an electric motor connected with and adapted to drive the winding arbor of the timepiece to wind up its spring, an electric circuit including the motor, and a novel mechanism actuated by the timepiece for closing and opening the electrical circuit whereby the motor is thrown into and out of action. The object is to provide a timepiece so constructed that when it is nearly run down it shall be rewound by the automatic throwing into action of the electric motor.

NUT-LOCK.—Benjamin Marshall, S. F. No. 401,044. Dated April 9, 1889. This invention relates to that class of nut-locks in which the bolt is so constructed as to serve to hold the nut upon it without the assistance of washers or other independent devices. The invention consists in a bolt having a spring or resilient tongue, its junction with the bolt being toward the end or point of said bolt, while its free end is toward the head of the bolt. The invention further consists, in combination with a bolt of this character, of a nut having an interior diameter slightly less than the diameter of the bolt. This device is applicable to locking the nuts of any machinery or mechanism, but is specially adapted to railway rails and fish-plates.

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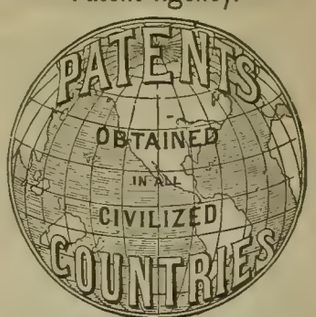

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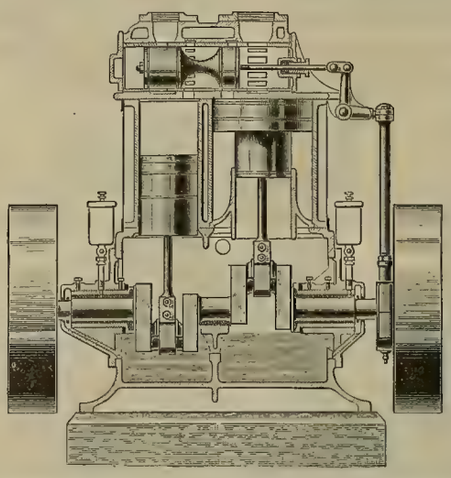

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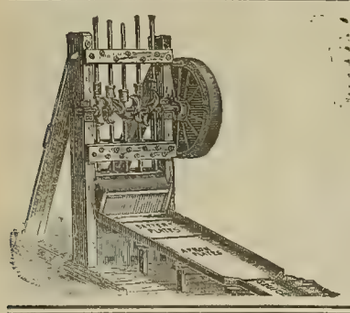

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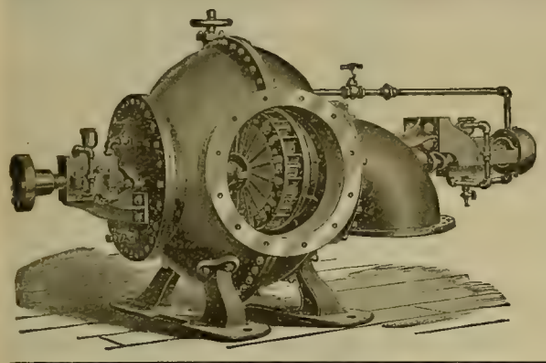

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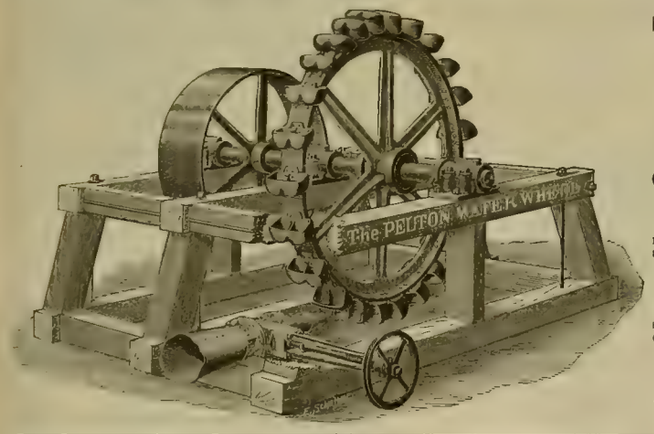

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MARKET REPORTS.

Local Market.

SAN FRANCISCO, April 18, 1889.

General trade is reported to be fairly active, yet the feeling is still of a conservative character. Among iron-workers there is very little doing, causing a disgusted feeling among foundrymen. So far as we can learn, there is no speculative movement in anything, and until there is, all lines of business will be more or less inactive. The banks report money generally easy, with liberal outside offerings of funds. Merchants report collections good for the season. The following receipts of treasure by sea are reported to have come to hand the past week: Coin, $5160.

The City of Sydney, hence April 15th for China, took out for Hong Kong: Mexican dollars, 237,631; silver bullion, $165,000; gold dust, $60; and gold coin, $4367. For Yokohama the same vessel took out in silver bullion, $46,000; and for Calcutta, $46,000. Total, $499 058.

SILVER—The market ruled weak up to Tuesday, at from 92 to 92½c, when it advanced to 92¾c under firm bidding. The output of the mines on this coast is barely sustained, although present indications point to a slight but steady increase for the next 60 or 90 days.

MEXICAN DOLLARS—The market continues to maintain its strength at 72¾@73¾c reported last week. At the close there appears to be a disposition on the part of one or two large receivers to ask more money.

QUICKSILVER—The market is steady at last week's quotations. Receipts the past week were as follows: Forty-five flasks, Parrott & Co.; 45, Haas Bros.; 47, A. Abbey. There was exported to Mexico, 90 flasks.

PIG IRON—Market lifeless, with holders firm, owing to the advancing tendency of the markets at the East and also abroad. The imports the past week aggregated 300 tons of foreign.

TIN—Imports the past week were 2178 ingots by sea, and 460 boxes overland. The market, owing to reported scarcity or a corner, is higher for pig. Coke is easy at another reduction, owing to liberal supplies on spot and near by. For prompt shipment, $4 75 is bid for coke tinplate, and $4.85 asked, with some business reported at $4.80. There was shipped the past week 24,300 lbs. tinplate to Victoria, B. C.

COPPER—It is very difficult to obtain any correct information regarding the outlook. At present, all buying is confined to actual requirements.

BORAX—Receipts the past week aggregated 1157 ctls., and exports by sea, 42,176 lbs. to New York. There was sent overland to New York in last month, 272,080 pounds.

ANTIMONY—The market is firm at the outside quotations.

COKE—Imports the past week by sea were 560 tons. The market is very strong for both spot and to arrive.

COAL—Imports the past week were as follows: From Tacoma, 6300 tons; Nanaimo, 3152; Seattle, 3316; and overland, 21. Total, 12,789. Coos bay coal is quoted at a decline of $1 a ton, and Cumberland in bulk at an advance of 50c a ton. The consumptive demand for house is slow, and for steam is fair. Consumers are not disposed to stock up beyond immediate wants, unless offered inducements. Australian advices under date of March 1st, say: Speculators in coal have freely chartered during the past few days, owing to low charters and collieries cutting in prices.

Eastern Metal Markets.

By Telegraph.

NEW YORK, April 18, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42½	92¾	$14 50	$3 65	$20 75
Friday	42½	92¾	14 50	3 67½	20 75
Saturday	42½	92½	14 50	3 70	20 75
Monday	42½	92½	14 00	3 67½	20 70
Tuesday	42 3-16	92½	13 75	3 65	20 60
Wednesday	42 3-16	92½	13 75	3 65	20 75

NEW YORK, April 17.—There are no useful reportable features to note in copper. Neither bids nor offers can be comprehensively made until the existing complications become disentangled. The output of 11 mines for March was 4842 tons. Refined petroleum—Barrels, 7c; plain cases, 9c. Pig lead is steady at $3.67½@3.70 for spot and early future delivery. Pig iron is firmer, as is pig tin.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, April 18, 1889.

ANTIMONY—	— @ 14
BORAX—Refined	7¼@ 7¾
Powdered	7¼@ 7¾
Concentrated	7 @ 7¼
COPPER—	
Bolt	26 @ 27
Sheathing	26 @ —
Ingot	17½@ 18½
Fire Box Sheets	— @ 26
LEAD—Pig	4½@ —
Bar	5 @ —
Sheet	8 @ —
Pipe	7 @ —
Shot, discount 10% on 500 bags Drop, ₱ bag.	1 45 @ —
Buck, ₱ bag	1 65 @ —
Chilled, do	1 85 @ —
STEEL—English, lb	16 @ 20
Canton tool	9½@ —
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Tow Calk	4½@ —
TINPLATE—Coke, prompt shipment	4 80 @ 4 85
Coke on spot	5 00 @ 5 10
Charcoal, 14x20	6 50 @ 7 00
do roofing, 14x20	5 37½@ 5 50
Pig tin, ₱ lb	24 @ 25
QUICKSILVER—By the flask	— @41 00
Flasks, new	1 05 @ —
Flasks, old	85 @ —
COKE—English, ton, spot	20 00 @— —
Do, do, to load	13 50 @13 75

	Spot.	To Load.
IRON—Glengarnock ton	27 00 @— —	27½@ —
Eglinton, ton	26 00 @— —	26½@ —
American Soft, No. 1, ton	— — @31 00	31½@ —
Oregon Pig, ton	— — @30 00	— @ —
Clay Lane White	— — @24 50	25 @ —
Shotts, No. 1	28 50 @29 00	— @ —
Bar Iron (base price) ₱ lb	2½@ 3	— @ —
Chrome iron ore, ₱ ton	— — @10 00	— @ —

Mining Share Market.

The market, the past week, was fairly active, with Mexican and Union still the favorites. The fluctuations in these two stocks were of a lively, attractive character, under active manipulation. With a few exceptions, the outside dealers look on the movements with suspicion, seeing at every favorable opportunity. The bearish feeling is intensified by the conflicting reports of value of the work now going on in Mexican. Union's chief attraction lies in the fact that a crosscut has been started with a view of cutting the ore body found in Mexican. There can be no doubt but the work in the two mines is of a very important character. In Sierra Nevada and Ophir, active prospecting work is reported under way. The same advices come to hand from Scorpion, Hale and Norcross, Best and Belcher, Gould and Curry, Savage, Chollar, Potosi, Crown Point, Belcher and Seg. Belcher. It is difficult to obtain reliable information of the work going on in Yellow Jacket and Challenge; probably this is due to the desire of the "Pool" to keep back everything until the assessment on the former is collected. An assessment is said to be pending on Challenge, as the mine was largely in debt on April 1st. Important crosscuts have been commenced on the upper levels in Alpha and Con. Imperial, with two others to be started within a short time in the latter. It is said that arrangements are perfected to explore the levels reaching from the 900-foot down to the 1650-foot in the following mines: Potosi, Bullion, Exchequer and Alpha. Work will be done through the Ward shaft. The explorations, it is reported, will be toward the east. Our private advices from the Comstock report the Crown Point mine looking exceedingly well on all the levels, and that in the Hale and Norcross crosscut, on the 750-foot level running west, they have run into very rich ore. This find is farther west than before found, which goes far in proving the richness of the unprospected area lying to the west. The Quijotoa stocks have been lifeless, as have the Bodies and Tuscaroras. Experienced operators are timid about dealing in the latter, fearing the public are large holders. The 50 cents assessment on Bodie, while money is reported in the treasury, destroys confidence in the stocks of the mines in that district.

It is claimed that the Sierra Nevada and Scorpion Mining Co.'s have arranged for the better development of their mines by jointly running a drift eastward from the 520 level of the former to the line of the Scorpion, where the drift will be taken up by the latter and extended well into its grounds. Mining men are very hopeful of favorable results following the contemplated work.

The assay value of ore mined the past week by Crown Point shows increased value, while Hale and Norcross and Confidence is less.

The St. Louis Mining Co., Virginia City, is to be listed on the two exchanges in this city.

The Nevada mill's 60 stamps will soon be dropping. The 40 now dropping on Hale and Norcross ore, crushes 1000 tons a week; with 60 dropping there will be 1400 tons crushed a week.

It is claimed that the new mill for the Occidental Mining Co. will be ready for service by July 1st of this year.

If there is anything calculated to prove the absurdity of the statement that the public wants dividends, it is the fact that Con. Virginia with regular 50-cent monthly dividends assured, and Confidence with monthly-dollar dividends assured, the stock of the two mines does not move up while the stock of Mexican, with a find of only two-foot rich ore, and the stock of Union with the ore yet to be found, have been steadily advancing with good fluctuations. It is an active gambling proposition that is wanted.

The bullion output of the Comstock mines is steadily increasing. For the week ending April 13th, it was $10,300 more than for the preceding week. The aggregate ore yield of the mines for the week ending April 13th, was 7403 tons, divided as follows: Con. California and Virginia, 3012 tons; assay value, $29 95; Best and Belcher, 115 tons; assay value, $22.50; Savage, 508; assay value, $19; Hale and Norcross, 930 tons, $30; Chollar and Potosi, 500 tons; Challenge and Confidence, 426 tons; assay value, $25.40; Crown Point, 763 tons; assay value, $19.31; Overman, 249 tons; Alta and Justice, 500 tons. The total bullion yield of the above was $165,000.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

CALIFORNIA FRUIT-PITTING CO., April 5. Object, to manufacture fruit-cutting machines. Capital stock, $50,000. Directors—W. F. Mau, Morris Newton, J. A. Ledden, Frank McCann and Frank H. Ames.

OREGON & CALIFORNIA LUMBER CO., April 9. Capital stock, $200,000. Directors—C. A. Hooper, Geo. W. Hooper, W. H. Talbot, A. W. Jackson and E. F. Burrell.

LA FAVORITA RAISIN VINEYARD CO., April 9. Object, to carry on fruit and raisin-growing. Capital stock, $64,000. Directors—W. W. Broughton, N. J. Bird, Robert Husband, S. W. Fergusson and T. K. Stateler.

HARQUA HALA M. CO., April 7. Location, Arizona. Capital stock, $100,000. Directors—J. S. White, W. G. Wharf, John McArthur, R. D. Hunter, A. Wilson, A. M. Benham and W. R. Thomas, all of Oakland.

MEXICAN COLORADO RIVER LAND CO., April 9. Object, to do a general land, mining, transportation, agricultural and building business in the Territory of Lower California and State of Sonora, Mexico. Directors—Wm. Hill and John Merritt of Petaluma, Guillermo Andrade, Calixte Denervand and Wenceslao Loaiza of San Francisco, Wm. Bihler of Sonoma and J. P. Thomas of Alameda. Capital stock, $20,000.

WESTERN CABLE CO., April 10. Capital stock, $1,000,000. Directors—Joseph Nash, Howard C. Holmes, Alfred S. Moore, Josiah O. Low and G. B. Willcut.

PORT CAROLINA, PALOS VERDES, MINERAL LAND & HARBOR DEVELOPMENT CO., April 16. Object, to improve the harbor of Port Carolina, northwest of San Pedro, connecting it with Los Angeles and San Bernardino and the East direct by a railroad already contracted for. The Palos Verdes ranch, where the harbor is located, contains 17 000 acres of land, on which is a lake, from whose waters the company intend to supply San Pedro and Wilmington. It is also the intention of the company to develop the coal, gold, silver and asphalt mines on the property, as well as the petroleum-wells now yielding abundant oil. Capital stock, $2 000,000. Directors—Joseph D. Redding, H. G. Wilshire, Lyman I. Mowry, J. K. Tuffrie and Lewellyn Bixby.

OCCIDENTAL BEET-SUGAR CO., April 16. Object, to conduct the Watsonville beet-sugar refinery and to erect a large number of factories throughout the Pacific Slope for the manufacture of beet sugar. Capital stock, $5,000,000. Directors—Louis Sloss, M. Ehrmann, Claus Spreckels and John D. Spreckels.

CENTRAL MILL & LUMBER CO., April 17. Capital stock, $80,000. Directors—Edwin Lord, Andrew Christenson, C. C. Dow, Leon A. Larcel and James P. Christieson.

C. E. SLADE LUMBER CO., April 17. Capital stock, $200,000. Directors—C. E. Slade, C. A. Thayer, C. N. Elliott, E. K. Wood and O. M. Kellogg.

KEITH ELECTRICAL CO., April 17. Object, to manufacture dynamos and motors and establish electric-power systems. Capital stock, $100,000. Directors — Montgomery Nicholas, T. Romaine, George W. Osborn, James R. Pickens and Sidney M. Smith.

ALASKA GOLD-EXPLORING CO., April 16. Capital stock, $2,000,000. Directors—William Johnstone, H. D. Page, William J. Gurnett, Jr., John Durant and A. Phelps.

KENAI COAL CO., April 16. Location, Alaska. Capital stock, $1,000,000. Directors—Charles F. Leege, Francis W. van Reynegom, H. M. A. Miller, Joseph Hutchinson and F. H. Eichbaum.

PACIFIC CONTRACTING CO., April 16. Object, to deal in patent rights relating to paving, roofing, building, etc. Directors—Clarence D. Vincent, Charles G. James, Wallace T. James, Sylvester Trull, J. S. Severence and E. J. Martin. Capital stock, $100,000.

TUBBS CORDAGE CO., April 16. Object, to acquire the entire plant and business of the San Francisco Cordage Company. Directors—A. L. Tubbs, Hiram Tubbs, Alfred S. Tubbs, Austin C. Tubbs and H. A. Tubbs. Capital stock, $1,000,000.

ABNER DOBLE CO., April 16. Object, transacting a general commission and mercantile business and to deal in machinery. Capital stock, $500,000. Directors—Abner, Robert F. and William A. Doble, F. L. Alderson and Francis Ferrier.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Overman, April 16, $7658; Mt. Diablo, 16, $12,780; Nevada Queen, 16, $11,000; Savage (for March), $28,271; Hale and Norcross, 16, $21,271; Cons. California and Virginia, 16, $76,404; Bluebird, 9, $17,472. Ontario (ore sales for past three weeks), $191,184; ounces fine bullion same time, $255,879; Hanauer, 9, $1600; 11, $1575; Queen of the Hills, 12, $2200.

Coal.

TO LOAD.

	Per Ton.		Per Ton.
Australian	$ 6 50 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	7 25 @ 7 50	Lehigh Lump..	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	6 00
Scotch Splint	9 00	Seattle	6 50
West Hartley	10 00	Coos Bay	5 00
Greta	9 00	Cannel	10 00
Westminster Brymbo	9 00	Egg, hard	16 00
Nanaimo	9 00	Cumberland, in sacks	18 50
Sydney	$ 9 00	do, bulk	17 50

HOW IT WORKS —If we were to put a two-line local in the most obscure corner of the paper, which stated that a certain business man charged more for his goods or kept an inferior quality than his competitors, that man would employ a bull-headed slugger to come around and kill us the next morning. But if we were to ask that same man for an advertisement of his wares, he would say: "No; I don't believe in advertising; no one reads the papers."—*Exchange.*

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T. LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Bodie Con M Co	California	10	50	Mar 25	Apr 30	June 4	B L Burling	309 Montgomery St
Bulwer Con M Co	California	5	25	Apr 10	May 15	June 12	L Osborn	309 Montgomery St
Calaveras Blue Gravel M Co	Cal.	2	05	Mar 28	Apr 30	May 27	B Burris	240 Montgomery St
Crocker M Co	Arizonia	6	10	Feb 25	Apr 2	Apr 24	A Waterman	309 Montgomery St
Eureka Con M Co	Nevada	11	50	Mar 19	Apr 27	May 20	H P Bush	306 Pine St
Exchequer M Co	Nevada	27	25	Apr 2	May 7	May 28	C E Elliott	309 Montgomery St
Found Treasure M Co	Nevada	5	12½	Apr 10	May 16	June 6	J Stadfeld Jr	309 Montgomery St
Gray Eagle M Co	California	12	05	Mar 19	Apr 23	May 14	O H Bogart	327 Pine St
Grand Prize M Co	Nevada	20	30	Mar 15	Apr 20	May 13	R R Grayson	327 Pine St
Laguna Con M Co	Nevada	1	03	Feb 23	Apr 5	Apr 26	J Stadfeld Jr	309 Montgomery St
Los Putos Coal, Iron & Mng Co	Cal.	1	1½	Mar 25	Apr 30	May 20	W C Stedfeld	309 Montgomery St
Mexican M Co	Nevada	37	25	Mar 5	Apr 10	Apr 30	C E Elliott	309 Montgomery St
Mono M Co	California	27	50	Feb 28	Apr 2	May 8	B L Burling	309 Montgomery St
North Commonwealth M Co	Nevada	2	30	Apr 3	May 3	May 30	J W Pew	310 Pine St
North Peer G & S M Co	Arizona	5	05	Feb 25	Apr 1	Apr 24	H Deas	309 Montgomery St
Oak Con M Co	California	1	03	Feb 25	Apr 8	Apr 23	E J Ryan	230 Montgomery St
Occidental Cons M Co	Nevada	4	50	Apr 8	May 13	June 5	A K Dustron	309 Montgomery St
Peerless M Co	Arizona	12	25	Mar 25	Apr 26	May 21	A Waterman	309 Montgomery St
Piedmont M Co	Nevada	1	05	Jan 28	Mar 6	Apr 23	J J Scoville	309 Montgomery St
Pinal Con M Co	Arizona	8	13	Apr 13	May 20	June 12	A Cheminant	328 Montgomery St
Potosi M Co	Nevada	32	50	Apr 10	May 15	June 5	C E Elliott	309 M ntgom ry St
San Francisco Copper Co	California	3	10	Mar 18	Apr 23	May 21	G Ruegg	405 California St
Sierra Nevada M Co	Nevada	94	25	Mar 5	Apr 9	Apr 29	E L Parker	309 Montgomery St
Taylor M & M Co	California	17	3.00	Mar 20	May 1	May 18	A E Ball	Mechants Ex
Utah Con M Co	Nevada	6	25	Mar 5	Apr 10	Apr 29	A H Fish	309 Montgomery St
Yellow Jacket M Co	Nevada	45	50	Mar 28	May 1	June 1	W H Blauvelt	Gold Hill

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Bullion-Beck M Co	Utah	A Badlam	322 Montgomery St	Annual	Apr 24
Commonwealth Con M Co	Nevada	H Deas	309 Montgomery St	Annual	May 8
Excelsior Water & M Co	California	W J Stewart	215 Sansome St	Annual	Apr 27
Russell Reduction & M Co	California	J Morizio	328 Montgomery St	Annual	Apr 22

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	Apr 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 25.		WEEK ENDING Apr. 4.		WEEK ENDING Apr. 11.		WEEK ENDING Apr. 17.	
Alpha	1.75	1.90	1.55	1.80	1.70	1.75	1.55	1.95
Alta	1.95	2.10	2.15	2.25	2.15	2.25	2.00	2.10
Andes	.80	.90	.75	.80	.75	.80	.70	.85
Argenta	....	....	....	....	.55	....	....	.00
Belcher	2.75	3.30	3.05	3.50	3.15	3.35	3.15	3.50
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	3.75	4.30	3.75	4.15	4.00	4.35	3.90	4.50
Bullion	.75	.85	.70	.85	.75	.85	.70	.80
Baltimore	.35	.45	.25	.35	.25	.35	.25	.30
Belle Isle	....	.30	.25	.30	....	....	....	....
Bodie Con	1.25	1.35	1.00	1.20	1.00	1.20	1.05	1.10
Benton	3.95	4.00	....	3.75	3.50	....	....	3.00
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	....	.40	.30	.35	.35	....	.20	.30
Con. Va. & Cal	8½	8.50	8½	88	7.75	8.50	7.75	8.50
Challenge	3.90	4.20	3.75	4.00	3.70	3.85	3.60	3.90
Champion	....	....	....	....	....	....	....	....
Chollar	2.10	2.60	2.10	2.40	2.10	2.40	1.95	2.35
Confidence	12½	13¾	12	12½	12½	12½	11	11¾
Con. Imperial	.60	.65	.55	.65	.55	.60	.55	.60
Caledonia	.35	.40	.30	.35	.30	.35	.30	.35
Con. Pacific	....	.20	....	....	....	....	....	....
Crown Point	4.10	4.80	3.70	4.35	3.85	4.25	3.75	4.05
Crocker	.45	.55	.45	.60	.55	.60	.45	.55
Central	....	....	....	....	....	....	....	.20
Dudley	.20	.30	....	.25	.30	....	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	1.00	1.25	.75	1.20	1.15	....	1.10	1.20
Exchequer	.75	.85	.65	.75	.60	.70	.60	.75
Grand Prize	.65	.75	.65	.8	.70	.75	.70	1.00
Gould & Curry	2.25	2.65	2.20	2.50	2.30	2.50	2.20	2.60
Hale & Norcross	3.65	3.95	4.05	4.45	4.15	4.50	4.10	4.40
Hollister	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	....	....	....	.30	.35	....	.25	.35
Justice	1.25	1.55	1.20	1.30	1.20	1.25	1.10	1.25
Kentuck	....	....	1.65	1.75	....	....	....	....
Lady Wash	....	.35	....	.40	.35	....	....	.35
Martin White	....	....	....	....	....	....	....	....
Mono	.60	.73	.50	1.00	1.25	1.30	1.20	1.25
Mexican	3.05	3.70	3.00	3.45	3.35	4.45	3.85	3½
Mt. Diablo	....	2.25	....	2.75	....	....	....	....
Northern Belle	....	....	....	....	....	....	....	....
Navajo	1.10	1.15	.95	1.10	1.10	....	.55	.90
North Belle Isle	....	....	2.50	3.00	2.90	3.00	2.60	2.65
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.75	2.85	2.85	3.00	2.95	3.00	2.55	2.65
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.25	1.30	1.20	1.30	1.00	1.20	1.00	1.10
Ophir	5.00	5½	5½	5½	5½	5½	5½	5½
Overman	1.25	1.40	1.25	1.30	1.20	1.30	1.20	1.35
Potosi	1.85	2.30	1.85	2.15	1.80	2.75	1.60	1.85
Peerless	.45	.65	.40	.45	.40	.50	.40	.45
Peer	.30	.35	....	....	.30	.35	.25	.35
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.50	2.80	2.40	3.00	2.60	2.80	2.55	2.90
S. B. & M	2.60	2.95	2.65	2.80	2.70	2.90	2.45	2.65
Sierra Nevada	2.60	3.00	2.50	2.80	2.95	3.30	2.90	3.90
Silver Hill	....	....	.50	.55	.50	....	.45	.50
Silver King	....	....	....	.85	....	....	....	....
Scorpion	.50	.55	.45	.50	.50	.55	.50	.65
Syndicate	....	....	....	....	....	....	....	....
Union Con	3.10	3.70	3.05	3.10	3.30	4.05	3.55	5½
Utah	.90	1.20	.80	1.05	1.15	1.30	1.15	1.45
Yellow Jacket	3.30	4.05	3.25	3.80	3.25	3.40	3.10	3.40

Sales at San Francisco Stock Exchange.

THURSDAY, Apr. 18.

350	Alta	2.10	
200	Andes	.85c	
350	Alpha	2.05	
250	Belcher	3.45	
310	B. & Belcher	4.40	
160	Bodie	1.10	
490	Bullion	.80c	
300	Baltimore	.30c	
100	Caledonia	.35c	
200	Challenge	3.95	
400	Chollar	2.35	
100	Commonwealth	5.25	
600	Crocker	.50c	
10	Confidence	11.00	
620	Crown Point	4.10	
200	Con Va & Cal	8.00	
600	Con. Imperial	.65c	
450	Exchequer	.75c	
50	Eureka Con	1.30	
200	Gould & Curry	2.65	
200	Grand Prize	.95c	
620	Hale & Nor	4.50	
100	Julia	.30c	
100	Justice	1.20	
50	Kentuck	1.90	
100	N. Belle Isle	2.50	
500	Nev. Queen	2.55	
100	Overman	1.35	
200	Ophir	5½	
150	Occidental Con	.10	
100	Potosi	1.85	
100	Peer	.30c	
100	Peerless	.40c	
500	Savage	2.90	
50	Scorpion	.65c	
200	Sierra Nevada	2.80	
675	Sierra Nevada	5.00	
850	Utah	1.45	
1070	Union	5.50	
150	W Comstock	.40c	
300	Weldon	.25c	
550	Yellow Jacket	3.40	

A LARGE SAWMILL ENTERPRISE.—Work has been commenced on a dam 48 feet high across the Klamath river, which is to afford water-power for a number of new sawmills not far from the California & Oregon line, in Shasta county. An Eastern syndicate, in which Gen. Alger of Michigan is interested, is behind the scheme, and the capital is said to be $10,000,000.

"De man wot knows it all is alluz a-makin change, a-buyin' ob experience." The man who does *not* think that he "knows it all" about Pumps can find out a great deal about them in *Grimshaw's* PUMP CATECHISM. By mail, postpaid, $1. Dewey & Co., 220 Market St., S. F., Cal.

ASSESSMENT NOTICE.

Gray Eagle Mining Company.—Location of principal place of business San Francisco, California. Location of works, Placer County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 19th day of March, 1889, an assessment, No. 12, of Five Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Room 9, No 327 Pine Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 23d day of April, 1889, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 14th day of May, 1889, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

O. H. BOCART, Secretary.

OFFICE—No. 327 Pine Street, Room 9 S. F. Stock Exchange Building, San Francisco, Cal.

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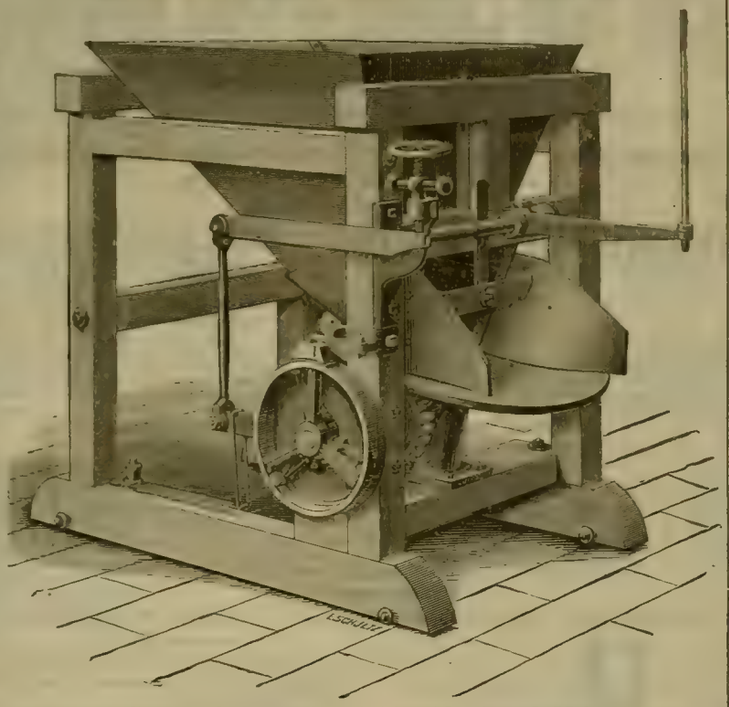

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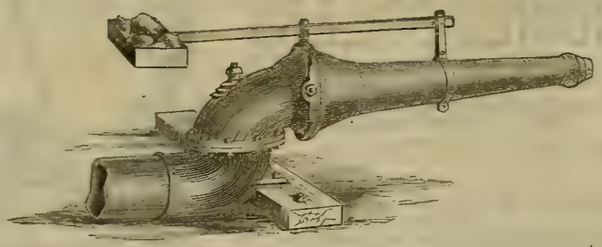

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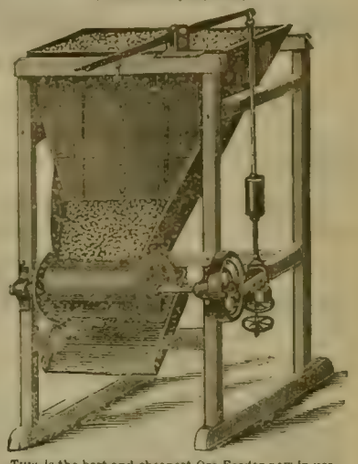

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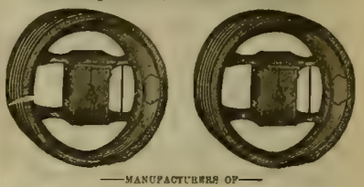

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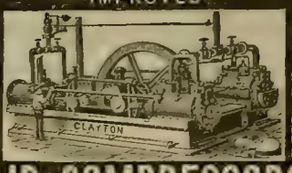

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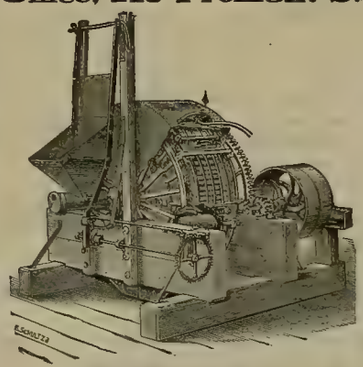

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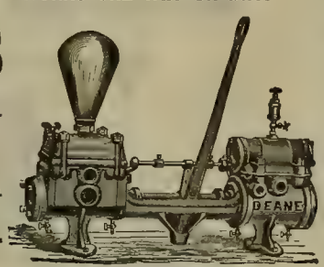

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A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for $2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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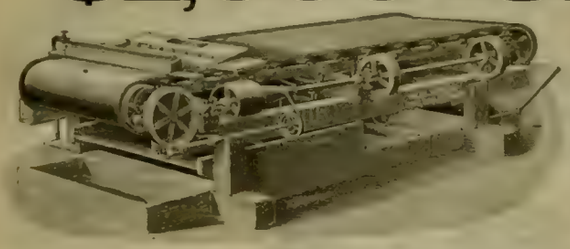

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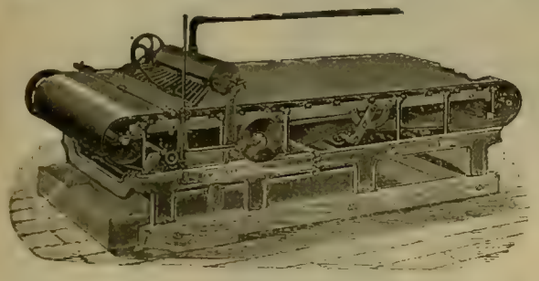

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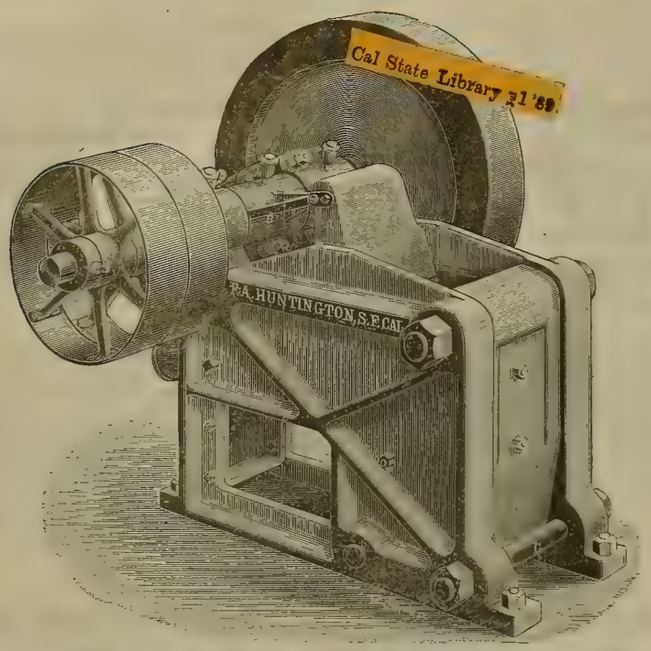

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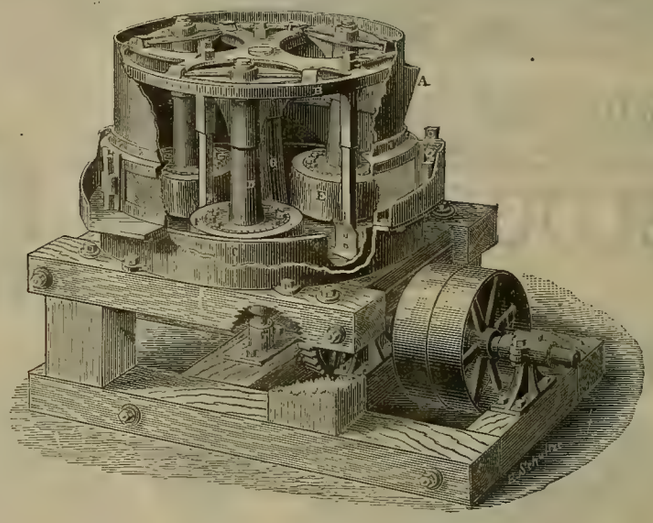
Huntington's Improved Rock-Breaker.

The main features of this machine are strength, ease of adjustment and simplicity of construction.

The movable jaw *A* is worked by the eccentric *B* and is pivoted at the bottom. The stationary jaw *D* is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt *C*. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt *C* and the jaw *D*. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



F. A. HUNTINGTON'S
Centrifugal Roller Quartz Mill.

The following will explain the above cut:

The ore and water being fed into the mill at the hopper *A*, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

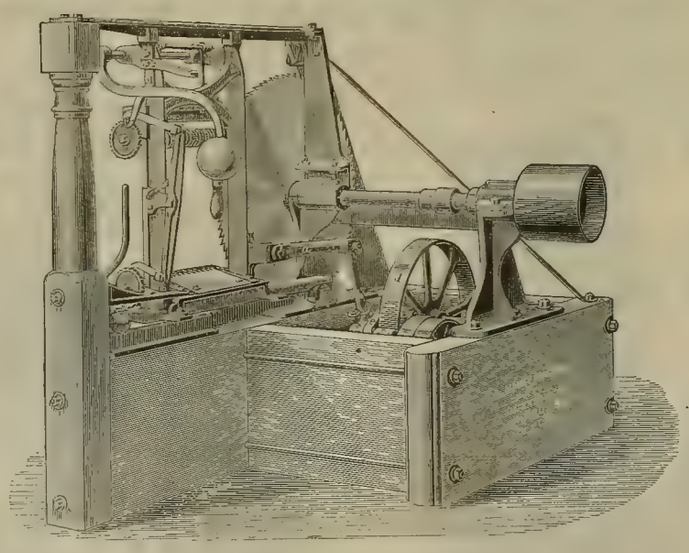
The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet crushing and gold saving it has no equal.

I claim especial merit in that feature of this system *which prevents* ALL FLOURING of gold and quicksilver, and the consequent loss of gold that attends stamp milling.

For the economical working of ore that contains sulphurets, I particularly claim the adaption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.

F. A. HUNTINGTON'S
PATENT SHINGLE MACHINE.

This Machine is so well and favorably known by all the principal Lumbermen on the Pacific Coast that it is useless to go into any detailed account of its merits; suffice it to say that recent improvements in a new, quick return feed-works has placed it far ahead of all competitors. This feed-works is positive and uniform in its action and obviates all the jar or tremor formerly given to the machine by the weight used in the old style feed.



For simplicity, durability and rapidity of action, these machines have no equal, cutting from 50,000 to 75,500 shingles per day.

Price, complete with Jointer and one 38-inch Saw, $475.00.

The new feed-works can be applied to any of the old machines.

Price $100.

SEND FOR CIRCULARS.

F. A. HUNTINGTON,

MANUFACTURER AND DEALER IN

STEAM ENGINES AND MINING MACHINERY OF EVERY DESCRIPTION.

PRINCIPAL OFFICE, 45 FREMONT STREET, SAN FRANCISCO.

MINING AND SCIENTIFIC PRESS.

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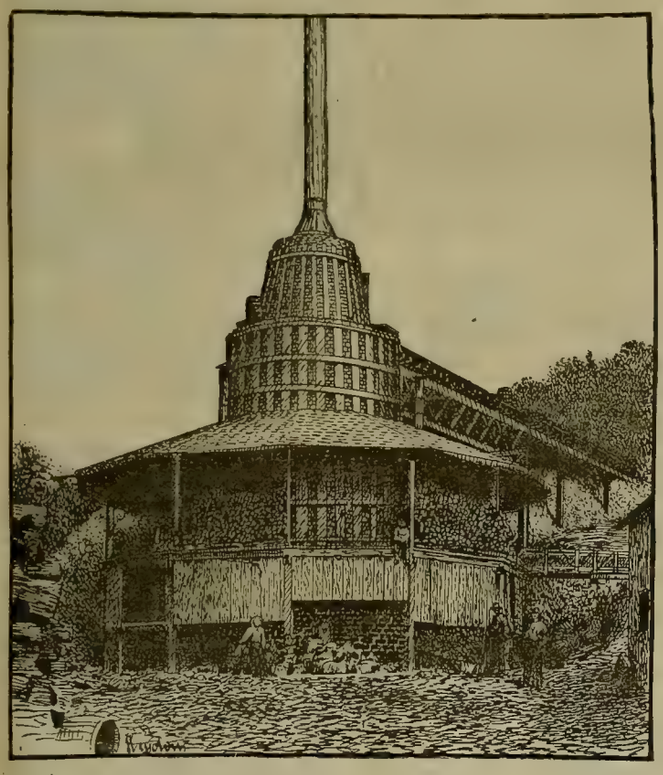
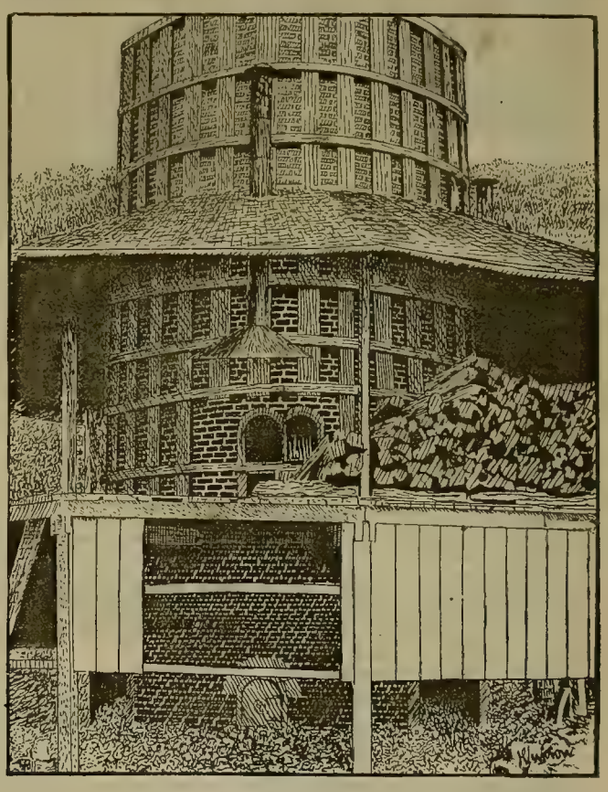
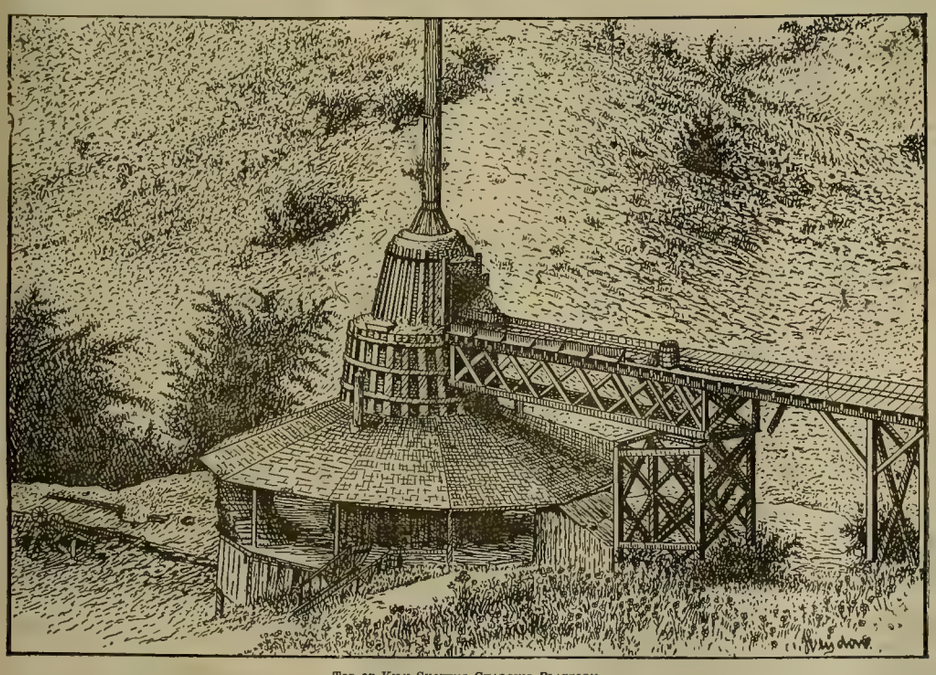


PERPETUAL LIME KILN AT GUADALUPE.



VIEW SHOWING FIRING DOOR AND DISCHARGE DOOR.



TOP OF KILN SHOWING CHARGING PLATFORM.

PERPETUAL KILNS USED IN THE MANUFACTURE OF LIME.

Lime-Burning.

At the works of the Guadalupe Lime Company an extensive business is carried on, the kiln being a perpetual one, and a decided improvement on the old-fashioned pot kiln. The works of this company are situated upon the eastern slope of the Almaden section of the Santa Cruz mountains, about ten miles southwest of San Jose and 2½ miles from Guadalupe Station, Santa Clara county, on the New Almaden branch of the Narrow Gauge Railroad. This property was first developed about the year 1864, and the lime burned in kilns on the banks of the Guadalupe creek.

The principal quarry of this company is situated at the hight of about 900 feet above sea level. It is a circular opening, and was connected by a tunnel with other workings about 150 feet below, but the tunnel has now caved in. The limestone in this quarry is about 45 feet thick, and dips to the southwest at an angle of over 30 degrees. It is a dark-colored bituminous limestone, many samples of which smell strongly of petroleum when freshly broken. Both above and below the limestone are strata of shale.

The present workings appear to be confined to smaller openings, most of which are at a lower elevation. In some of these the limestone is of a light color, but the formation presents the same general characteristics as the former. The accompanying engravings and the description, we take from the report of the State Mineralogist. Inquiry has been made by those using the old-fashioned kilns concerning the improved ones. The cuts will give those interested a good idea of the "perpetual kilns."

The limekiln, which is situated about 400 feet below the upper quarry, is supplied with limestone by trucks worked by a gravity pulley from the quarries above. The kiln is an upright circular furnace about 60 feet high, tapering from a circumference of about 100 feet at the base to about 40 at the top. It is surmounted by a smokestack 60 feet in hight. This kiln is con-

nected with an outer wall of ordinary brick and an inner one of firebrick, the space intervening being filled with concrete, altogether forming a wall of about six feet thick.

The trucks from the quarry are lowered to the charging platform, which leads to the door of the furnace. About 20 feet beneath the charging platform, the kiln is surrounded by a firing floor. On a level with this floor are three fireplaces, placed at equal distances in the main body of the kiln. The ash pits beneath the grates of the fireplaces extend directly down through the wall of the kiln, leading separately and directly to the ground or drawing floor, about 20 feet below. The space in the kiln between the level of the fireplaces and the ground floor constitutes a cooling chamber, the line being drawn from three openings at the bottom of the kiln. This kiln is charged by filling the cooling chamber with waste rock up to the level of the fireplaces, above which 18 truckloads, equal to about 30 tons, of limestone are dumped. The fires are then lighted, being fed with four-foot sticks of redwood.

After burning three days, a charge equal to 24 barrels of waste rock is drawn from the draw-holes at the bottom of the kiln, just as though it were burnt lime, and fresh limestone added at the charging door to keep the charge at the proper hight in the kiln. After six drawings, which now take place in 24½ hours, the waste rock is all drawn out, and the lime begins to make its appearance. The lime is sorted and shoveled into rawhide baskets, and hauled to the depot, where it is shipped in bulk. This kiln consumes from 4½ to 5 cords of wood in 24 hours, producing 160 barrels of lime in that time.

Production of Lead.

C. Kirchhoff, Jr., agent of the U. S. Geological Survey, makes the following preliminary estimate of the production of lead in the U. S. for 1888:

As compared with a series of years, the production of lead in 1888 was as follows, in short tons of 2000 pounds:

	1885.	1886.	1887.	1888.
Desilvered lead	107 437	114,329	135,552	151,465
Non-argentiferous lead	21,975	20,800	25,148	29,090
Totals	129,412	135,629	160,700	180,555

The total given under "Desilverized Lead" is the aggregate of the returns of every desilverizing works in the country. The quantity of "Non-Argentiferous Lead" for 1888 is the estimate made by Messrs. John Wahl & Co. of St. Louis, of which they state 13,800 tons is the output of Southeast Missouri and 7000 tons is the product of Southwest Missouri and Kansas district. A considerable increase in the make is expected during the current year from the former section.

This office is indebted to the Bureau of Statistics for the following figures relating to the amounts of lead returned by Collectors of Customs as contained in silver-lead ore imported from Mexico during the calendar year 1888:

	Pounds lead.	Value.
Corpus Christi, Texas	5,629,780	$ 49,170 10
Paso del Norte, Texas and New Mexico	41,647,291	832,944 00
Saluria, Texas	9,995,300	84,438 00
Totals	57,272,371	$966,552 10

In the calendar year 1887 the Mexican imports were estimated at 15,000 tons, so that the greater part of the enormous increase in 1888 is due to the receipts of lead in Mexican silver-lead ores imported duty free.

EUREKA DISTRICT.—The *Sentinel* says: A considerable amount of ore is again accumulating in this district, the shipment of which to the furnaces is hindered and delayed by the Government timber suits; yet there is not as much as there would be if these suits had not been commenced. The Jackson of Ruby Hill is said to be the best producing mine hereabouts at the present time; there are 32 tributers at work in it and getting lots of ore. The tributers in the Hamburg and Dunderberg mines are also doing well. There are about 25 men tributing in the Silver Lick mine, which is again looking well. These are now the principal producing mines, but there are a number of others yielding ore in paying quantities all awaiting the end of the Government suits for the furnaces to start up. If these suits are quashed this spring, the summer will bring us the best times we have had in Eureka for years past. In the meantime the Richmond and Eureka Con. mines remain closed down, except that in the former some men are at work on day's pay, timbering some yielding ground on the 100-foot level that is used by the miners as a main passageway through the mine. The Diamond tunnel is progressing, and the fact of that mine going into the hands of Salt Lake people stirs fresh hopes in those whose faith in the future of the camp was waning. There is a good prospect for a new company to operate near the Dunderberg mine, and much else in the district that bears encouragement for the future.

SMELTING COPPER.—The Adelaide Copper Company's furnace started up last week and has been running steadily since. The furnace is doing first-class work and copper ingots are being turned out by the ton. The mine is contiguous to the railroad at Golconda, and as the ore carries a high percentage of copper and assays well in silver, it will pay handsomely, notwithstanding the failure of the syndicate.—*Silver State.*

Notes on Leaching Silver Ores.

NUMBER 4.

Written for the MINING AND SCIENTIFIC PRESS by C. H AARON.]

The deterioration of the hypo in Hofmann's process never had any practical importance, whether it was calcium hypo or not, because those who use calcium sulphide seldom or never have to reinforce their leaching solution unless through mismanagement or accident. As to the bad effect of sodium sulphate, I do not attach much weight to it, because the Russell process has done and is doing excellent work, although the hypo must be charged with sodium sulphate, not only from the ore, but also from the effect of oxidation, the decomposition of lead sulphate, the use of sulphuric acid for neutralizing and the addition of bluestone for making extra solution.

Mr. Hofmann seems to attribute to the presence of sodium sulphate the constant necessity for reinforcement of the hypo in the Russell process, but this can hardly be so, because the need of reinforcement ought then to cease as soon as the hypo has accumulated the maximum proportion of sodium sulphate; but it does not appear to cease, hence we must look for some other reason why the Russell process consumes from one to seven pounds of sodium thiosulphate for each ton of ore leached.

Mr. Hofmann has cleverly turned the enemies' flank, and no doubt he is, to a great extent, right in his argument, while we others have erred in neglecting the effect of the sodium sulphate in the ore and that resulting from oxidation of the hypo, or perhaps we did not altogether neglect it, but failed of giving it due consideration. But the distinction he seeks to establish between his process and that of Kiss seems to be a distinction without a substantial difference. I think it simply comes to this—commencing work with sodium hypo, if the sodium sulphate from all sources is constantly, or on the average, equal to or greater than the equivalent of the calcium salts of the precipitant, our solution will remain sodium hypo; if the sodium sulphate is less than the equivalent of the calcium compounds introduced, calcium hypo will accumulate in the solution until it reaches such a proportion that the mechanical waste will balance the daily or periodic addition. On the other hand, if we begin with calcium hypo, in the first case we shall soon have, practically, sodium hypo to leach with, and in the second case, sodium hypo will accumulate until it reaches a proportion corresponding to its production.

In either way, so long as we use calcium sulphide and sodium sulphate is present, we are practically adding so much sodium hypo, and either some or not any calcium hypo to our stock in each operation, and withdrawing by mechanical loss about an equivalent. The result is a mere question of mathematics according to the proportions of the two added substances.

The analysis of Mr. Hofmann's solution after about three months' use indicates a very remarkable equivalence of the sodium sulphate and the calcium hypo, neither preponderating. It is hardly necessary to point out that this will not always happen.

Another singular thing in the analysis is the very small percentage of sodium chloride, which is 0.16. If the ore worked contained an average of 1.5 pounds of silver in the form of chloride, there would result about 0.8 pounds of salt for each ton of ore. However, as we neither know how many tons of ore were leached nor what quantity of solution was kept in stock, we cannot make any calculation as to the percentage of salt which might be looked for, and my only object in speaking of this is to suggest that a large part of the soluble silver may have been in the form of a double sulphate with lead, as I have found to be the case sometimes, and this would assist in accounting for the absence of calcium hypo as well as for the slow extraction of the silver in vat leaching.

The following statement from Mr. Hofmann's article is interesting:

	In tanks.	In troughs.
Quantity of water required for base-metal leaching, including sluicing per ton	943 gals.	1,129 gals.
Quantity of hypo required per ton	4 935 "	816 "
Total water required for 100 tons per day	94,300 "	112,000 "
Total hypo required for 100 tons per day	493,500 "	81,600 "
Time required to treat a tank of ore	109 hrs.	30 m. 15 h. 5 m.
Loss of silver in base leach per ton	0.25 oz.	Trace.
Extraction of silver		Equal.

In regard to the loss of silver in base-metal leaching, it must be observed that Mr. Hofmann introduces the water below the filter at first, when working the tank process, and does not recover the small quantity of silver which passes out with the base-metal solution.

As to the quantity of hypo required, it must be understood that the figures represent the number of gallons which must pass through the ore and must be pumped, etc., not the volume of the stock which depends greatly on the time required for leaching and the consequent number of tons leaching at once for a given number to be finished daily.

Mr. Hofmann has tried, and highly recommends, Mr. Stetefeldt's amendment of my method of recovering the waste sulphur from the precipitate. I did this by boiling the precipitate with slaked lime, which answered very well with the good lime at my command. Mr. Stetefeldt recommended caustic soda in place of lime. Now, Mr. Hofmann proposes to make lye from the wood ashes produced in the furnaces, convert it to caustic lye by boiling with lime, and use that to dissolve the free sulphur, producing potassium sulphide for use as a precipitant. There is one possible objection to either of these processes, which is, that gold may be dissolved from the precipitate; another objection to the latter two is that the resulting sulphide will probably contain caustic alkali; but this consideration need not trouble Mr. Hofmann if he will mix the liquid with his calcium sulphide, for I have proved that the caustic alkali is thus neutralized, calcium hydroxide being thrown down. (See article on "Lixiviation of Silver Ores," in MINING AND SCIENTIFIC PRESS, Dec. 22, 1888, in which other methods are also given for the neutralization.)

In working the Russell process, causing a regular consumption of hypo, a better way of recovering the excess of sulphur is by heating with aqueous sodium sulphite, producing sodium hypo, with no danger of dissolving gold. This additional hypo would be superfluous in Hofmann's mode of working, in which it is well known that a reinforcement of the hypo beyond that derived from the precipitant is seldom required.

In some cases the sodium sulphite may be added to the hypo, any excess simply going over to the next precipitation, but if the ore contains lead sulphate, any sulphite which may be present during the leaching will form insoluble lead sulphite, which will remain in the ore and the sodium salt will be lost. The ore of the San Francisco Del Oro mine contains some cadmium, and Mr. Hofmann proposes to recover that as cadmium sulphide, which is a valuable pigment commanding ready sale in London. He might also make lead chromate, if it would pay, by precipitating the lead from his solutions with potassium (neutral) chromate, which throws the lead down free from lime in presence of salts of calcium.

We are indebted to Mr. Hofmann for a method of ascertaining the change of weight and the loss of precious metal by volatilization during the roasting, which is as follows:

Take a sample of the already salted ore before it enters the furnace, and another of the same ore after the roasting. Weigh out a suitable quantity of each and roast in the muffle in half-hour periods until the weights remain practically constant. The percentage of weight lost by the previously roasted sample deducted from that lost by the other shows the loss of weight in the furnace, and the assay value of the raw ore being known, as well as that of the roasted ore from the furnace, the loss of silver by volatilization is easily calculated. In case an addition of salt is made during the roasting in the furnace, a similar addition must be made, at the same stage of the muffle roasting, to the sample which is roasted entirely in the muffle.

The process is open to objections: The roasting in the muffle takes place under different conditions from that in the furnace; the ore which has been roasted in the furnace will not have the same composition as the other at the same stage, because it will have lost an unknown proportion of its constituents by dusting; again, the ore from the furnace having already sustained a certain charge of weight, it is not possible to know how much ought to be taken to correspond with the taken weight of the raw ore. The error arising from the latter cause can be corrected to any required approximation by the loss of weight in the furnace indicated by the experiment. On the whole, this seems to be the best method we have, and it will doubtless prove useful, especially where reverberatory furnaces are used, as they cause less dusting than the cylinder or shaft furnaces.

NOTE.—In the *Engineering and Mining Journal* of April 6th is a letter from Mr. Ellsworth Daggett in which that gentleman replies to some of Mr. Hofmann's remarks on the Russell process at the Cusi mill, etc. Mr. Daggett also says that a week is not a sufficient length of time in which to determine the applicability of the Stetefeldt furnace to a refractory ore, which he says cannot be done in less than a month. Considering that the particular ore in question is completely ruined in the trials, it may well be that neither Mr. Hofmann nor his employers would care to risk the loss of 1000 tons or more, in addition to the expense, for the sake of a problematical success which can be readily attained by other means.

JUMBO DISTRICT.—The Blizzard and North Star mining locations in Jumbo district have been leased, and ore from them is being shipped to Fisher's mill in Six-mile canyon. The project of building a mill in the district is being discussed, as there is a large area of ore exposed in locations there that assays from $15 to $20 per ton, which is of too low grade to leave a margin after paying shipping and milling expenses. Prof. Willis has resigned the ferule and is now a knight of the pick and drill, and will soon begin developing his locations in the district. Several cabins have recently been erected in Jumbo, and the district resembles a California mining camp in the days of '49.—*Virginia Chronicle.*

OF INTEREST TO MINERS.—The Supreme Court, in the case of White vs. Lee, has decided that the location of a mining claim is incompetent and void if the location is not distinctly marked on the ground, notwithstanding the posting and recording of notice of location.

Mines and the Paris Exposition.

EDITORS PRESS:—I have just received from the Minister of Commerce and Industry in France the following information, which will probably be of interest to most of your readers:

The French Government has appointed an International Congress on the subject of mines and metallurgy, to be held in Paris on the 21 of September in this year, in connection with the exposition which is to take place there during the next summer. The Congress has for its object to make known and discuss the most recent inventions and improvements in mining and metallurgy, and will have brought before it a considerable number of memoirs which have been prepared by engineers specially detailed for the purpose. These reports will be printed and distributed in advance to persons who wish to become members of the Congress and will form the basis of the discussion, but other subjects may be introduced or other questions presented by the members, with the approbation of the officers in charge.

The Congress will consist of members and honorary members, the latter being appointed by the French Government and the former becoming so upon the payment of 20 francs.

Letters and communications from this country relating to the subject of mines and metallurgy may be addressed to Mr. Castel, Inspector-General of Mines and President of the Organizing Commission, 144 Boulevard Raspail, Paris.

The committee appointed by the French Government consists of: President, Mr. Castel, Inspector-General of Mines, President of the Society of Mineral Industry.

Vice-Presidents—Mr. Brull, Past-President of the Society of Civil Engineers in Paris; Mr. Haton de la Coupilliere, member of the institute, Inspector-General of Mines, Director of the School of Mines of Paris; Mr. Jordan, professor of metallurgy at the Central School, Past-President of the Society of Civil Engineers of Paris; Mr. Remaury, civil engineer of mines.

Secretaries—Mr. Dujardin Beaumetz, secretary of the Central Committee of Coal Mines; Mr. Gautier, civil engineer of mines; Mr. E. Gruner, civil engineer of mines; Mr. Lodin, engineer of mines, professor of metallurgy at the School of Mines of Paris. THOS EGLESTON

35 West Washington Square, N. Y. City, March 30, 1889.

An Alaskan Coal Mine.

The schooner Active, Captain William Murphy, which left Sitka on September 22d, last year, on a prospecting trip to the Yakutat Coal Co.'s coal mine, returned on Tuesday last, after an absence of over five months. The party, consisting of Peter Callsen, Harry Lyons and Jack Dalton, arrived at Yakutat on October 3d, and a few days subsequently started for the scene of the discovery, which was reached on the 8th of the month. The coal deposit lies two miles from the beach, some 30 miles north and a little to the west of Yakutat, on the Point Manby side of Yakutat bay. The beach is flat and level, being very favorable for hauling, and the whole of the adjacent country heavily timbered, with so little underbrush that a team can be driven through the woods at any point. The first thing which the prospectors commenced on was the building of a house for winter quarters, and when that was completed the work of opening up the deposit began in earnest. Forty sacks of coal were taken out of a five-foot vein, which widened as the work proceeded. The vein was found to dip due north at an angle of 45 degrees, but rose gradually as a greater depth was attained. A shaft 45 feet deep and 4x6 wide was sunk, and in the sinking three different seams were struck, each about one foot in thickness and some ten feet apart. These seams were made up of partly decomposed coal.

At the bottom of the shaft a drift was run in for 40 feet in a southerly direction, toward the point where the main body of coal lies. On reaching the outer wall of this main body, coal partly decomposed was struck and surface water was found in such a volume that further operations were suspended, the party having no suitable apparatus with which to pump out the water and ascertain the complete extent of the deposit. There are ample reasons, however, for believing that there is abundance of coal, as at a point 900 feet south of the discovery shaft the surface of the ground is covered with outcroppings for a distance of 20 feet; and 1½ miles west of the shaft, outcroppings are seen for a distance of 24 feet; these two places and the scene of the discovery being the only points where the mineral is exposed, all the remaining surface being covered with glacial deposits, underneath which there is supposed to be one vast bed of the mineral. The formation is that known as micaceous sandstone and fire-clay. The work of sinking and drifting was accomplished by means of the pick, no blasting being necessary. It may be asked why no more than 250 pounds of coal were brought down on the Active when the mineral was found to be so plentiful. This is very easily explained. There was no means of transporting the coal from the shaft to the beach, the snow being so soft, in consequence of the mild, open weather, that carrying the coal on a sleigh, as was intended originally, was found to be impracticable.—*Alaskan.*

THE Telephone Exchange of Stockholm, Sweden, is equipped with an American apparatus.

Intellect and Emotion.

Man is a very peculiar being and stands alone in the great creation of God. There is a gulf between him and the rest of animated nature—a gulf without a link, a chasm that only God could stride.

Below man we find all the rudiments of his nature except the cap sheaf, the intellect. The same flesh, bone, senses, instincts and wants are all there. Man is based upon nature, allied to it, subject to all its laws, and has nothing above it till we come to the mind. There he steps out; he is alone. There is not even a rudiment of his great mind and its appurtenances in all that stands below him.

He thinks, speaks, imagines, speculates on the past, the future, on causes and consequences. If God or angels wanted to select a being on earth to be an agent of heaven, all the conditions would point to man as that agent. No other could be thought of for a moment.

Even the passions of man are modified by this mind to make them fit company as it were. He cooks his food. He forms a family compact for life. He loves his wife and children till death. He builds a home. He uses weapons and tools. He works to-day for to-morrow. He becomes a philosopher, a judge, orator, artist, law-maker, a king.

He may be said to have two lives, one emotional and the other intellectual, and he plays between the one and the other continually. The emotional is the basis of his nature, the bedrock of his happiness or misery; and with a thousand the sum of their happiness, while only the one will abandon them for the pleasures of the mind.

Occasionally we find a rapt genius who soars upward, and regardless of parents, wife or child, will revel only in art or science, deeming life well spent, a grand success, if he have carried fame or fortune in his favorite pursuit. But for the most part these things are pursued only as a means to an end; the end, the home where wife and children bring him all his reward when the toil is done.

To have become Pope, to have reached the pinnacle of fame, or wealth, or any other eminence, cannot be deemed or accepted as a happy and successful life, if it imply a single state.

On the contrary, the poorest and least cultured of all, have lived well, who were born of a loving mother, with loving brothers and sisters, left them only for a loving wife, raised a good family of affectionate children and died in their arms. This is emotional life. It may be humble or great, but when complete it is the crowning joy of this world. Is is the perfection of human life when attended by modest fortune and the charm of cultivation. Domestic felicity is the only picture that can begin to realize the kingdom of heaven.

John Knox of Scotland, somewhat of an ascetic, in conversation with one of the "Old Kirk," who was thus happily situated, said to him:

"You and your whole family lack the grace that saves, and unless you change your hearts, St. Peter will shut the door in your faces."

"Well, well," said the old man, "we will camp outside and have heaven there. Wherever we are we make heaven for ourselves."

When we count up all the items of our happiness, we shall find the emotions are concerned in at least nine-tenths of the whole sum. If this is true as to man, it is doubly true for woman. She is essentially emotional. Her life is made up of her loves; indifference is a distress. For her, love must be active, demonstrative, and ever present. It begins with the cradle, and it should follow her to the grave. A loved child, sister, wife, mother, is the perfection of woman's life. To have been that is success; and not that, a dreary failure.

Accomplishments, high culture, ambition, fortune, fame, are well, but for the few only, and in their utmost perfection cannot compensate for the other. What a blank, when they attain nothing, and yet lose the pearl of great price.

This emotional nature needs practice, training and modulation. It should be the mother's care to see that it has all these from the earliest infancy. Cultivate the emotions in their proper channels. Teach your children to love one another. Impress upon them that they are near relatives, your children, brothers and sisters, allies and friends for life, and must on no account be hasty, or unreasonable, or unduly angry with each other. Train them to demonstrate their love for each other. Refer them to the fact that you love them all, and as they love you they must love each other. The kiss of peace and good-night, and the salute at morn will help them. Make the home a nest of love and helpfulness. Then in after-life all these things will be remembered to the end. They are not truly brothers and sisters who are not trained thus; and when we look around on society we fear that many have not been warmed in that nest.

We have a doubt if any education away from home can compensate for the loss of these advantages. We are not certain that even our boys do not lose more in mother's love and father's kind, homely instruction than they gain from the most erudite profession. Could not the college be near home so as to have both? Look at the world, and you will find more truly great men whose hearts were kept by their mothers than from the college or university. And for girls we deem the mother and the family indispensable.

We would not deprive our young women of all the knowledge and finish their natures admit of; but we insist that nature shall not be suppressed by art. You may refine and elevate, but you must leave the germ, you must cultivate the domestic affections, habits, and instincts, and the mother and the family is the only school where they can be nurtured and trained to a useful end. The mother's love is the great educator of the affections.

Mining for "Flour Gold"

From Mr. J. S. Hunt of Bliss, Idaho, who is engaged in mining in the "flour gold" placers at Salmon Falls, on the Snake river, a reporter derived some interesting information in regard to those mines, which are certainly among the most curious deposits of the precious metal.

The gold, of which Mr. Hunt has a sample in a vial, is literally as fine as flour, it taking, as he says, 100 colors to make a cent. Placers of this kind are found along the Snake river from Blackfoot to near Huntington, and in the locality where his mine is situated there has never been found a "nugget" as big as a pin's point. Notwithstanding the dust like nature of the gold, his mine yields about $1000 per month.

The gravel in which it is found is from 12 to 30 feet in depth. It is worked by ground-sluicing, the coarse gravel being separated and the fine allowed to run over burlap cloths. The fine sand and gold which collects on these cloths is then passed over plates coated with quicksilver, which takes up the fine gold. There should be no trouble about saving the gold in the black sand found on beaches by this system, as it cannot be any finer than the gold Mr. Hunt has. The difficulty probably would be to get plenty of water and to find sand with plenty of gold in it. The placers along the Snake river can only be worked in a few places on account of the impossibility of getting water on them.

When asked how he supposed this gold came to be so fine, Mr. Hunt, who is an intelligent gentleman, said he had three theories, but he did not know which was the right one, if either was. It was possible that at some time the country where this flour gold is found was the beach of a sea, and the gold came there as it did on any of the beaches of this coast. Another theory was that glaciers coming down from the north, grinding and powdering everything before them, might have ground up this gold on their way and deposited it in this place. The third theory is that the gold was thrown out by volcanoes in a vaporized form and settled in some lake in the form of gold "dust."—*Portland Oregonian.*

A Metallic Railroad Tie.

George W. Thompson, who is an old Californian, but now a resident of Sag Harbor, N. Y., has invented and patented a metallic railroad tie which is illustrated on this page. The invention is an improvement in the class of metallic tubular ties having bearing blocks arranged within them for supporting their top portions when a train is passing over the rails laid thereon. Heretofore such bearing-blocks have been made longer than the distance between the heads of the bolts that secure the rails to the tie, and have also been provided with openings to receive the heads of such bolts. The ties to which such blocks were applied were necessarily made open on the under side to enable the rail-bolts to be inserted through the openings in the blocks.

Fig. 1.

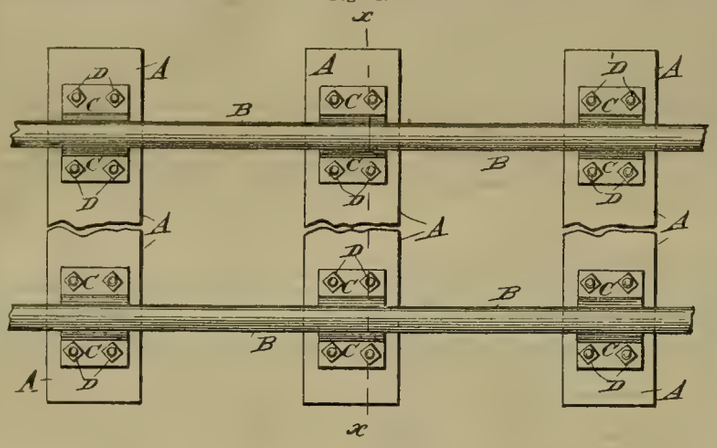


Fig. 2.

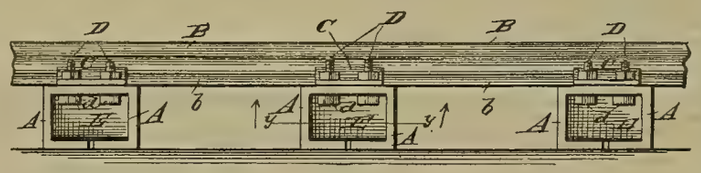


Fig. 3.

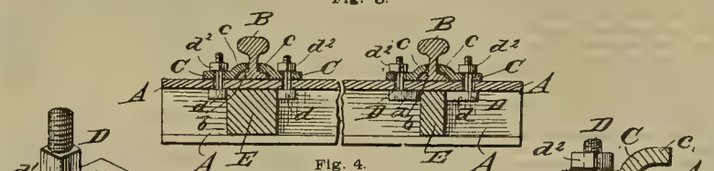


Fig. 4.

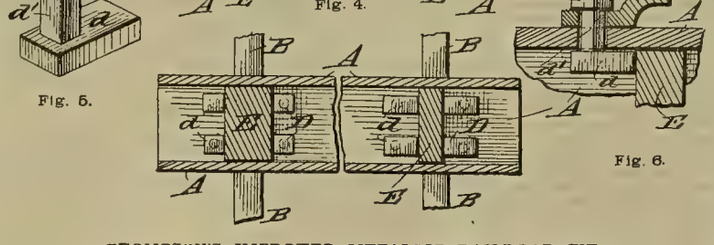


Fig. 5.

Fig. 6.

THOMPSON'S IMPROVED METALLIC RAILROAD TIE.

In Mr. Thompson's invention the bottom of the tie is closed, or nearly so, and the bearing-blocks are put in place by inserting them in the ends of the ties after the inner bolts have been applied. The heads of both the inner and outer bolts abut the sides of said blocks, and thus hold them in position.

The invention consists in certain novel features of construction of the railway tie and rail connections and supports.

In the engravings, Fig. 1 is a plan view of a section of a railway track laid upon the improved ties, which are broken away at their central parts. Fig. 2 is a side view thereof. Fig. 3 is a transverse section taken on the line *x x*, Fig. 1. Fig. 4 is a horizontal section taken on the line *y y*, Fig. 2, and shows the parts as they would be seen in the direction of the arrows; and Figs. 5 and 6 are detail views.

The main body of the improved railroad tie consists of a tube *A* which is preferably of rectangular cross-sectional form, produced by bending four times at right angles a rolled metal plate about two feet wide, seven feet long, or longer, and about three-eighths of an inch thick, more or less, the opposite edges of said plate meeting or nearly meeting at the lower side and longitudinal center of the tube, which is about seven inches wide, five inches high, and seven feet long.

The railway rails *B B* of a track are held to the solid or unbroken tops of the ties by rolled or wrought metal chair plates *C*, which are placed in pairs opposite each other on each tie and at the opposite sides of the rails, and are fixed by bolts *D* to the ties, and so that horizontal or nearly horizontal flanges or lips *c c*, formed at the inner edges of each pair of chair plates *C C*, overlap the opposite base flanges *b b* of the rails and securely bind them to each tie, as clearly shown in the drawings.

The bolts *D* are passed upward through the top of the tie and the chair plates thereon, and the heads *d* of the bolts rest against the under side of the tie top plate. Those portions of the bolts which pass through the tie and chair plates are made square or flat-sided to prevent turning of them, and the upper parts of the bolts which project above the chair plates are made round and are threaded to receive nuts d^2, which are tightened upon the chair plates to bind the ties, the rails, and the chair plates together in one substantial structure along the roadbed, which may be of earth, sand, gravel, or coal-dust, or may be a bridge, trestle, or other support, and the ties may be ballasted or not, as may be desirable or necessary.

The inventor utilizes the heads *d* of the bolts *D* of each pair of chair plates *C C* on every tie as lateral supports or braces to hold bearers *E* within the tubular ties and directly below the railway rails. These bearers are applied as follows: After the inner chair plate *C* of each pair of plates is fastened to the tie by its pair of bolts *D*, the bearer *E* will be slipped into the end of the tie and up snugly to the heads of this pair of bolts, and when the rail *B* and outer chair plate *C* are put in place the pair of bolts *D* to hold this outer plate will be applied, and so that their heads fit snugly against the outer face of the bearer, which will thus be held secure against displacement to give effective support to the tubular tie where the rail crosses it, and thus largely increase the durability of the ties and rails and the entire roadbed.

These bearers *E*, which are preferably made of cast metal, are fitted fairly at the edges to the inner faces or walls of the tubular tie, and may be of any desired width and yet be held by the heads of the chair-plate bolts, which will be made to fit the bearers. For instance, should rather broad bearers be used, the bolts *D* will be of ordinary form with bodies or stems concentric with their heads, as shown at the left-hand side of Figs. 3 and 4 of the drawings; and should the bearers be made narrower, the bolt-heads *d* will be elongated at the inside so as to bear fairly, as shown at the right-hand side of Figs. 3 and 4 and from the detail views Figs. 5 and 6. The bolt *D* having an elongated head *d* is shown in Fig. 5, while Fig. 6 shows in larger scale than the other views, such a bolt as applied to the tie, chair-plate and bearer. These elongated bolt-heads *d*, forming lateral supports to the bearer blocks, may either be made in one piece with the bodies or stems of the bolts or they may be made separate and as nut plates to screw into the lower ends of the bolts, as will be readily understood.

Railroad ties made and supporting the rails as described may be set about three feet apart from center to center or much farther apart than ordinary wood ties, and will be far more durable even when not coated with coal tar or other rust-preventing compound, which may be done to increase the durability of the ties and roadbed. The patent rights of this invention are for sale.

Those desiring further information may address the inventor as above, or "H. F. D.," Box 2361, San Francisco.

Visiting the Lick Observatory.

Prof. E. S. Holden, Director of the Lick Observatory, has issued the following circular:

The observatory building will be open to visitors, during office hours, every day in the year. Upon their arrival visitors will please go at once to the visitors' room and register their names.

An hour or so can be profitably occupied in viewing the various instruments, and the rest of the stay can be well spent in walks to the various reservoirs, from which magnificent views of the surrounding country can be had. At least an hour and a half of daylight should be allowed for the drive from the Summit to Smith Creek. There are no hotel accommodations at the Summit.

For the present, visitors will be received at the observatory to look through the great telescope every Saturday night, between the hours of 7 and 10, and at these times only.

Whenever the work of the observatory will allow, other telescopes will also be put at the disposition of visitors on Saturdays between the same hours (only).

At 10 P. M. the observatory will be closed to visitors, who should provide their own conveyance to Smith Creek, as there is no way of lodging them on the mountain.

It is expected by setting apart these times for visitors (which allow freer access to the Lick observatory than is allowed to any other observatory in the world) that all interested may be able to arrange their visits in conformity to them, and that the remaining hours of the week will be kept entirely uninterrupted, in order that the astronomers may do the work upon which the reputation and the good name of the observatory entirely depends.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NEW LONDON.—Amador *Ledger*, April 20: Steps have been taken toward the erection of a mill on the New London mine near Plymouth. The contractors were on the ground last week, and the erection of the work will be proceeded with at once. At the Morley or Wetzlar mine, the company have decided to open up the property further, before proceeding with the building of the mill. They are busy putting up the Rudd pulverizer for the reduction of cement gravel at the French claim at Volcano. The company, we are informed, have secured an extension of the bond, and the general impression now is that a sale will be effected. Some of the gold-bearing cement was sent to the city for reduction, and the yield was deemed satisfactory.

MORLEY.—Amador *Dispatch*, April 20: Mr. Parker, a brother to Chas. Parker, manager of the Morley property, is here looking after the interest of the company. Work has been suspended on the mill, and we understand a few men have been put to work in the tunnel.

NORTH STAR.—The negotiations for extension of the bond on this property, which will expire in June, have been satisfactorily completed. All of the owners except Daniel Boon, who is in Arizona, have signed the extension bond, and Mr. Boon has signified his intention to sign as soon as he receives the papers. The new arrangements provide for the payment, by the company to the owners, of $4500 at the end of each and every year the mine is worked, for six years, and the gross proceeds until the total amount paid aggregates $27,000. This new agreement has put renewed life into the North Star. The shaft will be at once driven down a couple of hundred feet.

COSMOPOLITAN.—The north drift on the 300 is out 200 feet, the ore body is 15 feet wide where cut; will crosscut soon again. The north and south drifts on the 500 still look well; they are now cutting a station at the 400 level; the new boiler and donkey engine were started the first of this week; a contract has been let to Knight & Co. for a 30-stamp mill, with all the improvements, to be ready by August 1.

SALE.—Mr. C. T. Crocker of Fitchburg, Mass., has purchased the Henry Clay and Providence mines near Drytown. They will soon start a crosscut tunnel from the west side of the hill and will run to the hanging-wall of the ledge, then raise to the surface for a shaft, then machinery will be put on and a shaft put down 300 or 600 feet.

MILL.—Frank Guerra and G. Bonnefoy had 40 tons of ore crushed at the Moore mill last week, from their prospect on Schober's hill. The result was so favorable that they now contemplate the erection of a small mill near the property. They have considerable rock in sight, which is exceedingly rich.

GINOCCHIO MINE.—There is a party of four men who have leased this mine after an idleness of a number of years and have put in a tunnel and have struck some very good ore; they will soon put up a Huntington mill and crush the ore that they have on hand.

OVERPLUS.—The Huntington mill at this mine is kept busy grinding ore; mine is looking better at present than ever before. The Overplus, together with the Original Quartz Mountain, has been bonded by an English company for $100,000.

GOVER.—This mine still goes on in the same old groove. The hoisting works has been made a success, but the mill and the hoist cannot be run from the same pipe.

DRYTOWN CON.—The hoisting works are up and the work of hoisting water will begin the first of the week. The company expect to start sinking the first of May.

NORTH CAROLINA.—They are still running their mill; they cleaned up last week; their ore paid a fair margin.

Calaveras.

UNO.—Angels *Record*, April 16: Rumor says that the Uno mine, located in the Nassau valley, and owned by Sylvester & Co., has been bonded to an English Co. for $6000, also the Golden Eagle mine at Albany Flat has been sold to the same company for $10,000. Last Wednesday, just as the miners were changing shifts at the Whittle mine, the final blast unearthed and disclosed an immense pocket, the extent of which has not yet been ascertained. The mine is owned by Mrs. Whittle and L. Graham, and is bonded to a San Francisco Co.

TULLOCH & LANE MINE.—*Mountain Echo*, April 17: The Tulloch & Lane mine, situated in the southern part of this town, is making an excellent showing, and we are informed that as the tunnel is pushed ahead the ore increases in richness. A new chute of ore has been struck and it is said the ore is better than any yet taken out of the mine. The owners are highly elated over the fine appearance of the mine and their continued success.

RICH ROCK.—We were shown some immensely rich specimens of quartz the other day which were taken from the Feet mine at a depth of 150 feet. This mine is situated near Albany flat and owned in part by Louis Graham. The fissure from which the rock was taken is about a foot in width and near the center of the shaft. Some of the rock was crushed in a mortar and yielded a fraction over $7 a pound.

El Dorado.

MINING OUTLOOK.—Placerville *Observer*, April 23: The outlook for mining in this vicinity is certainly promising. The water is out of the Pacific shaft and retimbering about completed, and ore will be coming to the surface during the present week. The 20-stamp mill is now about ready to commence crushing. The fine tramway from the mine to the mill is about completed. The Rose, on a parallel vein, is under the same management, and will also be ready for operation in a short time. The Epley mine is also under the same management, and development work is being prosecuted with vigor. This mine was worked in early times. This company is also developing other mines on the mother lode. The Big Sandy mine, in Kelsey district, has erected a new 20-stamp mill with all necessary gold-saving apparatus, and are about ready to start up under favorable auspices. The Taylor is now in running order. The Superior M. Co. are now doing development work, and have a vein of good milling ore ranging from two to ten feet in width. The True M. Co. have their tunnel in about 1600 feet. The Church M. Co. are erecting large hoisting works which will be completed by the 15th of May. The Equator M. Co., in their west tunnel, are finding promising ore. At the Bassett gravel mine, on Weaver Hill, a Rudd pulverizer has been erected and will be in operation the present week. These two gravel mines are being thoroughly opened up and put in complete working order, so that gravel may be rapidly and cheaply obtained. These mines are being fitted up with machinery different from anything yet tried on gravel in this county, and if they should prove successful a revolution will be created in this kind of mining, as we have miles of these gravel-beds running through the county.

THE GIGNAC MINE.—At this mine everything is in active operation. A new Bryan roller-mill has just been completed, which is one of the most complete establishments for the reduction of ores, perhaps, in the county. The cement is dumped into a large ore-bin, from which it passes into a heavy Dodge rock-breaker, with capacity of 100 tons per day. From the rock-breaker the ore passes into a Challenge ore-feeder, from which it is fed into the mill, being regulated so as to feed with perfect regularity, and as fast as may be required for proper reduction, the whole process being automatic. The screens used for this cement gravel are 16 meshes to the inch. Coarser screens are sometimes used in stamp-mills, but the screen-room in the Bryan mill is so far superior to the stamp-mill that the finer screen may be used, thereby saving a greater percentage of the metal contained in the cement, and work as much or more of it. The whole work is driven by a two-foot Pelton water-wheel, with 200 feet pressure. Work in the mine, under the supervision of Supt. A. A. Gignac, is being prosecuted with vigor. A large tunnel has been run and is now in solid ground over 150 feet.

Inyo.

SUCCESSFUL PROSPECTORS.—*Independent*, April 20: A few weeks ago a party of mining prospectors came from Pasadena to Owens valley. The party consists of Fred Burnham, Howard Burnham and Jack Gesford. They crossed over the Inyo mountains into Saline valley and went to prospecting. Last Thursday Howard Burnham came to Independence for supplies. He says that up Marble canyon, about three miles from the Waucoba road, they have struck what appears to be a big mine. The ledge is at least 20 feet wide, carrying galena ore. The ore is rich in silver and lead. The mine is easy of access and the ore can be got to the railroad at moderate expense. There are not wanting other indications that we are on the eve of a big revival of mining interests in Inyo county. No other part of the State offers such promising fields for prospecting as does Inyo county. These prospectors are a good deal elated over their success so far. Several specimens of the ore brought to Independence look very well indeed.

A WELCOME CHANGE.—The lessee of the Maxim property is making a very important move. One great drawback to gold mining in this locality has been caused by want of any means for extracting gold from sulphurets, and as the ore carries a good deal of this, the loss in working has been very heavy. Now this trouble will be remedied. A dry-kiln is being built at the Maxim mill to dry the tailings, and concentrators are being put in. The machine chosen is a late invention claimed to be much superior to anything yet in use. It is called the Victor, and the inventor, Mr. S. W. Shaw, will be here in a few days to put the machinery in operation. The lessee expects to have the machinery running by the 1st of May. All along the Inyo and Sierra mountains in Owens valley, miners are working small claims that are rich in gold; but in all of these the loss by sulphurets is heavy. The lessee will work all such ores at the lowest possible cost to the miners, and his enterprise will therefore prove a benefit to all, and will lead to the working of many more claims. In the past, every enterprise started in the valley that promised to be of public benefit has had the life crushed out of it by grasping greed and extortion. The lessee is free to do as he pleases and will pursue a more intelligent and liberal policy, doing good to his neighbors as well as himself.

A VALUABLE MINE.—The mill at Beveridge has been started up on a run of ore from the Keynot mine. The old Keynot never fails to respond with a lot of good ore when touched with the pick of the miner. There is a great deal of virgin ground in the mine that could be reached by a moderate outlay of money. Near the mouth of the tunnel is an almost sheer precipice of about 400 feet. A tunnel run from this would tap the ledge and beyond doubt would open up a large body of ore. If opened up properly the mine would develop into valuable property.

Los Angeles.

MONROVIA.—*Messenger*, April 16: No hurrah is being made, but a number of practical miners are on the ground. Every one who has done any intelligent prospecting has been rewarded with precious metal from a few cents to a few dollars' worth. The company has commenced to sink a shaft on the Bliss place. There were between 50 and 100 men at work on the hills yesterday, and the work of sinking a shaft is progressing finely. In addition to this number several old-time miners were abroad on the hills hunting quartz ledges. It should be borne in mind that the placers are not confined to the Bliss place, but extend from Diamond flats eastward for more than a mile. Colors have been taken from all the gulches nearly for that distance. Other ledges have been found, both east and west of the city, on the first range of hills, which promise a rich enough yield to cause quite a flutter among the miners.

TIN.—Monrovia *Messenger*, April 20: Mr. Van Tassel considers the mine as good as sold. Mr. Van Tassel also claims that a recent assay returned 20 per cent tin. Tin is worth about 20 cents a pound. A ton of rock carrying 20 per cent tin stone will reduce to 320 pounds metallic tin, which would make a ton of ore worth $64. The cost of concentrating and reduction is about $12, which leaves a handsome profit. It is hoped these gentlemen have as great a bonanza as they think they have. Monrovia is now wallowing in wealth. A vein of rich silver ore is the latest strike in the vicinity of that ambitious city. The new find is but three miles from town.

Monterey.

LOS BURROS.—Cambria *Critic*, April 16: A correspondent writing from Los Burros district says: "From all indications this district will before long be one of the most important in the State, the gold-mining belt extending from the ocean to the Lion's Den country, a distance of about 15 miles. Gold has been found the entire length, from fine colors to a nugget weighing $41, and the main and most important mines and prospects of the camp—Sure Pop, Melville, Last Chance, King, Ajax, Wild Bill, and many others—lie almost in a direct line, showing that it must be one continuous fissure vein or mother lode, having its many spurs and feeders. That the gold-bearing ledges are permanent below the surface is proved by the Cruikshank lead, which is the only mine that has been prospected any depth. This mine at the depth of 150 feet shows the ledges three times the size they are at the surface, and as rich in proportion."

Nevada.

SAN FRANCISCO MINE.—Nevada *Herald*, April 16: Eureka district is going to be lively this season. There will be a large amount of prospecting done there. One important enterprise will be started in the course of a few weeks which promises well. There is a ledge located south of the California about 300 yards, and running parallel with it, known as the San Francisco. It was located in January by James Grimes. He now has as partners Pat Foley, R. B. Brenham and Landers of San Francisco. The ledge is over 14 feet in width, and all the rock prospects favorably. The claim is situated about five miles south of Graniteville. A tunnel of between 200 and 300 feet only will have to be run to tap the ledge at a depth of 200 feet. The North Bloomfield ditch runs above the claim, near by, and will afford a fall of water of over 300 feet, which will give a splendid power. The company has two locations of 1500 feet each. The ledge is a contact vein, having a granite hanging and a slate foot-wall. The location is convenient of access and there are the best indications of a paying mine being developed. Jas. Grimes will superintend the work of development soon to be commenced.

AROUND SPENCEVILLE.—Cor. Wheatland *Four Corners*, April 16: We are informed that the owners of the Good Hope Quartz Claim, situated two miles from here, have started to work their shaft and are making several improvements. The owners are awaiting the pleasure of a company with whom they have been communicating for some time in regard to this mine. A representative of some capitalist from Nevada City has been around here for a few days, looking up and trying to bond some mining claims owned by different parties here, and we hear has been successful in getting the promise of some claims. Ed Redenger and John Sweet, who own a quartz mine near the Lime Kiln, Nevada county, are shipping ten tons of ore to Benicia to have it smelted. The ore contains a large percentage of silver as well as gold.

Placer.

OPHIR.—Cor. Placer *Herald*, April 20: Jameson's arastra has temporarily suspended. The steady roar of the stamps at the Hathaway mine, however, reminds us that despite the apathetic arastra aforesaid, the mining interests hereabout are alive and prosperous. Shurtleff reports excellent prospects in the Patrick. The Bell-Hamlin mine, under the supervision of Mr. Hartley, is employing quite a force of men, and its successful permanency is fully assured. There are many minor claims in this vicinity which are paying well, and with all due deference to the various other mining localities of the county, we are constrained to believe that Ophir and vicinity represent some of the most solid, paying mining claims in the county.

Plumas.

THE REWARD MINE.—Greenville *Bulletin*, April 20: Mr. Swearingen, who was in Greenville Saturday, informs us that good progress is being made in the Reward mine. The lower tunnel taps the ledge 350 feet from the top. The vein is the full width of the tunnel, which will be run 80 feet further. Then a crosscut will be made. The ore contains gold, silver and copper, and it is claimed that it is of very good quality.

Sierra.

WIDE AWAKE.—*Mountain Messenger*, April 17: Oscar Jones, who superintends the Wide Awake drift mine on Alabama Hill, was down the first of the week. He reports the mine a good one, but laboring under the disadvantage of the tunnel being too high, compelling them to work through an incline.

AT SIERRA CITY.—John Penaluna & Co. have leased the Colombo mine. Rumor has it that the Phœnix mine will soon be started. Mr. Morris, supt. of the Marguerite mine, returned on Wednesday. The mine will start up again in a few days. The San Luis Co. have let another contract. This company is composed of our own town's people, who have spent a good deal of money on their claim.

FOREST CITY.—Mr. Colman, of the Ruby, is now working a force of over 40 men. A very fine specimen of quartz from the crevice lately found in the mine has been on exhibition here during the past week.

Siskiyou.

QUARTZ AND PLACER.—Yreka *Journal*, April 17: Mr. W. B. Hull, who has secured the Johnson mine at Mugginsville in Scott valley, is now taking out some very fine quartz, having made a rich strike last week. Some of the river miners feel a little alarmed in reference to the building of a dam at Klamath city, thinking the flow may be irregular, to interfere with the running of the wheels or flood their wing-dams. From what we can learn, however, the dam will cause no difference, as the object is merely to secure a pond for retaining logs sent down from above, from which they can be taken into the mill run by steam-power. Lawson & Co. have struck an extensive body of rich decomposed quartz in their ledge on the south fork of Humbug creek, and expect to take out considerable gold during the coming summer. The Hamilton Brothers are also doing well in their quartz ledge on the Humbug, and Simmons & Co. and other companies in same section are finding excellent prospects. A pack train of 20 mules are kept busy hauling quartz to mill at Forks of Humbug, and John Burgess has also been hauling with team, making the Forks quite a lively mining camp. McCook & Co. are running their quartz mill day and night at Humbug city on the Forks, to keep up with the rush of quartz from various mines. The Hegler Bros. and Bruce Aldrich on the North Fork of Humbug, are also doing well in taking out rich quartz, are running their mill day and night. Kincaid & Co. have struck very rich pay in their placer claim at Humbug gulch, a short distance west of Yreka, the old Joe Lang claim. They took out a nugget of gold and quartz last week, which being pounded out in town, realized $52, and taking home the sand left, washed out $8 more. From the gravel drifted a couple of days at same time, they secured $12, wheeling it 200 yards and washing in a rocker. Heckathorn & Co., of Greenhorn, have also been finding rich prospects in their mine, and Charley Abbott has a large lot of rich quartz on the dump, ready to haul to mill. Herman Green intends starting up the Warren mill again, on Yreka Flats, near town, next week, to crush a large amount of quartz for several miners anxious to haul to mill.

San Bernardino.

GOLDEN BAR.—*Times-Index*, April 20: The Golden Bar M. Co., whose property is situated in the Yucaipa mining district, about six miles east of Redlands, have their arrangements all completed to put quite a force of men to work upon their properties next week, and as the assays and mill tests from their ore have proved so satisfactory, it is probable that in a very short time the company will begin receiving some handsome returns from their investment. News from the Bagdad mines continues to be good. A shaft is being sunk on the Silver Cornucopia mine, and the ledge gets better and larger as the shaft goes down. About a mile distant is another claim, the Mirage, upon which a tunnel is being run, and from the ledge in this tunnel ore has been taken which is very rich in horn silver, yielding 4000 ounces to the ton. The ledge is continuous from one claim to the other and claims have been located all along the ledge. E. P. Clyde, who recently located a mine in the Yucaipa district, yesterday received a return of $19 from 100 pounds of rock sent to the Colton Sampling Works. Reports from the Mt. Baldy M. Co. who have a force of men now at work on their property situated near the summit of Baldy mountain, are very flattering, and it is expected when the cleanup is made on the first of next month, that quite an amount of gold will be realized. A large number of men are at work on the upper portion of Lytle creek, placering, and good wages are being made. The *Times-Index* reporter was this morning shown some very handsome specimens of gold ore taken from the Coyote mine, located at Cottonwood springs, 30 miles northeast of Walters station on the Southern Pacific railroad. Mr. A. J. Downer, who had the ore in question, informed us that the ledge is about three feet wide and is getting richer as depth is attained. They have an arastra at the mine and are working the ore as fast as they take it out.

AT CALICO.—Pasadena *Union*, April 18: A few days ago a miner passing along the only street in Calico picked up a piece of rock, more from curiosity than from any value attached to the stone. He took it to his cabin and applied the "hypo" test to it, and to his unutterable surprise it showed a large quantity of silver. He returned to the place with a pick and commenced digging a hole. The details are unnecessary. Where was once the street is now a big hole in the ground, and several hundred tons of rock have been sent to the mill which returned from 70 to over 100 ounces silver to the ton. This place had been walked over, driven over and even prospected for the past five or six years, and yet it remained for the lucky miner to make the strike. This instance was almost equaled a few months ago by a rich strike not over a hundred yards from the same place. A miner commenced to dig a grade in a soft rock on the hillside, intending to place a cabin there. The rock was of light, ashy gray color, slightly tinged with green. Here and there was a red spot, and fine veins of iron oxide ran in irregular streaks through it. He tried the "hypo" on it. The miners at Calico "hypo" everything, from rich chloride ore to bricks and bed-posts. Silver in considerable quantities was revealed by the test, and taking a lease on the ground, the poor but lucky "drill polisher" went to work. To-day his cabin-site is a hole in the ground and a deep shaft has been sunken down into the rocks, and thousands of dollars in silver have been taken from the find. This place is also right on the main street, in the heart of the town of Calico.

NEVADA.

Washoe District.

HALE & NORCROSS.—*Enterprise*, April 20: On the 400 level the north drift from No. 1 west crosscut continues in excellent ore. Have started sill for sets and commenced stoping this ore. In the south drift from joint west crosscut have started a winze in the ore body; the winze is down six feet and continues in ore of good quality. On the 500 level have resumed work in the face of north drift and advanced the same 18 feet; about half of this drift is fair-grade ore. The northwest crosscut was extended 45 feet. North and south upraises continue in good ore. During the week have hoisted 1206 tons of ore; have shipped to the Nevada mill 1042½ tons, and have milled 1048 tons; average battery assay, $28.40; have shipped $27,150 in bullion since last report.

CONFIDENCE.—The joint Challenge-Confidence north drift on the 300 level advanced during the week 23 feet; total length, 73 feet. The face shows a mixture of quartz and porphyry. The joint Challenge-Confidence raise from the 300 level is up 28 feet, 14 feet having been added during the week. The top of the raise still shows ore of fair quality. Have shipped during the week to the Brunswick mill 328 tons of ore, the average battery sample showing a value of $26.31 per ton.

CHALLENGE CON.—The same as for several weeks previous, the work in this mine is jointly with the Confidence. During the week the Challenge shipped to the Brunswick mill 49 tons of ore, the average battery samples showing a value of $26.31 per ton.

SAVAGE.—On the 400 level have resumed work in the joint west crosscut on south boundary, and have advanced the same 24 feet from No. 1 and No. 2 west crosscuts. Are stoping ore of fair quality from main north drift. Are extracting ore from the old stopes. During the week have hoisted 491 tons of

ore. Have shipped to the Rock Point mill 480¾ tons, and have melted 505 tons; average battery assays, $19 32.

CROWN POINT.—Are now up five floors in the stopes above the 400 level. The top is badly mixed with porphyry and clay and does not look well. Are extracting some good ore from No. 1 crosscut, but it appears to cut out in going north. The 450 and 350 stopes look about the same as usual. Shipped to the mill during the week 907 tons of ore, the average battery sample of which was $21.10 per ton.

CHOLLAR — North lateral drift, 538 level, has reached the Hale and Norcross south line. The only work done this week on the 700 level has been confined to retimbering north lateral drift. The north lateral drift, 850 level, is out 121 feet. The face is in hard porphyry.

POTOSI.—South drift, 750 level, has not been advanced during the week on account of needed repairs to the drift. The south drift, 850 level, is out 183 feet. The face is in hard porphyry. The south drift, 930 level, has been repaired a distance of 475 feet south of the shaft.

BELCHER.—The 200 east crosscut is out 200 feet, having advanced 25 feet during the week. The face shows streaks of quartz giving low assays. The 200 west crosscut is out 143 feet, having advanced 28 feet since last report. The face continues still in soft porphyry.

ALTA.—Are still raising toward the 100 level, preparatory to crosscutting toward the Keystone vein and prospecting it. The usual quantity of ore is being extracted and milled from the 800, 825 and 925 levels.

EXCHEQUER.—The west crosscut on the north line is out 85 feet; face in clay and porphyry. The north lateral drift, 500 level, is out north of shaft 435 feet; face in clay and porphyry.

SILVER HILL.—On the 200 level southeast drift is in from the shaft 100 feet, having run 10 feet during the week; face in porphyry and quartz, and the ground getting harder.

CON. IMPERIAL.—No work is being done in the mine, but the Alpha Con. Co. has started an east crosscut on the 500 level on the Imperial line.

ALPHA.—Started east crosscut on south line jointly with Imperial, which is now in four feet in quartz giving assays of from $6 to $10 a ton.

SEC. BELCHER.—The 1100 west crosscut advanced 49 feet during the week; a total distance of 238 feet. The face continues in soft porphyry.

SCORPION.—During the week the west crosscut on the 300 level was advanced 17 feet; total, 457; face, vein porphyry and clay.

BALTIMORE.—Work of exploration is progressing favorably on the 225 and 338 levels in drifts westward.

OVERMAN.—Extracted 229 tons of ore and shipped to the Vivian mill 240 tons. Nothing new to report.

BULLION.—Are cutting out a station on the 760 level, preparatory to drifting north on the ledge.

JUSTICE.—The mill is running steadily and the mine is producing the usual quantity of ore.

NEW YORK.—West crosscut driven 18 feet; total, 115, on the 800 level.

Jackrabbit District.

ONONDAGA. — Pioche *Record*, April 16: The Onondaga mine is shipping ore again. About 14 tons of good ore was shipped to Salt Lake last month. The new hoisting plant has been in operation long enough to clear the shaft and drifts of waste, and regular development work is again going ahead. The owners have confidence in the future of the mine and should soon know now what they have there. Only the better grades of ore are shipped. Ore carrying 60 ounces silver is piled on the dump to await the advent of a railroad or the starting up of some furnace in the vicinity. Present freight rates make it undesirable to ship it to the Salt Lake smelters. Over 500 tons of this second-grade stuff are piled on the dump now. It can be held as a sort of reserve fund on which to draw in future if necessary, though no need of doing so is now apparent.

Morey District.

MILL.—Belmont *Courier*, April 20: Superintendent Cohen, of the Morey Mining Co., will arrive at Morey, Nye county, to-day. County Assessor Charles McGregor informs us that Mr. Cohen will soon start up the mill at that place on ores from the mines of that district. The mines are looking well, and there is plenty of rich ore in sight, some of it assaying as high as 1000 ounces to the ton. Morey promises to be a lively camp the coming summer.

ARIZONA.

CHLORIDE.—Mohave *Miner*, April 20: John Barry has a force of men at work prospecting the Minnesota mine. James Cadden, at work on the St. Petersburg, is taking out some fine ore. Cross & Co. are still taking lead ore from the Elkhart, the ore being shipped to Denver. M. P. Delhanty is making a shipment of about 20 tons of ore from the Schuylkill mine. Kelly & McKinnon have purchased the Alatta mine, formerly owned by J. J. Goshorn, and from which considerable good ore has been taken. Kelly & McKinnon, whose lease on the Connor mine expires next month, are busy sorting and sacking a lot of high-grade ore for shipment. There are a good many mines in this district which produce ore which works from $20 to $50, but are too low grade for profitable working, and the time is anxiously awaited by the miners when reduction works will be built in this camp, and the mining interest will then take a boom. H. P. Ewing and Joseph Prisk are taking out some good ore from the Tuckaho. The ore is being leached by Mr. Ewing, who seems to have good success in this direction.

CERBAT.—Tom Mulligan has charge of the Flores mill, and everything about the place is in good working order. The Cerbat mill is nearly in shape, and it is expected that everything will be in readiness next week. Tortelotte & Wilkins are having about 160 tons of ore run through the Flores mill. The ore is being packed down from the mine above the mill by the Conard Bros. burro train. Chas. E. Sherman has struck two feet of high-grade ore in the Queen Bee. The Keystone mine is now being worked with about a dozen miners under the foremanship of Steve Smith. The report of a wonderful rich discovery of a gold-bearing ledge, near Ehrenberg, is brought to this place. It is said that it excels in richness the Harqua Halas. A Mexican, from near Sigoal, stumbled on the ledge and brought the specimens to that place. Considerable excitement exists there over the discovery.

DRILLING.—Tombstone *Epitaph*, April 21: From R. S. Fisher of the Sterling Silver Company we learn that the mill will drop stamps as soon as the contractor has finished his work, which will be the first part of next month. The diamond drill will be put in the well in a few days to prospect for an additional supply of water, although the well is now producing about 3000 gallons of water every 24 hours. After prospecting for water is finished the drill will be placed in the Vizina mine and will be used to thoroughly prospect the mine. If this method proves a success other mining companies will undoubtedly pursue the same course, as it will save the expense of deadwork. The company will accept custom ores in 10-ton lots and over, in addition to working the ore from their own mines. They can work $15 ore at a profit and have now about 6500 tons of ore on hand that will be graded up to $17 per ton. The mill has a capacity of 30 tons per 24 hours.

BLUE DICK.—Prescott *Courier*, April 17: McDonald of the Blue Dick had another carload of ore worked at the sampling works, the net proceeds of which was $2000, making in all about four carloads in the last month, which netted over $10,000.

BRITISH COLUMBIA.

WORK TO BE RESUMED AT FIELD.—Donald *Truth*, April 16: The latest news in regard to the affairs of the company who built the smelter at Vancouver and opened the Monarch mine at Field is more encouraging. The management has placed L. D. Davis practically in charge of both smelter and mine. If this is true there is a show for the company to run their business successfully. It is claimed that he will have the smelter blown in within three weeks, and that when it is blown in it will not freeze up before a trial run is made. Operations are to recommence at the mine at once.

PORCUPINE CREEK.—The Donald G. M. Co., with a capital of $10,000 in stock, has applied for registration under the provincial law. They will probably commence to do business within ten days. The Elsie Co. have secured the services of an old-time Cariboo man for foreman, and will put on a force of eight men as soon as practicable. The Discovery company intend to put in a bedrock flume. Porcupine will boom, simply because it has something to boom on.

PRETTY GOOD ROCK.—Dave Woolsey believes that he has struck a mine on Cariboo creek, 45 miles west of Donald. It is close to the C. P. R. track. The vein is 11 feet wide, carrying silver-lead ore. Assays give returns of $40 and $90 to the ton of silver.

COLORADO.

COKE OVENS.—Elk Mountain *Pilot*, April 20: The Rio Grande Western is building 30 coke ovens at Castle Gate. It is said that they will make coke equal to that made at Crested Butte. We stated last week that the Augusta Mining Co. would erect a concentrator at Pittsburg. We now learn from Erbine Groesbeck that the machinery is purchased and will be on the ground soon. S. C. Robinson is waiting for the water to run sufficient to start his concentrator. He has been delayed somewhat on that account, but expects to run by next Monday. Pittsburg will be the scene of great activity this summer.

DAKOTA.

REPORT ON THE GOLDEN REWARD.—Deadwood *Pioneer*, April 20: The directors of the old reduction works and the officers of the Golden Reward have expressed an intention of engaging a thoroughly competent person to visit the Golden Reward property and make a comprehensive and faithful report of the condition and workings of the property, and the same will be published in the *Pioneer*, after which it will be issued in neat pamphlet form, together with a clear statement of facts and plans connected with the formation of the Deadwood Consolidated M. and M. Co. The gentlemen have not designated as yet who they will engage for the labor spoken of, but at all events he will be some person wholly competent for the work.

TIN.—There has been going on for some time quite an extensive correspondence between many of our citizens and Eastern capitalists regarding the tin mines of Nigger Hill and elsewhere in the Black Hills, from which it is to be inferred that considerable interest is being manifested in Eastern quarters. That there are tin mines in the Hills is so well an established fact that anything said concerning their existence seems a waste of words. What is wanted in the Hills is capital to develop and mills to reduce the ores, and the supply of tin for which millions of dollars are paid annually to foreign markets can be produced within a few miles of Deadwood.

IDAHO.

WATER SCARCE.—Cœur d'Alene *Record*, April 14: The owners of the Arizona old wash claim are making the most of the very limited supply of water for hydraulic work. What little they get they have to reservoir, and the supply at present is but very little greater than it generally is when they shut down for the season. Mining under such unfavorable circumstances is very discouraging. The Arizona claim is well opened, and there is every reason to believe that with an abundant water supply it would be one of the best paying claims on the old wash channel.

ADVANCE. — Wardner *News*, April 16: Cœur d'Alene is experiencing a continual advance in its mining interests and general prosperity. It is not a boom of short duration, such as too often occurs in mining regions, but it is a steady and onward move that increases every year, augmenting our business activity, not alone in mining matters, but in every branch of trade and industry. When a claim or location gives fair promise of containing mineral, the owners pursue their work of development with good heart, feeling confident before the season ends they will be enrolled on the list of mine-owners. The natural advantages and unequaled resources of Cœur d'Alene form the broad basis on which we build our hopes of future prosperity. The prosperous period has been reached and an era of activity is inaugurated that will stand unparalleled in the annals of mining in the Northwest. Our miners are using greater caution than was the habit in former years, and while they have every right to expect large returns from their labor, still, they do not "want the earth" but are content with fair and liberal profits. Our mineral belts and veins speak for themselves; there is nothing to conceal, but on the contrary everything that their owners are proud to exhibit.

STRIPPING GROUND.—Idaho *World*, April 16: B. F. Hayden is to make a new departure in placer mining where ground has to be stripped—that is, the method of mining that is employed where hydraulic-power cannot be had, and the surface is stripped off and removed down to the pay, and the gravel shoveled into boxes. Mr. Hayden last Friday received two railroad-wheel scrapers, which, being pulled by horses, scoops up the surface until a sort of a shovel, provided with sides, is filled, when it is hauled off and dumped. The rig is a two-wheeled vehicle, with the attachment mentioned, the wheels being the same distance apart as those of a wagon or buggy.

THE TUNNEL at the Buckeye mine is in over 300 feet, and is underneath the old shaft. This tunnel cut the top of a pay chute, but no pay ore outside of this chute has been struck, but may be any day. The tunnel was run south to the ledge, and is now being driven east.

CŒUR D'ALENE. — *Montana Mining Review*, April 20: The mines in the Cœur d'Alene country are reported to have never presented so good an appearance as at present. The output of the mines is steadily increasing, and likewise the prosperity of the country in which they are located. The large quantity of ores constantly arriving at the Helena smelter for treatment furnish ample testimony as to the value of Cœur d'Alene mines.

LOWER CALIFORNIA.

SANTA CLARA AND ALAMO.—*Lower Californian*, April 16: Notwithstanding the bitter and unwarranted attacks made upon the new gold mines at Santa Clara and Alamo by many newspapers, the camp is growing and the mines are a wonder to all who have carefully examined them. Present indications in 10 or more mines upon which work has been done, go to show that the ore is as rich and veins as wide as the most sanguine expected. In most cases where shafts have been sunk the ore is better and shows more free gold than on the surface. In some instances the surface rock showed no gold, but at 20 to 30 feet deep great richness was developed. Two thousand men are at work in the placer mines. The veteran prospector Peck is in town from the Santa Clara and Alamo mines, and states that he believes the camp will be permanent and prosperous. He said: "I purpose to follow that mineral belt on toward San Fernando. Lower California will show them what a genuine gold mining camp is." Eighty-eight quartz mines have been located in the new mining camp—18 at Santa Clara and 70 at Alamo. Some good discoveries have been made on the same belt beyond Alamo. All of the 250 placer claims are being worked. The old Tunnel mill at the Real del Castillo is hard at work on ore from the Occidental mine, which is one of the old Tunnel group. The ore is said to pay $30 to the ton, and the vein is four feet wide.

MONTANA.

RICH DISCOVERY.—Butte *Miner*, April 17: It is not a month since Michael Gilmore and his partner, James Keeton, left Butte on a prospecting tour, taking a northeasterly direction. They made for a section of Jefferson county which has hitherto escaped the attention of the prospector. The place selected by Mr. Gilmore and his partner for prospecting is about 38 miles southeast of Boulder, three miles from the mouth of Boulder river and about 12 miles from Pony. Here they discovered a ledge from a foot to four feet wide where it crops out of the surface. Eight inches from the grass roots the vein showed up handsomely in both copper and silver. Going down four feet they got into a gold quartz, and assays from samples sent by them to Messrs. Carney & Hand of this city showed 192 ounces gold and 7 ounces in silver to the ton. He and his partner have located seven claims which they have named the Julia, Mary Ann, Jefferson Chief, Pony, Posey, Parnell and Gilmore. All have equally fair prospects, the surface indications being exactly similar. Mr. Gilmore says the district has only been scratched over. One of the ledges that bears evidently a high percentage of copper and silver had been opened before, but the former locator had abandoned it, no work having been done for a long time. The news of this discovery has already been discounted in town. A number of men hearing of it but ignorant of the whereabouts, are out now hunting for the district. He reports the district as having the prettiest location for a townsite in the Territory. Three miles away is Caldwell's ranch, one of the richest in the Boulder valley, and within a short distance is the proposed Butte and Gallatin branch of the Northern Pacific. He reports game abundant there, and the surroundings attractive enough to make an ideal spot to live in.

CABLE AND GEORGETOWN.—Anaconda *Review*, April 18: In looking around Cable and Georgetown last week the *Review* finds that there is unusual activity in mining circles there. The camp is fully one month ahead with its work this season, owing to the early spring.

THE BLUE-EYED NELLIE.—Work on this well-known mine is going on as usual. They have a force of 28 men taking out and sacking ore, a good part of which is being stored in the mine. They are hauling about 8 tons per day to Anaconda for shipment. We learn from outside sources that it is the intention of the management to erect at once a blast furnace, of a capacity of 40 tons per day, to work the ores from this mine, and save the expense of shipping to Denver and Omaha.

RED LION.—The new mill on this valuable property is just completed, and the owners expect to start it running about the 1st of May. The body of the ore has improved and the company beyond all doubt have a very handsome property, which will pay dividends from the start. Salton Cameron is grading for a 10-stamp mill of his own. He intends to work in this mill the ores from his Luxemberg mine and also what custom ores he can handle.

THE SOUTHERN CROSS.—The Southern Cross gives promise of being the best property on the west side of the range. They have an incline shaft, 4x7, down 250 feet, which is all in ore. They have not crosscut the vein and do not know what is the exact width. The company intend to immediately erect a 10-stamp mill to handle the ore.

THE PYRENEES.—Last Tuesday it was three years since the stamps were dropped at their mill, and during that period they have been hung up only 40 days. The property, though small, is a good paying one. They have a good body of ore, and the dividends to the stockholders are regular.

CABLE.—*Montana Mining Record*, April 20: The Cable company recently struck a good body of $1000 ore in their mine near Phillipsburg, and there is said to be every indication of its holding out. The output of the Granite Mountain for the week ending April 11th was 38 bars of bullion containing 61,686.06 ounces silver and 51.60 ounces gold.

NEW MEXICO.

LAKE VALLEY.—Silver City *Enterprise*, April 20: The Lake Valley mill will start up Monday next. The rolls have been replaced by 20 stamps, with a capacity of about 60 tons daily. This week the Mountain Key shipped $2650 in gold; the Aztec, $1200; the First National Bank, $174 in gold and $600 in silver; the Silver City National Bank, $375. The excavation work will be completed this week for both the Pacific and Aztec mills. A large per cent of the ore shipped from Sierra county is sampled at the Lake Valley Works before being loaded on the cars. During the last 15 months the Comstock mine at Kingston has paid over $100,000 under the efficient management of Messrs. Barton & White, with a working force of from 10 to 12 men, and during the past couple of months it has been doing better than at any time within the last half year. While opening up a new piece of ground on one of the Bremen group this week, a 3½-foot ledge of talc was encountered between the lime and porphyry contact, which is literally full of silver glance. The Minnie Grande, the Mogul and the Bullion were last week transferred by Bell & Stephens of Pinos Altos to W. H. Newcomb of this city for $25,000, the larger portion of which was paid in cash. G. Wormser of Deming reports that 14 men are now regularly employed upon the Flower Queen at Cook's Peak. Two shifts of two men to a shift are kept constantly stoping, and average two tons per day to the shift. The ore is all good and of the grade heretofore shipped with satisfactory returns. On Saturday last 18,000 ounces of bullion was shipped by the Mimbres Co. of Georgetown, making a total shipment of 34,200 ounces in 28 days. The concentrates on hand and the amalgam in the pans on the close of the 28th day from the starting of the mill was sufficient to have swelled the output to about $45,000—not a bad showing. The mill is in splendid shape, and will continue to output at about its present ratio for some time to come, as no more stops will be necessary. Since the discovery of the Georgetown mines, the output of the camp has been over $7,000,000, and the mines will probably do better this year than ever before.

OREGON.

CORNUCOPIA.—Bedrock *Democrat*, April 16: Mr. Fred Dill says the Oregon Gold Mining Co., Major Smith, superintendent, started up their 20-stamp mill last Friday, and are pounding away on ore from the Red Jacket, and it is expected the mill will be kept running for many months to come, as there is an abundance of ore awaiting reduction. The ore is exceedingly rich. A new mill has been contracted for by Dr. Howard, owner of the Last Chance mine, and it is to be ready by the first day of July. It is to be a Huntington, with all the latest improvements. The Last Chance is one of the leading mines of the camp, and is developing into a wonderfully rich property. The general outlook of the camp is of a most encouraging nature, and Mr. Dill says the grand future of Cornucopia is assured. Business of all kinds is prosperous, and the residents of the camp cheerful and content with the bright prospects ahead.

CRACKER CREEK ITEMS.—Much is being said for and against this camp, but only those who live here can give a correct account, and they not wholly so, as mining operators do not always herald their business to the public; but I will say that all of the mines that ever were worked here are being worked now, except a few that are not accessible on account of the snow. The mines that are now running are full-handed and have plenty of men, hence I would advise men seeking work to apply elsewhere until the machinery for the plant arrives. The mines here are rich and extensive, but time will be required to fully develop them.

UTAH.

ORE RATES.—Salt Lake *Tribune*, April 21: Local smeltermen think the reduction on bullion and ores by the Union Pacific will tend to keep them going, but one interested party said the railroads could afford to lower the rate to $10 and $11 and yet make money.

PARK CITY.—Bullion shipments: April 16th, 18 bars Ontario, 9454 ounces; April 17th, 17 bars Ontario, 8883 ounces. Received at Park City sampler for the week ending April 19th, 565,870 pounds Woodside ore; 306,520 pounds Ontario ore; 301,560 pounds Daly ore. The Crescent Co. made the first shipment this year amounting to 224,000 pounds of concentrates. The tramway has been cleared and put in good repair, and during the coming week the hauling of ore will be resumed. The Woodside stands at the head of the list this week in ore shipments. It is confidently expected that during the coming week the Mayflower will be added to the list. The Ontario drain tunnel is in over 1000 feet. Owing to the soft ground the progress has been rather slow during the past few weeks. The bids for running the Alliance tunnel will be opened on the 27th inst. In the meantime the buildings are being put up, and a small force of men has been put on at the mine under the charge of Geo. B. Norman. A force of carpenters are now at work on the new concentrator in Empire canyon, and the work will be pushed along as rapidly as possible.

SCIENTIFIC PROGRESS.

Self-Mending Insects and Snakes.

Much has been said and written in regard to what are sometimes called "self-mending insects and snakes." The *Scientific American* of Sept. 24, 1887, contains a communication from Oliver White, secretary of the Peoria, Ill., Scientific Association, in which he relates of breaking one of these reptiles into pieces from one to two inches long, from the vent to the tip of his tail—two-thirds of the whole length of the way—then placing a cage over him. On returning to the place 24 hours after, the snake was there, sound and whole, in full length.

Another and later correspondent of the same paper, referring to the above, says: "A similar operation is performed by the insect known as the earwig. One resting on a board was cut in two with a knife, when the head half crawled away about a foot, and, after making a circuit, came back to the tail half, butted against it, and was again united with it, when the severed insect became whole—a perfect, living, moving object. Can you or any of your readers, Mr. Editor, give me a scientific reason for, or an exp anation of, this most marvelous operation of the self-mending snake and the earwig? Are there any other insects, reptiles or living objects that do the same?"

To the above still a third correspondent of the *Scientific American*, G. A. Stockwell, M. D., F. L. S., of Port Huron, Mich., in the issue of Oct. 29, 1887, says: "In the 'glass snake' and other low orders of life repair is usually by primary adhesion, by scabbing, or more rarely immediate union; or it may, in a sense, be a medium between the two former. Creatures with three-chambered hearts and sluggish (cold) circulation retain vitality in severed tissue much longer than those possessed of a four-chambered heart and quick, warm circulation; and to even greater extent is this true of white-blooded insects, without complete circulatory apparatus. Here reparative material is poured out, undergoing changes similar to those in primary adhesion; and the wound cicatrizes rapidly beneath the scab formed by the highly plastic serum of the blood effused on the surface, and which coagulates with extreme rapidity and firmness in the lower orders of creatures. The scab affords support, the embryo cells with the plastic lymph being the medium of repair. The process is identical in all grades of life, and in all tissues, whether bone, muscle, integument, tendon, capillaries or nerves, and depends solely upon the blood supply and the capability of the nervous system to provide this nourishment. Severed fingers have successfully been reunited to the hand in the human subject; bits of muscle, integument, or scalp grafted; teeth transplanted; and even the spurs made to grow in the comb of the same barnyard cock. The processes are precisely the same as in the reunion of a severed portion in reptiles or insects when the latter are led by instinct to approximate the separated portions of their economies, and to await the exudation and 'sealing' that will insure permanent union. The exudation about the wound gives support, exactly as the 'provisional callous' forms a false splint holding the bone in place until reparative processes shall reunite the fractured surfaces. Had the *opheosaurus* of Mr. White been reunited *without* exhibiting traces of the injury, we might be justified in deeming it phenomenal, or in believing the gentleman had been unconsciously deceived; but under the circumstance, he narrates nothing but what is an every-day physiological occurrence, curious only as the severed digit, when replaced and healed, is curious! But withal his observation is valuable, since it adds one more link to the chain that must eventually strangle superstition and silence 'doubting Thomases' possessed of narrow minds, and race egoism, that can conceive of nothing less than man as an object of Nature's fostering care."

One of these curious reptiles—the glass snake—is said to have been seen, a few years since, by a party of ladies near Pescadero beach, in this State. As the party passed the reptile, one of the ladies—Mrs. Swanton, who resides at Pescadero—struck it lightly with a stick, when it immediately separated into several pieces. Soon afterward, in returning by the same path, what they supposed to be the same snake, appeared united and in quite a lively condition. At least, a snake similar to the first seen, was observed lying in identically the same place and no portions of the reptile which had been separated before their eyes were anywhere to be seen.

WONDERS OF BOTANY.—The finest botanical gardens in the world are said to be those of Peredinja, near Kandy, in Ceylon. They comprise 150 acres. Among the curiosities are bamboos 100 feet high and nine inches in diameter, which in the month of July grow between one and two feet a day. India-rubber trees with immense roots three and four feet above the ground, when cut with a knife give forth a milky substance. Ginger, cloves and jack fruit are passed in succession; most beautiful orchids, such as would command fabulous prices in Europe, are seen in profusion with flowers of every shade and color.

THE MAGNETIC PROPERTIES OF IRON.—A series of experiments, with a view to determine the temperature at which soft iron becomes non-magnetic, have recently been carried out in the laboratory of the Sorbonne, by M. Ledeboer. The bar of iron experimented on was first insulated by being completely covered with mica, over which was wrapped a helix of platinum wire, and the whole was then placed inside one of two exactly similar induction coils, which were connected with a Wheatstone bridge, so that their relative self-inductions could be compared, and would, of course, be equal when the iron lost its magnetic properties. The bar was heated by passing a current through the platinum helix mentioned above, and the raise of temperature was measured by means of a thermopile. The results obtained were that up to a temperature of 680° C. the iron preserved sensibly the same magnetic properties as when cold, but beyond this temperature the decrease of permeability was very rapid, and the bar became completely non-magnetic at 770° C.

The Microbe of the Magnet.

With all the paraphernalia of the modern physical and electrical laboratory, the instruments of precision that will handle a millionth of an inch as readily as a laborer his pick and shovel; with all the evolution going on through generations of scientists, and the almost incessant wresting of secrets from the bosom of nature, we doubt if science is any closer to the isolation or attenuation of the microbe of the magnet.

It is absurd to suppose that a primary energy is impressed upon a piece of hardened steel once for all. The transfer of that energy into actual work would quickly destroy the magnetic power, yet such a destruction not only does not take place, but the very exercise of the power strengthens the magnet. A horseshoe of steel may be magnetized in ten seconds by the current of a few amperes from a battery, a ridiculously small amount of energy all told, and such magnet can lift many pounds of iron in contact. But without contact it may lift and hold a pound of iron easily. It will hold that pound for an eternity, and every second of that time without end the magnet is expending energy until it foots up an almost inconceivable total of actual power. Not alone that, but the magnet of one pound lifting-power to-day may and will be stronger to-morrow. Where does all this really tremendous amount of energy come from? By what inscrutable process does the mere magnetization of a bar of steel make of it a machine for the transformation of energy? Not a reactionary or storage device which, like a steel spring, honestly gives back approximately all it has received, but a perpetual transforming or converting machine. There is a hidden process going on of some kind; energy is going into the magnet all the time it is doing work—energy in some form. Where does it come from—gravity? atmosphere? solar rays? earth currents? Who can say? It is a great problem, worthy of a lifetime of indefatigable research. It is a microbe and it will be discovered, and the discovery will make electricity the queen of nature's forces and steam will become a dim vision of the dark ages of the past.—*Electrical Review.*

Light Without Heat

A great many experimenters are now trying to find out some way of producing light without producing heat at the same time. If this can be done at all it will probably lessen the cost of lighting our streets and buildings very considerably. Some years ago James Clerk Maxwell advanced the theory that light is a sort of electrical disturbance of the ether that is supposed to fill space. This theory, though not yet rigorously proven, is supported by a great deal of evidence—in fact, by all the evidence we have. We know, for instance, that light and electric induction are propagated by the same medium, and with the same velocity. We know, further, that each consists of wave-like motions, or strains, in that medium; and that the waves of both are transverse and unlike those of sound. There are other reasons, too, for believing that Maxwell's theory is correct, and that the difference between light and electric induction is the period of their respective waves. If this is a fact, it is evident that if we could charge and discharge a Leyden jar rapidly enough it would break out and shine with a brilliancy that would depend only on the intensity of the electricity supplied to it. Now it is believed to be possible to charge and discharge such a jar a thousand million times a second, which would be the same as sending a thousand million waves a second out into space; yet this rapidity, though it is utterly inconceivable to the human mind, is stillness itself compared with what is required to produce light, and it must be increased at least 400,000 fold before it can produce the faintest glimmer.

Grim as the outlook is, we can take courage from the fire-flies, for they seem to have overcome the difficulties somehow. Maxwell's theory, if correct, is a stupendous generalization; and though it has been of no use to us yet, some way of applying it in the arts must soon be discovered. The possibility that it suggests, of transmitting light by electricity as we now transmit sound, is curious and interesting; and it would be a novel experience to stroll the streets of Hartford on a summer evening, bathed in light shining somewhere in China.—*Locomotion.*

THE NATIONAL ACADEMY OF SCIENCE met at Washington on the 6th inst. The attendance was full, and an interesting session is was held.

MECHANICAL PROGRESS.

Progress in the Iron Foundry.

It is admitted that foundry practice has made but little important advance in the past generation. Beyond some improvements in molding, a little better knowledge of mixtures of iron, and some recent study of the use of ferro-aluminum, ferro-silicon, etc., this whole great industry is practically where it was 25 years ago. There are exceptions to this rule. A few wide-awake, energetic foundrymen, under the stress of keen competition for important work, have experimented successfully with lower grades and reached results both as to economy and quality hitherto deemed impossible. In nine-tenths of all foundries, however, one or other of the two conditions prevails: Either the shop is so full of work and crowded to get out castings on time and in good order that the responsible head cannot find time and thought for careful experiments, or else a state of ancient and rock-rooted prejudice exists that forbids any departure from the good old ways of the fathers. Under either of these conditions the chance for progress is small. It is an unfortunate circumstance, also, that intelligent, well-equipped foundrymen, with some little acquaintance with books and theory and good practical experience, are scarce, and when found are expensive men.

Our attention has been called of late to an extended series of experiments in this line made by Rogers, Brown & Co., Cincinnati and Chicago; 119 distinct foundry mixtures are covered by these tests; in all, about 300 bars were broken. The standard adopted is an inch-square bar, 24 inches between supports, and broken by transverse pressure applied in the center. It was noted that nearly all bars overran in size from one-thirty-second to one-eighth inch, making the actual breaking strength from 50 to 300 pounds greater than the correct result after being reduced by mathematical formula to inch square. This scarcely noticeable difference in the size of bars makes a far greater disparity in breaking strength than is usually supposed, and accounts for cases of unusual strength reported in foundries where only average results are realized. The bars for these tests were furnished by leading foundries in the West, particularly Ohio, Indiana, Missouri and the Northwest. They represent all classes of work—agricultural machinery, general machinery, architectural work, jobbing, stove plate, hardware, etc. The mixtures used are from coke and charcoal irons, mainly the former. The proportion of foundries using charcoal iron at all is less than 20 per cent. Those using it in any considerable proportion scarcely amount to eight per cent. These are mainly in the Northwest, where Lake Superior charcoal iron has been a recognized standard for years and is slow to give place to newer mixtures.

One of the most interesting facts brought out is the average strength of about 300 test bars broken. This is 1120 pounds, and it may fairly be assumed that this is the average strength of all foundry mixtures west of the Alleghenies. Exclusive of bars containing flaws, and of which no account was made in the inquiry, 37 broke below 1000 pounds, only 12 broke above 1400 pounds and 3 above 1500 pounds. One bar in which wrought-iron scrap and ferro-aluminium were mixed with pig iron broke at 1958 pounds, the strongest of the series, but it was hard to drill or work. The two weakest bars were made from a mixture of half each Lake Superior charcoal No. 1 (a favorite brand) and old car-wheels. The strongest bar, other than the one above named, was from an all-coke iron mixture, in which Lake Superior, Southern and Hanging Rock ores were about equally blended. It is clearly proved by the experiments that it is rather by the intelligent mixing of medium-grade irons than by the use of the strongest and highest-priced brands that best results are achieved. In several conspicuous cases, where the highest-priced Lake Superior charcoal irons were mixed with best known Northern Ohio soft or "Scotch" brands, the object being to "get the best," without reference to price, the results were below the general average, while of the very strongest mixtures a majority were from the cheaper brands. In scarcely a single instance where Hanging Rock, Lake Superior and Alabama or Tennessee coke irons, of proper grades, were mixed in judicious proportions was a weak, hard or defective casting obtained. Some low-grade and low-cost mixtures, thus judiciously made up, yielded strength and general working qualities that were quite surprising. In such adaptations Nos. 2 and 3 grades were freely used without rendering work too hard for machine-shop. Wrongly adapted, the same grades would doubtless yield hard and brittle castings.

The bending capacity or deflection of bars was in each case noted. The maximum test was .53 inch, the breaking strength 1435 pounds. The minimum test was one-fourth inch, the breaking strength being 845 pounds. In color and grain, results were conflicting. The darkest fractures and those of the cleanest, sharpest grain were sometimes among the weakest, but as a rule were of good strength and soft. A mixture with too much silicon invariably proved weak and brittle, while too little silicon produced physical results very similar. An interchange of views and information was had among the foundrymen taking part in these tests as to facts of foundry practice, methods of charging cupolas, pressure of blast at tuyeres, kind and proportions of fuel used, etc., and it is promised that a summary of the results of these will be given at a later time.—*The Iron Age.*

MELTING ZINC.—Zinc is troublesome to cast, and more troublesome when small thin molds are to be cast. Lining the mold with whiting and water which must be allowed to thoroughly dry, will often cause the metal to fill the mold well. Burning of the zinc (oxidizing) may be prevented by covering the metal while in crucible or ladle with a layer of common salt, a little muriatic acid, which amounts to the same, as a coat of zinc oxide is immediately formed on the surface of the melted metal, which effectually prevents further oxidation from action of oxygen in the atmosphere. It is an improvement to keep a layer of charcoal on top of the zinc, or any other soft metal which can be melted in a ladle; the coating of oxide forms a protection against oxidization to only a certain degree, while the layer of charcoal tends to reduce the oxide again to its metallic form. Indeed, it is possible to recover lead, tin, zinc and antimony from the "dross" or oxide which gathers in the ladle. It is only necessary to melt the oxide with charcoal, salt, and soda to get it again into useful shape. The dross should be powdered, likewise the salt, charcoal and soda. Mix them together and melt. The soda and salt melt into a pasty mass and the carbon unites with the oxygen of the dross, leaving the metal free, but burning off the charcoal. The salt and soda act simply as flux in reducing the oxides.

CAR CABLES.—The strain put upon a cable in operating a cable road is very heavy, while the power required to move one is enormous. On most lines a cable 1¼ inches in thickness is used, which consists of a hemp or jute heart wrapped with 6 strands composed of 19 wires of crucible steel. The weight of the cable is 3½ pounds to the foot, so that a mile of cable figures up a dead weight of 10 tons. The force necessary to draw this weight extended over the entire line is very much greater than would be required to move the same weight in a compact body. The breaking strain guaranteed by cable manufacturers is 45 tons, but the maximum strain used is only 10 tons. An average of 75 per cent of power is spent in pulling the empty cable, and the balance is all that is used for profit. A cable can be used only about 7 months, when it becomes so worn as to be of no further use.

CENTRAL WORKSHOPS FOR SMALL MANUFACTURERS.—The scheme for assisting small manufacturers in a practical manner by establishing in the large towns a central workshop, where the manufacturer may at the same time use steam-power, has so far been highly successful. These central workshops have for some time existed in some of the large towns of France and Italy. The experiment is now to be tried in Hamburg, where a central workshop of a similar character is to be erected. The result of this new departure will be awaited with great interest.—*Kuhlow's.*

THE BEST AMERICAN TOOL STEEL is made of iron which comes from Sweden, and, so far as known, there is no iron produced elsewhere from which steel of equal quality can be made. Our American steel-makers pay a heavy import duty upon this iron, while the English steel-makers import it free. But while this undoubtedly affects the cost of the steel, no one will assert that it affects its quality, so long as the iron is imported and used.

ANOTHER USE FOR STEEL.—The high price of brass has led the clock manufacturers of Ansonia, Walesburg, and Thomaston, Conn., and other places to experiment with steel for certain parts of the cheaper grades of clocks, and the result has been gratifying. Soft steel has been put under the dies, and many working parts are now made entirely of steel which were formerly composed of brass.

HARDENED STEEL TOOLS.—The *Scientific American* says that hardness on steel tools, almost equal to that of the diamond, is obtained by plunging them when white-hot into sealing-wax, repeating the operation until the steel is too cold to enter the wax. The tool is then just touched with oil of turpentine.

AN IMPROVED BARREL HOOP.—A corrugated steel barrel hoop has been invented, which is said to be elastic and firm, hugging a package tightly. Four steel hoops will take the place of ten wooden hoops on a flour barrel. They are made at Worcester, Mass.

PETROLEUM FUEL.—An English firm has been using petroleum for fuel in a torpedo boat, and getting a speed of 21 knots. The oil is carried in the vessel's double bottom. The boilers, it is said, steamed excellently.

COPPER MAY BE HARDENED by melting with it and thoroughly stirring into it from one to six per cent of manganese oxide. The other ingredients for bronze may then be added.

CAST IRON COLUMNS with flat ends uniformly bear about three times as much as those of the same dimensions with rounded ends.

THERE should be less pride felt in peculiarity of employment and more in excellence of achievement.

GOOD HEALTH.

Health of the State.

The monthly report of the State Board of Health has been received. The introductory remarks are as follows:

Reports of mortality received from 74 localities, with an estimated population of 741,500, give, in the aggregate, 907 deaths, which is an annual death rate of 14 88 per annum. If we compare this percentage with that of any other State within the Union, we will at once begin to realize the salubrity of our climate and the lessened tendency to death that exists within its borders. There is hardly a State that can be named whose death rate for the month of March comes within one per cent of our average, and when we reflect that one per cent means 10,000 lives spared in each million persons per annum, we no longer wonder at the large number of emigrants that seek our shores.

Reports of sickness from 79 localities show a remarkable absence of any epidemic, or indeed of any very prevalent disease, if we may except pneumonia, bronchitis and influenza, which were very general in their diffusion, but of a mild type and sporadic character. The temperature of the month being much warmer than what we usually experience in March, and the rainfall being somewhat in excess, may have had a modifying influence upon the character of these diseases, as it has been conclusively shown that the prevalence of coughs, colds, bronchial and rheumatic affections depends very much upon temperature, a very moist atmosphere accompanied by a low temperature being conducive to their frequency, an increase of temperature lessening their fatality. It was noticed during the month that when the atmosphere was dry, and the temperature low, an increase of acute pneumonia was developed, and in the higher altitudes it seemed to determine its fatality. The connection between meteorological conditions and disease is still a problem to be solved, and appears to be worthy the attention of every votary of science whose mission is to consider all the influences affecting the public health.

We would call especial attention to the following remarks in the report in regard to the care which should be taken to avoid that greatly dreaded disease—scarlet fever: As the tendency to infection from this disease lessens with advancing years, the longer a child can be protected from it, the greater the likelihood that it will escape it entirely. To attain this desirable end, it is absolutely necessary to isolate patients as soon as the disease is discovered; and this isolation must be maintained until the shedding of the epithelium or outer skin is completed. It is a well-known fact that scarlet fever patients are most dangerous to others when the skin is beginning to desquamate or peel off. During this time they should be frequently bathed, and their skin afterward anointed with fresh lard or other animal oil which will hinder the dissemination of the branny scales. Children exposed to scarlet fever should remain under observation 10 or 12 days before being allowed to mingle with other children, and all attendants on the sick should change their garments, and disinfect their hands, face and hair by washing in a disinfectant solution before mixing with the public. It must not be forgotten that the type of the disease in one person is not certain to reproduce the same in another, as what is so mild as scarcely to confine to bed in one person, may communicate a poison to another that will be so very malignant as to cause death in a few hours. It is therefore the part of prudence to confine the spread of the disease to within as small a radius as may be possible. To determine the most infective period of the disease, Dr. Whitlegge of London analyzed 1700 cases, of which he had exact particulars, and found the infectiveness suddenly decreased at about the sixth day, increased again about the twelfth day, and reached its maximum on the sixteenth day.

TYPHOID FEVER TREATMENT IN GERMANY.—The Philadelphia *Record* speaks as follows in regard to the efficacy of cold baths as used in German hospitals as a typhoid fever remedy: Dr. Simon Branch, attending physician to the Manhattan General Hospital, published a paper in the *Medical Record* on the treatment of typhoid fever which advocates the abandonment of the present method of treatment, and the substitution of the cold-bath treatment as successfully practiced in the German military hospitals. Without burdening the reader with the methods of the cold-water system, which are the province of the physician, it is worth while to note the valuable results attained. Out of 19,017 cases treated with "all kinds of cold baths," there was a mortality of 7.9 per cent. Out of 2841 cases in which the treatment was "intermediate, with water," the mortality was 12.2 per cent. Out of 2198 cases treated with "strict cold baths," the mortality was 1.7 per cent, and in the same cases 2150 patients who were treated before the disease had progressed five days, all recovered.

VACCINATION FOR DIPHTHERIA.—It is claimed that two professors connected with the Pasteur Institute have discovered the generative microbe of diphtheria, and that a preventive of this disease by means of vaccine virus is expected to follow. Should this expectation be realized, the discovery and its successful application will certainly take rank among the most important triumphs in the realm of medical science. The prevalence of diphtheria, especially in the principal cities, and the very large proportion of fatal cases, is little dreamed of excepting by those who are giving special attention to the subject. In Brooklyn, N. Y., for instance, there were, in 1888, 984 deaths from diphtheria, which probably represented 3000 cases.—*Scientific American.*

DANGER IN NEWLY BUILT HOUSES.—There is too great haste in occupying a house after its completion. In many places there is such a demand for dwellings, and often business apartments, that, so soon as finished, they are occupied. This is especially true of small dwellings. There is more danger in this than is supposed. There is no health in dampness and mold under any circumstances, and in living apartments, where the tendency is toward poor ventilation, the dampness of newly finished houses contributes largely to ill health. In the town of Basle, Switzerland, a regulation has been adopted which prevents newly built houses from being occupied until four months after completion. Under many circumstances, so long a time as above specified is not necessary, but it is often well to err on the side of safety. The size of the house, its location, surroundings, the material used, and the state of the weather enter into the consideration of the time necessary in which a building should become sufficiently dry for occupancy.

THE LATEST SMOKING CRAZE.—The latest dissipation invented by the women of Paris and London is the smoking of tea cigarettes. Special grades of the finest tea are used, and the effect of the cigarette is said to be delightful for fully an hour after one has ceased to smoke. After that comes a reaction in the form of a nervous trembling and excitability, which is best endured, according to a woman of title who goes in for all these things, by drinking a thimbleful of frozen absinthe.

DANGEROUS DRUGS.—The Grand Jury of this city have asked the Board of Supervisors to pass an ordinance making it unlawful to sell or give away any opium, morphine or cocaine, except upon the written prescription of a practicing physician, and then only upon the day of the date of said prescription. The ordinance is also to make it unlawful for a prescription to be given, except for special medical purposes. Penalty, $500. Such an ordinance, rigidly enforced, has become a necessity.

USEFUL INFORMATION.

A Curious Character.

Some years ago a curious character, known as Jack Coop, lived in Pittsburg, Pa. He claimed to have been the inventor of the circular saw. His story in that regard is told in another column of our present issue, under the head of "Sawmill Notes." He occupied three rooms filled with an inconceivable amount of old relics, including a large library of old books, many of them from Russia and England.

He claimed that he was born in 1778, on a British man-of-war, during an engagement with a French man-of-war, the British ship being commanded by the afterward famous Lord Nelson; that his father and mother were both killed in the naval battle before he was two days old; that he was put into a hen-coop and cared for by the sailors; that he was educated by the British Government as a sapper and miner, and was sent with a corps of sappers and miners to Russia, and was in Moscow when it was invaded by Napoleon Bonaparte, and that he became a Russian citizen, and afterward traveled with the Emperor over England in disguise.

In the fall of 1870 the old man packed all his traps in boxes, put them on a flatboat, and left for the South, saying that he was going to spend the remainder of his life where the winters were warmer. He had not tasted meat, fish, or flesh of any kind for 30 years, his principal food being bread (which he made himself, cleaning and grinding the wheat in a handmill) and apples.

He is said to have had more than a peck of old gold watches of all kinds in his room, and over $10,000 in ready money, and he refused an offer of $25 for his old saw. He would never allow any one to call him by any other name than "Old Jack" or "Old Coop."

HISTORY OF SOAP.—The accurate history of the manufacture of soap stretches back to the factories built at Marseilles, where there was an apparent recognition of the principles of saponification. Neither then nor until centuries later, however, was there any desire to understand what the principle was, and for many years every effort to wrest the secret from chemistry and make soap-boiling an art was fought by the manufacturer and workman. "The factories at Marseilles had around them all the materials necessary for soap-making," says a recent English work upon the art. "The olive tree, the fruit of which yields a fixed oil in great abundance, flourished in the south of France, while the shores of the Mediterranean yielded an ample supply of maritime plants from which crude soda was obtained by calcination. As time progressed Italy furnished olive oil, while Spain contributed crude soda, or barilla. The gradual development of the art, while extremely interesting to the chemist, is of no special interest to the general reader. Leblanc's discovery of a process for the manufacture of soda from common salt, and Chevreul's explanation of the nature of the reaction which takes place when fatty substances are treated with boiling solutions of caustic alkali, give an exactness to the manufacture of soap such as it never before had, but it was a long time before the boilers would avail themselves of the aid of these men of science. Steam succeeded the ordinary fire, and the list of fatty substances used in soap-making grew and grew, until there are now a dozen of them forming the base of soap, with over 100 entering into the composition of different kinds of soap to greater or less degree."

The Use of Ropes.

The *American Architect* translates from the *Bautechnische Zeitung* the following practical suggestions in regard to the use of ropes, which may be worth remembering. With hemp ropes the character and probable strength may be judged in some degree from the appearance. A good hemp rope is hard, but pliant, yellowish or greenish-gray in color, with a certain silvery or pearly luster. A dark or blackish color indicates that the hemp has suffered from fermentation in the process of curing, and brown spots show that the rope was spun while fibers were damp, and is consequently weak and soft in those places.

Sometimes a rope is made with inferior hemp on the inside, covered with yarns of good material, but this fraud can be detected by dissecting a portion of the rope, or, in practiced hands, by its behavior in use. Other inferior ropes are made with short fibers, or with strands of unequal strength, or unevenly spun. In the first case the rope appears woolly, from the number of ends of fibers projecting, and in the latter the irregularity of manufacture can be seen by inspection. Occasionally a hemp rope is spun with a core or central strand, such as is used in the interior of many wire ropes. This somewhat increases the strength, but the core, shut in by the outside strands, is liable to rot and infect the rest, and any rope with a musty, moldy smell should be rejected.

The best hemp comes from Russia, Switzerland, Alsace and Northern Italy, and it is said that the strongest fibers are obtained from plants grown at the foot of high mountains. Ropes to be used on board ship, or where they are liable to be often wet, are usually soaked in tar to preserve them, but the tarring diminishes the strength by about one-third, and increases the friction of the rope.

The injurious action of tar upon the hemp fibers seems not to be clearly explained, but it is said to be lessened by subjecting the tar, before applying it to the rope, to repeated melting and washing with water. The effect on a rope of soaking with water is, however, worse than that of saturating with tar.

According to accurate experiments, the tensile strength of a wet rope is only about one-third that of the same rope in a dry condition, and a rope treated with grease or soap is weaker still, apparently through the influence of the lubricant in facilitating the slipping of the fibers. It should never be forgotten that hemp cords contract strongly on being wet, a dry rope 25 feet long shortening to 24 feet or less when dipped in water or exposed to heavy rain.

ELEVATORS FOR DWELLING HOUSES.—The ingenious plan proposed by a Berlin inventor of a simple and inexpensive elevator for private dwellings, in place of the ordinary staircase, has attracted some attention. It is on the principle of the inclined railway, and the motive-power is furnished by the city water, which is applied in the cellar. Each flight has its separate chair, so that, for example, one person can ascend from the first to the second story while another is on his way from the second to the third, or still another is descending from the fifth to the fourth. The chair, being only of the width of the human body, requires but little space, and still leaves a free passage for any who wish to walk up or down, instead of riding. It is set in motion by a simple pressure of one of its arms, while after it has been used it slides back to the bottom step, its descent being regulated in such a manner that the carrying of passengers is a matter of entire safety. The motive-power is, of course, more or less expensive, according to the cost of water, this being, it is stated, at Berlin at the rate of a little more than one-tenth of a cent only for each trip.

TRANSPORTING GAS BY RAIL.—It is said that a party of Denver men are engaged in a project that contemplates the transportation of natural gas from the wells in Pennsylvania to Denver by rail. The cars are made of steel boiler plate, and much in the form of oil-tank cars, and are expected to contain from 10,000 to 15,000 feet of gas when compressed. It is to be used as fuel to operate the engines of a cable line of street cars.

THE CENTENNIAL ANNIVERSARY of the inauguration of President Washington will occur on Tuesday, April 30th. General Washington was inaugurated on April 30, 1789, because the bad weather had prevented Congress from assembling and organizing. James Monroe and Zachary Taylor were inaugurated on March 5, 1821, and 1849, respectively, because March 4th in those years fell on Sunday.

ENGINEERING NOTES.

Direct Production of Hot Air From Cold.

A discovery having an important bearing in the present upon the arts and manufactures has recently been made by Mr. Wm. Gibbs of Essex, says the London *Times*. The discovery is to the effect that perfectly pure air can be produced from the combustion of coal. The arrangement for effecting this result is extremely simple. It consists of a brick chamber, about five feet long by two feet wide and two feet high, built upon the ground. At one end is a lead chamber and a fuel chamber, and at the other a powerful exhaust and blast fan. Placed immediately between the chamber and the fan are baffle plates, a standing ridge with perforations at the back and a hanging ridge with perforations at the front. There are also several carefully proportioned inlets to supply the exact quantity of air requisite for perfect combustion. The exact apportionment of the air constitutes one of the main points of success, and it is the one which Mr. Gibbs found the most difficult to determine. Once known, however, this law of proportion between air and fire is, of course, easily maintained.

Another point having a very important bearing on the result is the exact relative proportion of the fuel chamber to the feed chamber, and both to the volume of air drawn per minute by the fan. This also being ascertained, after many failures, is now a fixed instead of a doubtful quantity. Given these proportions and some other of minor importance, the result is distinctly curious.

Issuing from a fan-mouth 12 inches in diameter comes rushing a column of hot air, marking on the pyrometer at its exit a steady, uniform temperature of about 500° Fahr. Not a trace of smoke or fume is visible to the naked eye; not a taint of any kind is perceptible to the taste or smell. Standing as we did on the range of this simoon, with the hot blast full in the face, the heat is, of course, excessive, but the air is perfectly pure. Save in the matter of temperature, it affects neither the eyes, the throat, nor the nostrils. As a proof of this purity, some choice tea which had been saturated with hot water was placed in the hot-air current, and when redried was pronounced by an expert to be wholly free from any imparted taint or taste.

In order to show the character of the products of combustion before being submitted to the fiery ordeal, the fan was stopped, and a dense cloud of thick smoke rose up from the coal in the feed chamber, charged with suffocating fumes. On restarting the fan it was quickly drawn in again, and not a sign of it appeared at the exit from the fan, and the air when inhaled was as pure as ever. It would be interesting to know the rationale of the process by means of which all the varied products from coal combustion are thus so completely destroyed. Mr. Gibbs suggests that the water contained in the coal is decomposed into oxygen and hydrogen, and that the hydrogen in burning adds to the heat of the resultant air, while the oxygen, reinforced as it is by that obtained from the large volume of fresh air admitted at the various inlets, decomposes and purifies all these products. But whatever the theory may be, the fact remains that it is not only possible but easy and economical to obtain the utmost amount of heat from coal without deterioration of the atmosphere.

The success attained by Dr. Gibbs naturally suggests the application of the principle in many other very important directions in connection with the industrial and mechanical arts as well as for steam-raising purposes and for domestic use by the suppression of open fires in stoves.

A PROBLEM IN COAL HAULAGE.—The Lens Colliery Company has satisfactorily solved an interesting problem. The development—thanks largely to the use of compressed air—of one of their deep seams, 1100 feet from surface, rendered necessary the addition of a third deck to the cage. But with this additional weight the engine was found unequal to the task of drawing the load. The difficulty had, however, been foreseen, and in part provided for. A special engine has been erected to condense the steam in the air-compressing, pumping and ventilating engines. A few hours' work was sufficient to connect this with the winding-engine. The success was complete. By means of this condensation the engine has been rendered capable of drawing 1000 tons a day from the depth mentioned. The stroke is 1.60 meters, and the diameter 0.70 meter. The principle of condensation is likely in future to be generally applied to winding-engines. All examples hitherto, so far as can be learned, have given satisfactory results.—*Colliery Guardian.*

OUR PRESENT POPULATION.—It is estimated that the present population of the United States is 64,000,000. The total increase is said to be 100,000 a month, exclusive of immigration, and last year the increase by immigration was 518,000. At this rate the next census, which will be taken in July, 1890, will show about 67,000,000.

AN excellent polishing powder for gold and silver consists of burnt and finely pulverized rock alum, five parts, and levigated chalk, one part. Mix and apply with a dry brush.

MINING AND SCIENTIFIC PRESS

A. T. DEWEY. W. B. EWER.

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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO
Saturday Morning April 27, 1889.

TABLE OF CONTENTS.

EDITORIALS. — Lime-Burning, 295. Passing Events; Mexican Mines and Miners; The Mining Bureau Museum; Tin; The Washington Centenary, 302. Fine Crushing of Ores, 303.

ILLUSTRATIONS.—Perpetual Kilns Used in the Manufacture of Lime, 295. Blake Multiple-Jaw Crusher; Chile Mill—Section; Chile Mill With Screens Outside, 303.

MISCELLANEOUS.—Production of Lead; Eureka District; Notes on Leaching Silver Ores; Mines and the Paris Exposition; An Alaskan Coal Mine, 296. Intellect and Emotion; Mining for "Flour Gold;" A Metallic Railroad Tie; Visiting the Lick Observatory, 297.

SCIENTIFIC PROGRESS.—Self-Mending Insects and Snakes; Wonders of Botany; The Microbe of the Magnet; Light Without Heat, 300.

MECHANICAL PROGRESS.—Progress in the Iron Foundry; Melting Zinc; Car Cables; Central Workshops for Small Manufacturers; Another Use for Steel; Hardened Steel Tools; An Improved Barrel Hoop; Petroleum Fuel, 300.

GOOD HEALTH.—Health of the State; Typhoid Fever Treatment in Germany; Vaccination for Diphtheria; Danger in Newly-Built Houses; The Latest Smoking Craze; Dangerous Drugs, 301.

USEFUL INFORMATION.—A Curious Character; History of Soap; The Use of Ropes; Elevators for Dwelling Houses; Transporting Gas by Rail, 301.

ENGINEERING NOTES. — Direct Production of Hot Air From Cold; A Problem in Coal Haulage, 301.

MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 298-9.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 308.

Business Announcements.

[NEW THIS ISSUE.]

Stamp Mill—A. B. Paul, Jr.
Machinists—Adam Schilling & Sons.

See Advertising Columns.

Passing Events.

The miners on the Comstock lode, Nevada, are much interested in the question now being discussed as to suspending underground work in the mines on Sunday. Such work has been kept right on 365 days in the year, the custom having prevailed since they commenced mining there. It is now proposed to stop the Sunday work. In California it has never been the custom to carry on underground work on Sundays. The Comstock mine managers are willing to leave the question to the miners themselves.

Public attention is turned at present toward Oklahoma, where vast tracts of land were thrown open to settlement this week. Thousands of people were prepared to enter the region, and a town of 15,000 inhabitants sprung up in a day. Many are disappointed, however, water being scanty and poor.

There is just now some little excitement at Monrovia, Los Angeles county, over gold discoveries. Nothing very big has been found, but enough to encourage a lot of people to continue prospecting.

The Santa Clara gold excitement in Lower California has about died out. It appears, however, that some of the ledges found are pretty good and will be developed to prove their extent and value.

JOSEPH POWNING, for 20 years the controlling spirit of the California Powder Works, has resigned his position in the Board of Directors.

Mexican Mines and Miners.

The Conditions in Various Districts.

We had a conversation this week with Alexander H. Dubois, who has been for many years a resident of Mexico, where he has been identified with the mining industry. From him we learned many interesting facts concerning mining sections of which we hear but little. Mr. Dubois agrees with others familiar with the country in saying that the Mexicans are good miners and can mine and beneficiate their ores cheaply and well. They have been working their mines for 300 years or more, treating mainly the free-milling ores. In many places they have worked the claims by open cuts as far down as free-milling ores existed, and then left them. About 25 miles from Sombrerete is one of these open cuts, which is from 15 to 20 miles in length. There Mr. Dubois saw blast holes the size of a man's arm and in one of these he found lime, showing they had used this to rend the rocks.

As far as raising ores are concerned they can do it as cheaply by hand as we do by steam in many cases. Not long since he saw an instance of this. The peons were making 40 trips a day each from a depth of 400 feet, and a lateral drift of 1000 feet, carrying loads of 200 pounds, for 75 cents a day. These men were paid mainly in produce.

The cause of failure of so many foreign mining companies in Mexico Mr. Dubois attributes to their sending out men who were not miners. They get the most expensive labor and do not properly handle it. A few years ago Mr. Dubois met a California prospector who was an exceptionally intelligent man, and who was about to return to this State, saying the Mexicans knew too much about mining and that there were better old dumps and abandoned mines left in California than in Mexico. The ore has to be very rebellious for the native not to attempt to work it. At Topia, where there is a mining camp of about 5000 people, the ore is base, but they work the zinc blende by roasting and patio up to 80 per cent of the assay value. The lead ores are smelted imperfectly, but are made to pay.

These Mexicans get hold of foreign "tenderfeet" and sell them the shells of their old mines for good prices. Practical mining men would not give ten per cent of the price asked, but lots of people get fooled on the past records of abandoned mines.

From the seaport of Altats, with fortnightly steamer communication from Mazatlan, and say 150 miles north of same near the mouth of Humaya river, is Culiacan, a town with 10,000 inhabitants, the capital of the State of Sinaloa, on the confluence of Humaya and Canelas rivers. This is the ancient Colhuacan, one of the stopping places of the Aztec tribe on their peregrination from unknown northern regions, according to the old Aztec traditions and hieroglyphic manuscripts. There are here cotton-mills, extensive sugar-cane plantations and a sugar factory.

Following up the Canelas river, we find Tamazula, in the State of Durango, now almost in ruins. It is on the confluent of Canelas and Sianori rivers, 80 miles from Culiacan.

La Bajada.

About 30 to 35 miles farther up the Canelas river, at La Bajada, are the ruins of a 30-stamp mill driven by three overshot-wheels, and a White & Howell's roasting furnace, abandoned because of failure in working the ores from La Prieta y Los Hollines mine. This was due to the grossest mismanagement. The ores run 60 to 90 ounces troy in silver per ton, and had given fair results by leaching process and roasting in brick furnaces, but the managers erected a White & Howell furnace and pans to work the roasted ores and no settlers, but discharged the pulp directly from the pans into a sluice or flume, resulting in scandalous losses of quicksilver and amalgam; in fact, ores which, according to the establishment's assay record, showed a battery assay of 60 to 90 ounces troy silver only produced some 30 ounces silver.

The mine is worked on two parallel veins respectively named La Prieta and Los Hollines, distant say 40 feet from one another. Each of these veins is two to four feet in thickness and have a dip of about 45° out of the mountain. They are almost completely gutted above the mouth of the tunnel (named La Sierpe); below said tunnel the deposit is almost intact. The hillside slopes pretty much parallel to the dip of said veins and a lower tunnel located probably 500 or more feet below the La Sierpe tunnel would crosscut these two deposits, besides cutting several other virgin mineral veins. These deposits consist mainly of blende, pyrite, mispickel, besides some other arsenical and antimonial ores in quartz and other ore chimneys in calcspar carrying ruby silver between the cleavages of the calcspar. These last ores have mostly been overlooked, and I found considerable quantities of them on the dumps. The mine is located about two miles from the mill, and the mouth of La Sierpe tunnel is say 600 feet above the river-bed and mill.

The most remarkable feature about this mine is the extent of ore-bearing ground; if I recollect rightly, 1500 to 2000 feet in the horizontal, and would probably reach further were it not faulted and displaced.

Near the intersection of La Sierpe tunnel and the Prieta and Hollines veins we find a cross vein. This is the San Carlos, some four feet in breadth with ruby silver as mineral constituent in a quartz gangue. It is but little developed.

The mine is at present only nominally worked, in fact not sufficient to hold it under Mexican mining law, which requires that every year 26 weeks' work at least be performed inside of the property to hold it.

The walls are as firm as a bell, so that although the upper levels are almost completely gutted, the mine is not in a ruinous condition.

The Sierpe tunnel and workings are furnished with a tramway extending the whole length of the worked deposit.

Some ten miles above La Bajada is Las Juntas, the confluent of Canelas river, with the creek that comes down from Pilones and Birimoa, of which more further on. Some 30 miles further up the Canelas river on a creek near the headwaters of Canelas river we reach

Topia,

A mining town with 5000 inhabitants. It is reached from Culiacan by following up the Canelas river, mostly up a narrow valley following the bed of the river and crossing the same river 365 times. It is only accessible from the Pacific Coast in the dry season, except by mountain paths.

Topia is the capital of the Tamazula county of Durango State. It is a flourishing camp, producing about $1,000,000 yearly product of silver bullion and considerable quantities of exporting ores. The ores of the district are rich fahlerz mostly exported and galena worked there in *galene* furnaces; zinc blende and some pyrite worked either by leaching process or by patio after roasting with salt in brick reverberatories and yielding by same 80 per cent and even more of the assay value! It must be conceded that the Mexican azogueras do not work so badly!

The chief mines are Cantaranas with three steam engines, Cornish pumps, compressors and machine drills, hoisting works, a small crusher, a pair of rollers, jiggers, a dry stamp battery, brick-roasting furnace and patio, all located at the mouth of the shafts. The mine, about 400 feet deep, is remarkably well timbered, but is now nearly worked out. It was developed by mining engineer Ei Wertheman, who in some 10 or 12 years made a snug little fortune out of it.

La Madrugada is a relatively recent mine with rich galena and fahlerz ores.

La Oliva has rich fahlerz ores and zinc blende.

La Leona, which furnished a very large bunch of $100 per ton galena ores, lay abandoned for several years, but a Mexican company has lately resumed developing by means of a tunnel on the extension. La Juliana, with its extensions, among the first mines developed in Topia, has a large vein some 8 or 10 feet in breadth, with ores of copper, silver glance, fahlerz, galenas, zinc blende and pyrites. The vein has a clay gouge and is exposed to extensive cavings. It has to be very heavily timbered and has given rise to large loss of life. It is worked by deep levels and tunnel. The mines have produced very largely, and even now are valuable properties, belonging to M. M. Lopez.

The ores from these mines are worked in an establishment Molinos in a gulch below Topia moved by water-power. There are two brick furnaces 10 or 12 feet high, with a water blast, as in the old Catalan forges in Spain. They smelt daily some four tons each. The slags are rather rich and ores rebellious.

A stamp-mill with square stamps is moved by an overshot wheel. There are brick reverberatories, and leaching and patio processes are both successfully and economically worked.

These two last mines were among the first opened out in Topia. They were developed (1825 or 1830) by D. Zeferino de Anitua, the administrator of the Vetanegra mine and other properties belonging to M. M. Fagoaga in Sombrerete, who in 1812 or 1815, when the Spaniards were expelled from Mexico, remained in possession of the Sombrerete mines and worked until it was entirely worked out. The Vetanegra mine was abandoned only after considerable search for new ore bodies. Subsequently the working by barrel process of the dump of Vetanegra (and Pabellon?) produced very considerable quantities of bullion.

Work has been resumed in late years by an American capitalist (Haggin) on the Sombrerete mines.

Half-way between Topia and Canelas, in a deep gulch or canyon, is the old mine La Prieta, latterly reopened by Mr. Rivera. It yields considerable quantities of exporting ores and good roasting and patio ores, mainly fahlerz.

Canelas,

A small town of 1000 to 2000 inhabitants, is in a pretty valley well watered by numerous mountain creeks, with many gardens and orchards. Under Spanish dominion it was the seat of local government and center of mining enterprise in the district. Now Topia has taken the lead, and is the seat of the Prefecture. Canelas is surrounded by old mining camps, now mostly abandoned, viz.: Ceballetas, Los Tajos, La Perenya, San Ramon, Mesas de Culiacan and others too numerous to enumerate.

The Mining Bureau Museum.

The museum of the State Mining Bureau in the Pioneer building, Fourth street, near Market, is well worth a visit, both from strangers and tourists, and also from residents of the city, many of whom are quite unaware of the extent of the collection which has grown up there.

During the last few months a gallery has been added to the museum, which has been filled with showcases, most of which are full of various objects of interest, such as fossils, corals, shells, Indian stone implements, etc.

The division devoted to the gold quartz mines of California has been increased by more than 50 per cent, and the representation of the silver ores of the State has also been largely extended. The "mineral collection" (as distinguished from the ores) has also been largely increased, and, together with the ores, entirely rearranged. The useful minerals and building stones of the State have had special attention paid them and are pretty well represented. Altogether about 1000 new specimens of ores and minerals have been added to the collection during this period, besides many sundries not yet catalogued.

Tin.

Although the first tin mine in the United States was found in San Bernardino county, California, yet the mine is still unworked, though it is about to be. Another deposit is reported lately in the same county. The tin deposits of Dakota, which have been known for some years, have been, for some strange reason, neglected, though within the past year the attention of English capitalists has been drawn to them. Doubtless before long we will have some practical results. There are many lodes, some of them carrying a high percentage of tin ore, and the whole tin region of Dakota ought to become prosperous as soon as capital assists the miners. A few weeks since the discovery of tin was announced in Nevada, but thus far little is known of the value or extent of the deposit, but it is not believed to amount to much.

It would seem, in view of these facts, that before very long tin will be one of the products of the United States to a practical extent. The Dakota deposits are the most advanced toward a producing point. A great deal of interest is manifested there, and very many claims have been located. It is to be hoped that the California deposits will be properly explored before long.

The Washington Centenary.

New York advices are heavily laden with the details of the celebration planned for April 30th in that city as the last of the series of centennial events, the formal seating of Washington in the Presidential chair. The event is one of crowning significance, and we trust Nature may smile upon the great occasion for thanksgiving and rejoicing.

The celebration of the event in California will be general. The day, April 30th, is a public holiday by proclamation of President and Governor. In San Francisco there will be a formal celebration, and other towns will no doubt commemorate the day appropriately. As the churches in New York in 1789 held fitting services, so the churches in 1889 will open their doors for prayer and praise. The occasion is one fit to arouse praise and patriotism in every loyal heart.

A. F. MCGREW, electrician of the San Francisco Underground Conduit and Electric Light Telegraph and Telephone Co., sent a communication to the Board of Supervisors submitting an ordinance granting to the corporation the right to construct, maintain and operate in this city pipes, wires, etc., for the transmission of messages, sounds and signals, and the production of power, heat and light by the aid of electricity. He requests the passage of the order.

THE UNION IRON WORKS' people announce that reporters will not be allowed to go on the trial trip of the cruiser Charleston. A "manifold" report will be delivered to the newspapers. This has put the reporters on their mettle to obtain independent reports.

PETROLEUM has been found at Ukiah, Mendocino county.

Fine Crushing of Ores.

The Blake multiple-jaw crusher, in combination with the ordinary Black rock-breaker, can be used in the reduction of ores to a great degree of fineness. Good practical results are shown in their use on a large scale on the gold ores of South Carolina and iron ores in New York.

Without giving any details with respect to the Haile gold mine, South Carolina. Fig 1 of the cuts shows the multiple-jaw crusher, which is the main feature of the mill.

The crushing appliances of the system consisted of one 20x10 Blake breaker, the product of that going to a 30x5, product of the 30x5 going to two 60x2 multiple-jaw crushers, each with three jaws, receiving capacity of 20x2 inches. The product of the 60x2 multiple crushers, approximately of corn-grain size, was finer. The central spindle, carrying horizontal axis on which the wheels revolved, had a speed of 40 revolutions per minute. Each wheel of the mill, weighing about a ton, was 4 feet in diameter and 8 inches face. The distance from outside to outside of the wheels was 50 inches, and the tyres were of hard white iron, having a cross-section 8x8 inches. The segmental dies on which the wheels ran were of best chilled iron. The shallow pan holding the dies was

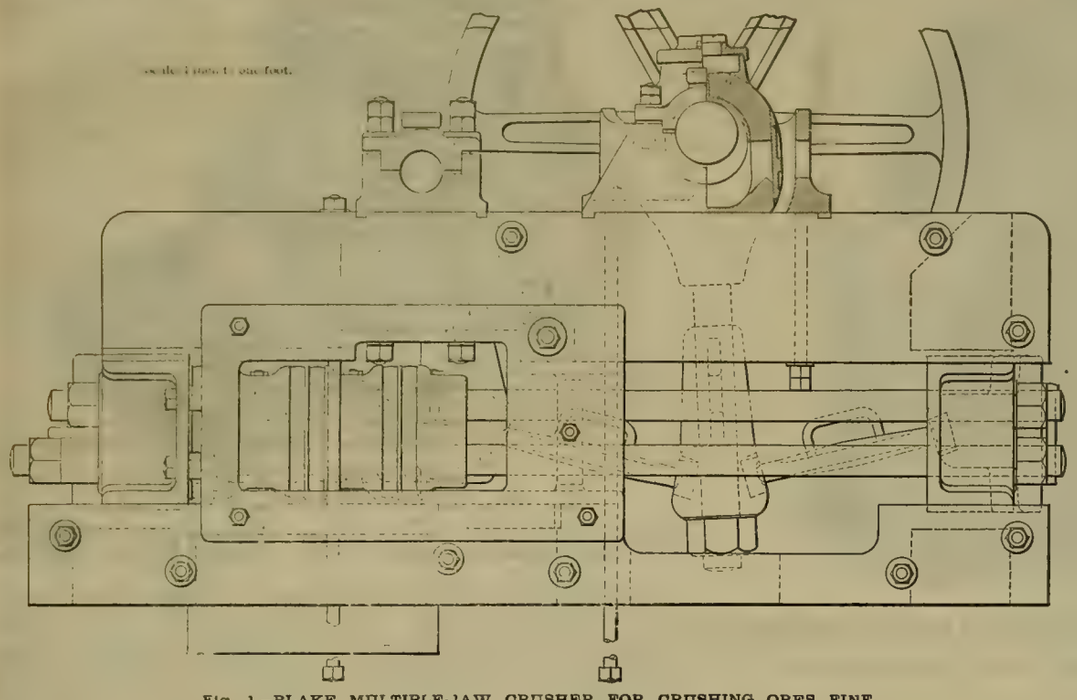


FIG. 1.—BLAKE MULTIPLE-JAW CRUSHER FOR CRUSHING ORES FINE.

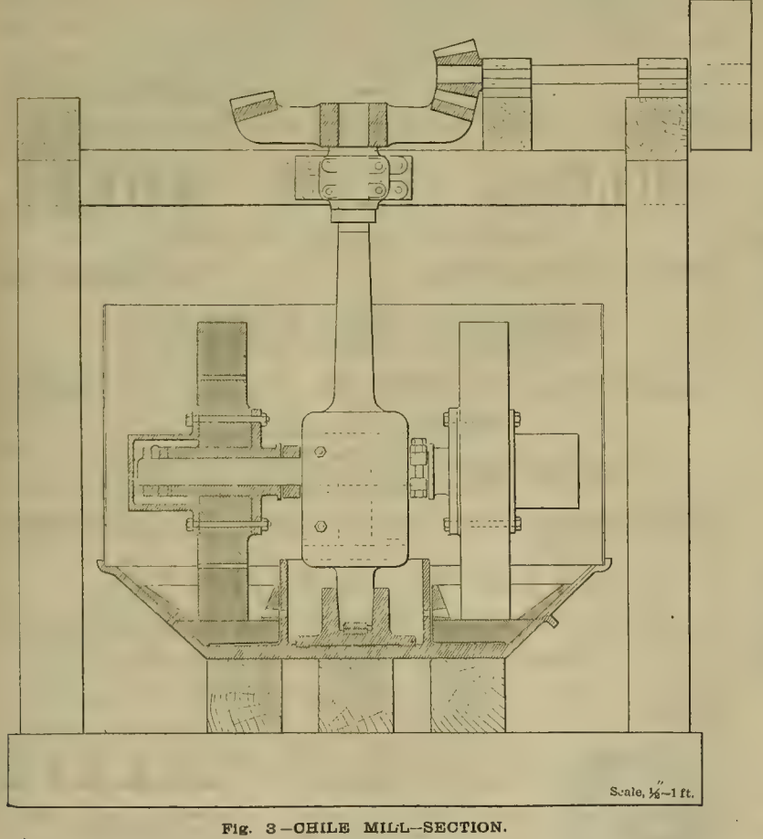


FIG. 3.—CHILE MILL—SECTION.

face, forming so many buckets which served to elevate the material which failed to pass the screens, and throw it on to an apron which carried it back to the mill. This screen was run in water, submerged to the depth of the rim—i. e., about 4 inches—and at the rate of 12 revolutions per minute.

No screens were used in the Chili mill itself; the crushed ore issued from openings on opposite sides and was, by the aid of water, discharged on to the inner periphery of revolving screens. The two Chili mills handled 7½ tons an hour.

Mr. Blake says: "I am without special items of cost of milling per ton of ore in the Blake mill at the Haile mine, and can only state in a very general way that it showed great economy of power and material after the introduction of the Chili mills. Its operations were not sufficiently great to determine the real facts with accuracy. Enough was shown by its working to prove that mills on this system for crushing and amalgamating or concentrating, or both, may in future come into general use, that their economy per ton of ore crushed, of power and material, is greater than that of the stamp-mill, and that there is no reason why they should not run with quite as much, if not with more certainty, and as continuously as the best stamp-mill ever built."

SAVAGE & SON.—An assignment for the benefit of creditors has been filed in the Recorder's office by John E. Savage and Richard Savage of the Empire foundry. The assignors state that they are unable to meet their obligations as they fall due and are insolvent. The total amount of liabilities aggregates $35,884.99, of which $33,537.46 are firm debts, $1850.90 individual debts of John E. Savage and $496 63 individual debts of Richard Savage. The principal creditors are Wm. T. Garratt, $1889; Huntington-Hopkins Company, $1808; C. R. Allen, $17,275; Hobbs, Wall & Co., $1166; and Holbrook, Merrill & Stetson, $8888.

MR. J. P. LAMBING has gone to Golden, Colorado, to build and operate one of his machines for working low ground, such as he has been operating at the Lambing mine, Amador county, for some years. We illustrated this machine in the PRESS not long since, and there is also a description of it in this year's report of the State Mining Bureau. There are many places where this hoisting or dredging apparatus is invaluable, as the gravel cannot be handled by any other means.

THE RAND ROCK DRILL CO. has issued a new illustrated catalogue, which, besides describing the various rock drills, compressors, fittings,

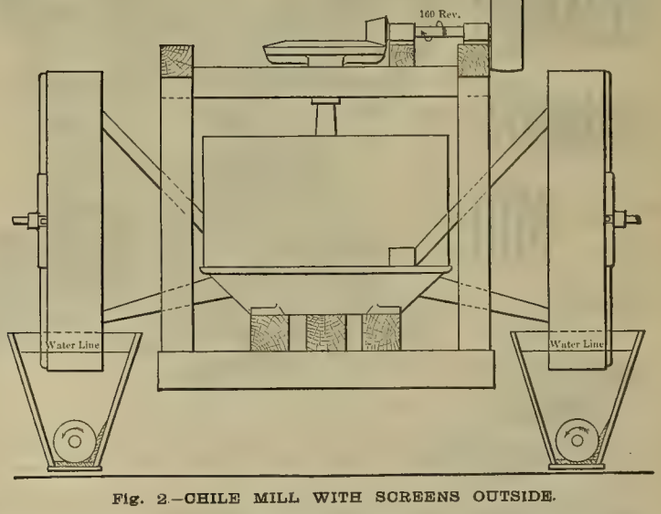


FIG. 2.—CHILE MILL WITH SCREENS OUTSIDE.

the different mills built upon the Blake system, it may be stated that, although it has proved possible to carry any hard and brittle material with crushers alone to a fineness such that all particles will pass a 30-mesh wire screen, still the economical limit of such crushing will be found somewhere between 14 and 20. If it is necessary to carry all the material to a fineness greater than this, the system must be supplemented with the arrangements. The material must be dry enough to screen readily.

Theodore A. Blake of New Haven recently described to the American Institute of Mining Engineers the mill built on this principle for elevated and screened through one-quarter-inch holes. That which did not pass the holes of the screens went to finer crushers. The material, one-fourth inch fine and finer, was elevated, screened through 40-mesh wire screens, and all that did not pass 40-mesh, that is, material between one-fourth inch and 40-mesh, went to the two Chili mills. (Figs. 2 and 3.)

The capacity of these mills, run as they were, was something wonderful—no one who has not seen one run as it should be can form an idea of the rapidity, economy and certainty of their work, when dealing with material already carried to one-quarter of an inch and surrounded by an inclosure of sheet iron 4 feet high, to prevent water and ore being thrown out by the splash of the rapidly revolving wheels. On each side of each Chili mill was a revolving tub-shaped screen, 8 feet in diameter and 18 inches face, turning on a horizontal axis extending from the side furthest from the mill.

The outer periphery of this was covered with wire cloth 35 meshes to the linear inch, of the coarsest possible steel wire, equal to 40 meshes with wire of ordinary fineness. The inner periphery of this tub-shaped screen, provided with a rim about 4 inches deep, was divided into six segments by wooden pieces across its

etc., contains much useful general information. The literature pertaining to drilling and excavation of ore and rock by machinery is quite scant, but in this catalogue they have compiled a great deal of material which will be useful to mining men. There are many illustrations showing the various methods of rock-drilling and the proper places for the holes, etc. Aside from its value as a trade catalogue, the little book will be found handy for reference in many particulars.

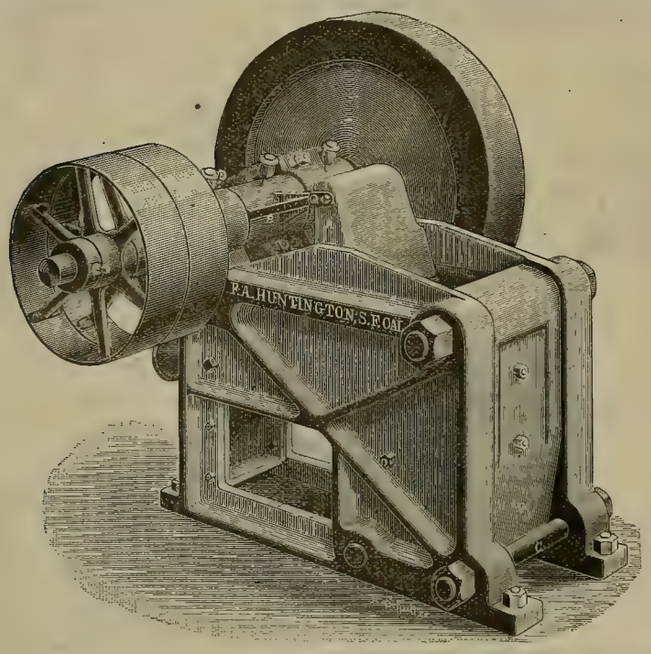
SOME very fine copper ore has been found at Golconda, Nev.

F. A. HUNTINGTON,

MANUFACTURER AND DEALER IN

STEAM ENGINES AND MINING MACHINERY OF EVERY DESCRIPTION.

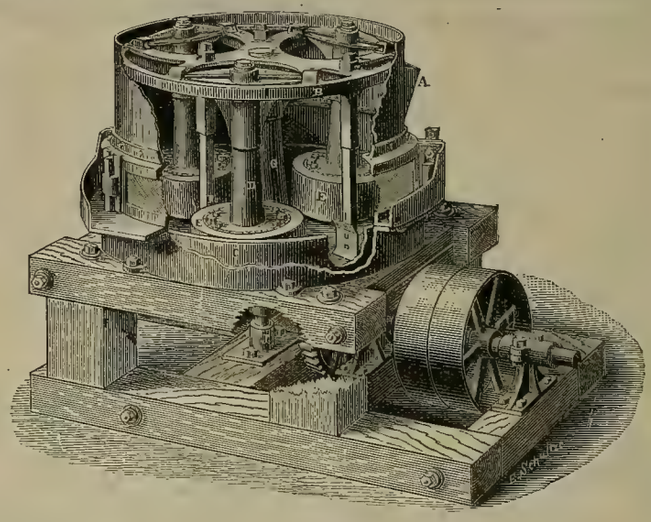
PRINCIPAL OFFICE, 45 FREMONT STREET, SAN FRANCISCO.



Huntington's Improved Rock-Breaker.

The main features of this machine are strength, ease of adjustment and simplicity of construction.

The movable jaw *A* is worked by the eccentric *B* and is pivoted at the bottom. The stationary jaw *D* is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt *C*. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt *C* and the jaw *D*. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



F. A. HUNTINGTON'S Centrifugal Roller Quartz Mill.

The following will explain the above cut:

The ore and water being fed into the mill at the hopper *A*, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

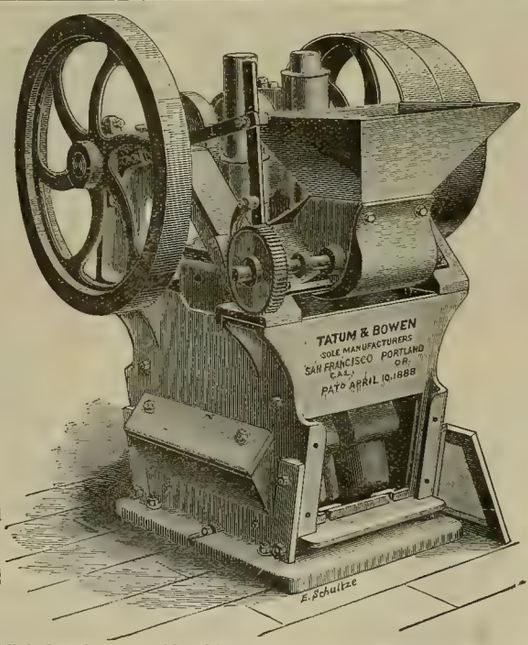
The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet crushing and gold saving it has no equal.

I claim especial merit in that feature of this system *which prevents* ALL FLOURING of gold and quicksilver, and the consequent loss of gold that attends stamp milling.

For the economical working of ore that contains sulphurets, I particularly claim the adaption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.

—THE—

PERFECTED DOUBLE Economic Quartz Mill.



Attached to each Mill is an effective

Automatic Ore Feeder.

THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

IMPROVED ROCK BREAKER.

Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address:

TATUM & BOWEN,

34 and 36 FREMONT ST., SAN FRANCISCO, CAL.,

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MANUFACTURERS OF MINING AND SAW MILL MACHINERY.

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Successors to SAVAGE, SON & CO.,

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MINING MACHINERY,

Stamp Batteries, Pans, Settlers, Etc. "Dodge" Rock Breakers, Pulverizers, Concentrators.

SAWMILL MACHINERY,

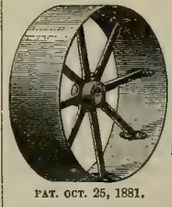
Refrigerating and Ice Machinery,

STEAM ENGINES,

CORLISS, MYER'S CUT-OFF, PLAIN SIDE-VALVE.

Shafting, Pulleys, Hanger and Boxes, Etc.

Special machinery of all kinds. We have a large list of Standard Patterns, Gears, Pulleys, Boxes, etc. REPAIR WORK SOLICITED.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

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MEDART PATENT WROUGHT RIM PULLEY

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

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Office of all Stage Lines leading out of Sonora. Fine Bar, Billiard, Reading and Sample Rooms. Everything first-class. Terms reasonable. C. S. FITCH, Proprietor.

Two-Wheeled Vehicles.

This title is strictly applied and confined to conveyances commonly called "carts," but known also as "dog carts," "village carts," etc. One would not think the field of invention in this sphere very broad, nor the necessity for improvement very urgent. Yet in no field has the march of improvement been more marked, or the resulting comfort to the public greater, than has taken place in this simple class. The list of those who have turned their successful attention to this subject is a long one, and we are happy to say that California has kept abreast of the times, and that as good a cart can be had of California invention and make as anywhere in the country. D. W. C. Putnam of Petaluma was the pioneer in this State. He early caught the fever and brought out a cart which for all-round service has stood every test and is deservedly popular. Not long behind him came G. G. Buckland of Tulare, S. W. Metcalf and S. G. Thompson of Santa Rosa, H. Hortop of Rutherford and J. A. Bliz of Pleasanton. By this time the fever was raging and carts were invented and brought out by Wright, Fowler & Shaw of Napa; D. R. McLennan of St. Helena; G. P. Kimball, since deceased, of San Francisco, and better known as the inventor of the "Kimball C Spring;" Jacob Price of San Leandro; W. T. Adel of San Jose; Geo. W. Dutton of Tomales; B. P. Whitney of Potter Valley; Daniel Carmichael of San Jose; Page & Raynor of San Bernardino; Nelson Peterson of Antioch; Willis O'Brien of San Francisco; Creighton & Taylor of Smith's Flat; Geo. Larsen of San Leandro; Geo. E. Guerne of Santa Rosa; W. T. Goodman of Fulton; F. A. Knox of Woodland; J. A. Gallagher of Stockton; L. St. Ores of Guadaloupe; Newell & Litton of Fresno; T. S. Bayley of Alturas; J. A. Sneed of Marysville; K. A. Brigham of Gilroy; Peter Glazer of Redding; J. G. Kenyon of Port Kenyon; Joshua Sovereign of Woodland, and some others.

Given a vehicle made up of an axle, two wheels, a body, springs for the body, and shafts, there does not seem much latitude in arranging them. The wheels must be on the axle, and the body, springs and shafts must be, in some way, connected with it. But if they are arranged in the manner of the old carts, the rider will get that unpleasant horse-motion which has always made carts of no value as vehicles for pleasure or the lighter pursuits. The horse cannot be prevented from jogging, and then the cart body rocks back and forth with the up-and-down movement of the horse. This is the justly obnoxious "horse-motion." The secret in overcoming this motion is to give to the body, in one way or another, sufficient independence of movement to enable the rider, unconsciously, to counteract the shaft movement.

This motion is not present in four-wheeled vehicles, because in them the shafts are pivoted or hinged to the axle and can move up or down with the jogging of the horse, and not communicate this movement to the body of the vehicle. But in two-wheeled vehicles this hinge connection of the shafts is not possible, unless other connections are used to keep the body from turning over.

The idea in all these improved carts is to give the body an independence sufficient to enable it to keep itself steady, and then to limit this independence by yielding connections, so that there will be no danger of swinging too far. This independence is not, in all cases, applied directly to the body, but is sometimes applied to it through the springs, which may be pivoted and limited, or through the shafts which are pivoted and limited, or are divided and limited so that the front portion only of the shafts rises and falls.

In one form or another all these improved carts succeed in doing away with the horse motion to such an extent that, when compared with the old-time carts, it may be said to be wholly obviated. It is doubtful whether carts will ever take the place of buggies or other four-wheelers, but they certainly find a place in the community, serving their purpose well, and on account of their cheapness and finished appearance are much sought after as novelties, and become necessities after being tried.

A RICH gold mine has been found near Rocky Mount, Franklin Co., Virginia, which promises to pan out better than anything before discovered in the State.

What a "Storage" Battery Is.

How electricity can be stored is a puzzling question with those who see the useful work it can be made to do. Electricity is a force, explains the Philadelphia *Ledger*, more subtle even than light, and the effort to retain it seems as chimerical as that to bottle sunshine. Reflection, however, will show that the latter marvel has been accomplished and is being put into service all about us. The coal from which our gas is made is the direct product of the chemical action of the sunlight of former ages, which is stored up not indeed as sunlight but as latent chemical energy. The process is exactly similar in the case of electricity. It is not absolutely electricity that the motor car carries about with it, stored away under the seats. Practically there is nothing there but a chemical battery, similar to the familiar cells of the galvanic battery seen oftenest in the telegraph-room, but differing from them in the important particular that these storage cells are double acting, so to speak, and that, while, like the chemical cell, they convert chemical energy into electrical energy, they are, beyond that, capable also of reversing the chemical process, under the influence of an outside electrical current, and thus converting electrical energy into chemical energy.

As long ago as 1860, M. Plante, a French scientist, after a long and careful investigation of the phenomenon known as "polarization" of chemical batteries, discovered that when two lead plates plunged in a bath of dilute sulphuric acid were subjected to the action of an outside electrical current, the water decomposed by the electric current set free oxygen in a "nascent" or newly born and very active condition at one plate, which would combine with the lead, while hydrogen was set free in little bubbles on the surface of the other. He also found that, when the current was stopped and the two terminals of the plates were connected together, the bubbles of hydrogen were reabsorbed and united with the oxygen of the oxidized plate to form water once more—that the oxide of lead was reduced to metallic lead, and that this reverse process was accompanied by the evolution of electricity. The process was of no practical utility at that time, and was exhibited by M. Plante to the French Academy of Sciences as a scientific curiosity.

The discovery came to no practical use for 20 years, when the dynamo-electric machine and the multiplied uses of electricity completely changed the surrounding circumstances. Then M. Faure, another Frenchman, took up the old discovery of Plante, and announced the important advance that it was not necessary to oxidize the plate originally by the electric current, that this could be more cheaply and very much more quickly done by chemical means, and the great problem was how to hold the oxide upon the surface. In order to do this he coated the lead plates with the oxide, and then inclosed them in parchment or other wrappings, which would allow chemical action to go on while preventing the scaling off of the oxide. The Faure battery was then presented to the world as the solution of the problem of storing elecricity. But the expectations of the inventor were not realized in that form. The parchment or textile covering, while tolerably efficient in holding the oxide to the metallic plate, was a barrier to the passage of electricity, and in spite of its use the plates were soon disintegrated by the chemical action and the battery became worthless.

Since 1880 the inventions to overcome these objections have been numerous, and the time has been too short to decide which, if any, of them has succeeded. As at present constructed, the storage battery consists of three parts, the "cell," the liquids and the plates. The cell is a vessel or box usually made of wood, lined inside with sheet lead, as the old tea-boxes were lined, except that it is made water-tight and is somewhat heavier. The liquid consists simply of dilute sulphuric acid. This was the fluid originally employed by Plante, and nothing better has since been discovered.

The plates are in two sets, positive and negative. The positive and negative plates alternate, each set being soldered together into a series, and then insulated from but fastened to the other series by a set of insulating bolts. The whole collection of plates is packed as closely together as the possible damage to the cell from alternate plates touching each other will admit, in order to reduce the internal resistance. They are of metallic lead, and when originally cast are in the form of agridiron, being perforated by numerous square holes, each side measuring about a quarter of an inch. These apertures are then filled with a composition whose principal constituent is litharge, which is a lower oxide of lead. The apertures are so formed as to securely hold the litharge in position, thus obviating the necessity for the use of parchment or other material, and offering very slight impediment to the flow of the electric current.

When a current of electricity of proper volume and strength, which may be procured from any source, but preferably from a dynamo-electric machine, is made to flow through such a battery, a chemical change occurs. The current in flowing from the negative plate to the positive decomposes the litharge in these cells, and the water of the surrounding liquid, oxygen, is removed from the litharge, producing metallic lead, but in the spongy form. Oxygen is removed from the water, leaving hydrogen which is held in the pores of the spongy lead. On the positive plate the free oxygen attacks the litharge, uniting with it and forming the "red lead" of commerce, which is an oxide of lead containing more oxygen than litharge. A portion of the oxygen also attacks the lead plate itself and oxidizes it. This process is continued until the spongy lead and the negative lead plate are no longer capable of holding on to the hydrogen, which then commences to escape.

The foregoing has reference to the charging or "storing" of the cells with energy. When the cell is doing its work the process just described is reversed. The oxygen of the positive plate leaves the higher oxide and unites with the hydrogen and the spongy lead to form once more litharge and water. This action evolves the energy in the form of electricity in amount proportional to the amount of energy originally put into the battery to separate the elements, and the electricity as given out may be put to useful work, whether of driving an electric motor or of lighting streets and houses. When the process is finished—when the spongy lead has become oxidized and the hydrogen reabsorbed, the battery is exhausted, but it is in the same condition it was before the charging was commenced. Again a current of electricity may be passed through it, again its elements will decompose, and again it will be ready for useful work.

In the course of time (how much time is an important question) the lead frame becomes so weakened by repeated oxidation and reduction that it is unable to support its weight, and crumbles under the strain. It will be observed, however, that in all these processes there is theoretically nothing lost, except a small amount of power inseparable from every transference of energy. The material of the battery can be recovered.

It is always to be borne in mind that the first force by which the cell is charged with electrical energy is mechanical force, whether in the form of a steam engine, a gas engine, a waterfall or some other source of mechanical power, and it is the cost of this power to which must be added the loss incurred in the use of a storage battery which makes up the chief cost of the storage battery. How much that cost of fuel and material is, is the one chief matter upon which we have not yet got precise or full information. It is said, however, to be less than the cost of maintaining horse-power.—*Chicago Journal of Commerce.*

Mining Share Market.

The past week witnessed renewed activity in the Comstock stocks, with decided and attractive fluctuations. On Friday, April 19th, the market made a sudden advance of from $1 to $3.50 a share, scaring a large number of the shorts to cover, after which prices declined rapidly until by the following day they had fallen off fully 30 per cent which was followed by another decline under a bear raid of about 10 per cent on Monday morning. The leaders, Mexican and Union, suffered the most in the decline, for in the other stocks there appeared to be good sustaining orders after a drop of from 20 to 30 per cent. Outside of some bears filling their shorts, the purchases at the higher prices were made by the "pool." After the first break there was some outside buying, but two more setbacks frightened many into selling. Among those who are in position to know, it is claimed that the market is in good position for more of a bull movement than heretofore had, which, if correct, will allow holders who do not want the earth to get out at a good profit. Experience has demonstrated that the average dealer wants everything, and in being too grasping loses all and then condemns everybody but the proper person—himself. The recent moves in the Comstocks are causing the Quijotoas and the Bodies to show more activity, but they fail to attract attention, owing to dealers having no confidence either in the mines or the way in which the stocks are handled. The Tuscaroras receded some, but reacted under strong points put out on the street, and glowing telegrams from one or two of the mines.

News of a reliable character from the Comstock is very difficult to get, and in its absence the feeling among outside dealers is unsettled, and feverish and in such a condition that they can be easily influenced in any desired direction. The conflicting reports are well illustrated by well-informed parties stating that in the Mexican upraise they run out of ore, while in Union water is coming in in the face of the crosscut. On the other hand, equally as well-informed parties say that in the upraise they have 12 feet of good ore, and in Union the formation of the rock indicates a near approach to the ore body. Our own advices, while not so good as desired, are of an encouraging character, with the prospects very favorable, but more work is required to demonstrate the value of the find in Mexican and what will be found in Union. From Hale and Norcross our advices continue very encouraging, as are those from Savage, Crown Point, Belcher and Seg. Belcher. Favorable advices are expected from Alpha, Yellow Jacket and Challenge. Crosscutting in Con. Imperial is to be started soon. In Sierra Nevada the east drift promises to open up a large area for active prospecting later on. In Potosi and Chollar more favorable news is looked for at an early day.

The ore yield of the Comstock the week ending April 20th aggregated 7181 tons, divided as follows: Con. Cal. and Va., 3016 tons, assay value, $29.10; Best and Belcher, 116 tons, assay value, $18.56; Savage, 490, assay value, $19.32; Hale and Norcross, 1012 tons, assay value, $28.40; Chollar and Potosi, 500 tons; Challenge and Confidence, 400 tons, assay value, $26.35; Crown Point, 907 tons, assay value, $21.16; Overman, 240 tons; Alta and Justice, 500 tons. The total bullion yield of the above was $155,000.

DR. C. C. PARRY, a distinguished botanist, is again on the coast collecting materials for a botanical monograph.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING APRIL 16, 1889.

401,484.—WATER-WHEEL — Willis G. Dodd, S. F.

401,432.—BOTTLE-TAP—E. H. Griswold, Baker City, Ogn.

401,440.—COMBINED WRITING-DESK, ETC.—H. L. Keith, Stockton, Cal.

401,358.—SAFETY CAR HEATING STOVE—Locke & Thayer, S. F.

401,446.—PROPELLER—E. Lotze, Spokane Falls, W. T.

401,457.—ORE CONCENTRATOR—J. H. Pemberton, Los Angeles, Cal.

401,510.—STACK PROPELLER—J. A. Robb, San Jose, Cal.

401,463.—CALCULATING MACHINE—E. M. Rosenthal, San Jose, Cal.

401,471.—PNEUMATIC ALARM FOR RAILROAD—T. Taylor, Cedarville, Cal.

401,472.—ELECTRIC RAILROAD TRACK ALARM—T. Taylor, Cedarville, Cal.

401,522.—SHEET-METAL LATH MACHINE—J. Weichhart, S. F.

401 523.—SHEET-METAL LATH MACHINE—J. Weichhart, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

WINANS' BOILER COMPOUND.—One very intelligent and capable engineer says: "Yes, that compound removes scale, but I do not want it; it makes my boiler leak," forgetting that the presence of the scale is the cause of the leak, for the reason that while the scale had been forming the additional heat that it had been necessary to use to maintain the required steam had weakened or burned the ends of his tubes; consequently, when it was removed the leaky places were made manifest. That boiler needed repairs then. After a little, although compound was refused, it became imperative to repair, and while that job was in progress, large quantities of scale were removed. As a proof that Winans' compound does not cause leaks or injure iron, many locomotive stationaries and marine boilers can be shown that have had a prolonged use of this article. When with one accord chief engineers, with first, second and third assistants, even down to water-tenders and firemen who do the actual work of cleaning the boiler, each and all declare that the results are good and they can see no injury, but on the other hand benefit, the maker and vender can offer and urge its use despite all prejudice to the contrary.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Savage, April 22, $7175; Nevada Queen, 22, $10,000; Confidence, 22, $16,967; Moulton, 15, $18,855; North Belle Isle, 18, $10,000; Bluebird, 13, $17,472; Lexington, 13, $12,000; Crown Point, 19, $7457; Con. California and Virginia, 19, $64,000; Lexington, 18, $28,000; Hanauer, 16, $3700; Queen of the Hills, 17, $1150; Hanauer, 17, $2100; Queen of the Hills, 19, $750; Hanauer, 19, $1700; Hale and Norcross, 20, $27,150; Justice, 19, $2722; Mt. Diablo, 19, $8954.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

A. F. JEWETT—Tulare Co.
F. B. LOGAN—Southern California.
H. G. PARSONS—Southern California.
GEO WILSON—Sacramento Co.
J. C. HOAG—San Francisco.
CHAS. F. BLACKBURN—Idaho.
FRANK S. CHAPIN—Colusa Co.
MRS. E. J. STEPHENS—Sierra Co.
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THE CHINESE HYDRAULICKERS arrested at Omega for violating the anti-debris injunctions have been found guilty of contempt of court and fined $500 each, with the alternative of 500 days imprisonment. There are 20 of these men, and they have all been sent to jail.

GOVERNOR WATERMAN has made a written offer to dispose of his Cuyamaca ranch, including the Stonewall gold mine and mill, San Diego county, for $2,000,000. There has been some controversy on the subject, and it has been said he had refused $5,000,000.

THE San Jose Electric Road Co. has been granted three months more in which to put the road into working shape.

FOR WATER WORKS
AND GAS PLANTS,
CONVERSE PATENT LOCK-JOINT PIPE.
Strength, Durability, Economy.

SEND FOR DESCRIPTIVE CATALOGUE.

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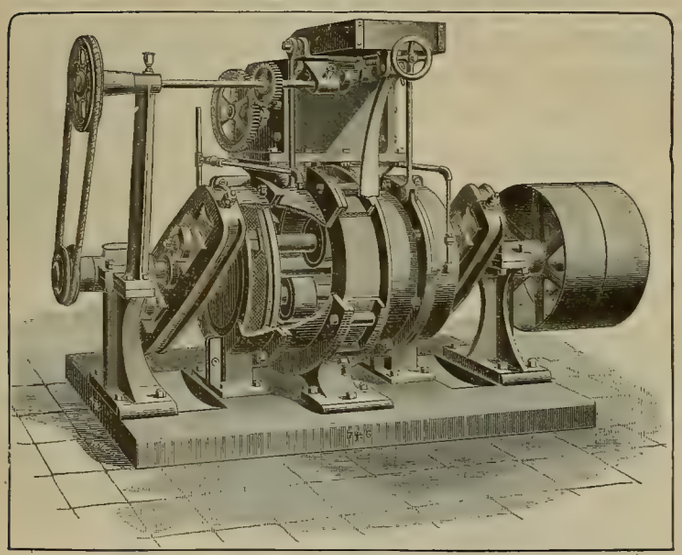
This Mill, with a weight of less than 9000 pounds has a capacity of three tons per hour of hard quartz to 40 mesh; has been thoroughly tested; we guarantee its work as represented, and we will give long time trial.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

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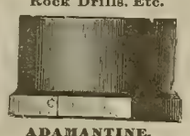

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GOLD SEPARATOR

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VULCANIZED RUBBER FABRICS

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EMERY WHEELS.

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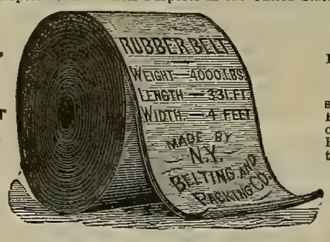

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THE HIGHEST AMERICAN TUNNELING RECORD.

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For Mines, Tunnels, Quarries, Sewers, Grading, etc.

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Stamp Mills for Wet or Dry Crushing. Huntington Centrifugal Quartz Mill. Drying Cylinders. Amalgamating Pans, Settlers, Agitators and Concentrators. Retorts, Bullion and Ingot Moulds, Conveyors, Elevators, Brückners and Howell's Improved White's Roasting Furnaces, Etc.

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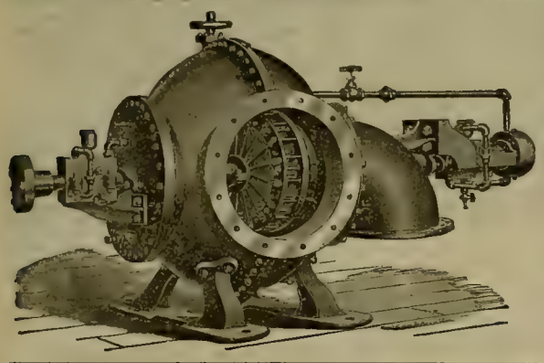

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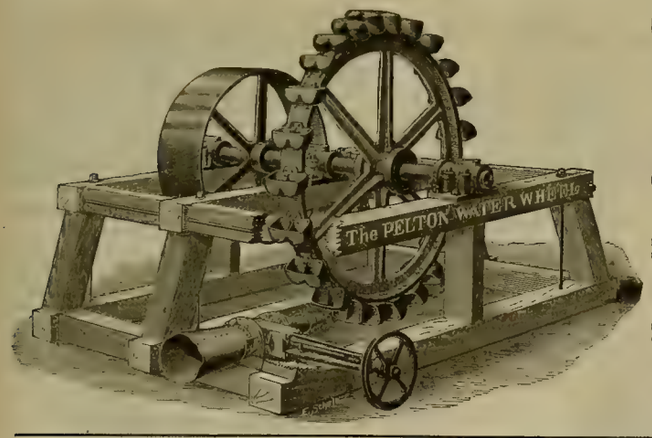

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Over 600 in use on the Pacific Coast alone, aggregating upwards of 50,000 Horse Power.

It is not only most economical of water, but the most simple and reliable power for Quartz Mills, Compressors, Hoisting, Pumping, or any other purpose where water power can be used.

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Power from these Wheels can be transmitted long distances with small loss, and it is now being extensively used in this way in all parts of the country for producing both light and power.

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MARKET REPORTS.

Local Market.

SAN FRANCISCO, April 25, 1889.

Trade continues good for the season, with a decided increase in the volume of goods going out looked for in the next month. As a rule, retail merchants place chiefly assortment orders, not caring to stock up yet awhile. Indications point to a very active campaign this year; this is the more plainly seen in the putting into execution of many contemplated improvements, which will cause the disbursements of large sums of money; this has particular reference to buildings. In this city, the plans for many new and expensive structures are being mapped out; one by the Young Men's Christian Association to cost about $100,000. The same association will erect another in Oakland to cost $50,000. These buildings will require considerable iron. A canvass among iron-workers, while confirmatory of prevailing dullness, shows that there is a gradual increase in orders coming in, with the outlook very flattering for more activity soon. The money market continues easy, with the rate of interest for call, and short loans favoring borrowers. The call for money from the wool interest is increasing. There is an almost entire absence of any kind of speculative movement outside of the effort being made to galvanize mining stocks into new life. Remittances from the interior are good for the season. The following is the receipt of treasure by water the past week: Coin, $1150 from Port Harford; $710, Honolulu; $717, Portland; $46,903, Victoria, B. C.; $32,206, Seattle; $300, Port Townsend. There were two heavy consignments of silver bullion from Mexico, but the amounts could not be ascertained. The steamer leaving the past week for China took out for Hong Kong, Mexican dollars, 256,223; gold coin, $5231; silver bullion, $263,000. For Hiogo, silver bullion, $92,000.

To-day stocks were quite active, with a strong bear raid on the Comstocks after the 9:30 informal session, and a bull move in the Bodies. The Bodie assessment of 50 cents a share is delinquent on Saturday of this week.

SILVER—The market has shown a fair degree of steadiness the past week, ranging from 92½@92¾c, with some placed slightly higher. To-day's quotations, based on the London quotations of 42½d, are 92 to 92¾c. At 42½d the parity here is over 92¾c. The output of the mines on this coast is still light, with the outlook not at all favorable for any material increase in the near future.

MEXICAN DOLLARS—The market has ruled fairly steady at from 73¾ to 73¾c, but at the close, buyers are not disposed to take any large quantity, except at a concession.

QUICKSILVER—The market is very quiet, with quotations more or less nominal. Receipts the past week were 120 flasks, of which Haas Bros. received 75, and Knox & Osborn, 45.

TIN—The market for pig is reported quite strong at the advanced quotations. Tinplate is easy, with only a fair demand reported. The shipments the past week to British Columbia were 10,045 lbs. pig, and 193,536 lbs. tinplate. There was shipped by sailing vessel to New York, 33,394 lbs. of tin scraps.

LIME—Receipts the past week aggregated 7551 barrels, and the preceding week 4552 barrels. The consumptive demand is reported to be good, but the outward movement is quiet.

BORAX—The market is steady. Receipts the past week aggregated 944 cts., and the shipments 56,612 lbs., of which 24,576 lbs. went to Cedar Rapids, Iowa, and 22,136 lbs. to Chicago.

COPPER—The market is quiet, with a weak, unsettled feeling reported. There was shipped the past week to New York, 915 lbs. copper and 179,180 lbs. copper ore.

CHROME ORE—The market is quiet, but steady. There was shipped the past week to New York, 431,880 lbs.

IRON—The market for spot is barely steady, but for prompt shipment it is strong. There was received the past week 300 tons of pig from Puget Sound.

COAL—Receipts the past week were as follows: From Seattle, 7207 tons; Coos bay, 2050; Departure bay, 700; Nanaimo, 852; New York, 100; Baltimore, 1901; Australia, 4980. Total, 17,790 tons.

A decline of $1 a ton is reported in the yard prices for Scotch splint, Greta and Sydney. The market for all kinds is weak and easy; 1901 tons of Cumberland came to hand the past week. Its receipt will probably not cause any decline.

Eastern Metal Markets.

By Telegraph.

NEW YORK, April 25, 1889.—The following are the closing prices the past week:

	Silver in London	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42 3-16	92½	$13 75	$3 67½	$20 70
Friday	——	——	——	——	——
Saturday	42 3-16	92½	13 75	3 70	20 70
Monday	42 3-16	92½	13 50	3 65	20 80
Tuesday	42 3-16	92⅝	13 50	3 65	20 85
Wednesday	42½	92	13 50	3 65	20 75

NEW YORK, April 24.—No late session in copper. Lake is offered at 14¾c for April, 14¼c for May, 14c for June. Merchantable, $11.70, April, down to $9 70 for July. The decline in London and the unsettled condition at Paris caused an uncertain tone. The visible supply in Europe is 126,720 tons. Quicksilver, 57@58. Borax is steady. Refined and powdered, 8¾@9½; concentrated, 7¾@8¾c. Pig lead is without material change. Cash sale, 50 tons at $3.70 for June.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, April 25, 1889.

ANTIMONY—	—	@ 14
BORAX—Refined	7¼	@ 7⅞
Powdered	7¼	@ 7⅞
Concentrated	7	@ 7⅛
COPPER—		
Bolt	26	@ 27
Sheathing	26	@ —
Ingot	17½	@ 18½
Fire Box Sheets	—	@ 26
LEAD—Pig	4½	@ —
Bar	5	@ —
Sheet	8	@ —
Pipe	7	@ —
Shot, discount 10% on 500 bags	Drop, ℔ bag. 1 45	@ —
Buck, ℔ bag	1 65	@ —
Chilled, do	1 85	@ —
STEEL—English, lb	16	@ 20
Canton tool	9½	@ —
Black Diamond tool	10	@ 16
Pick and Hammer	8	@ 10
Machinery	4	@ 5
Toe Calk	4¼	@ —
TINPLATE—Coke, prompt shipment	4 80	@ 4 85
Coke on spot	4 60	@ 4 65
Charcoal, IX 20	6 50	@ 7 00
do roofing, 14x20	5 37½	@ 5 50
Pig tin, ℔ lb	24	@ 25
QUICKSILVER—By the flask	—	@41 00
Flasks, new	1 05	@ —
Flasks, old	85	@ —
COKE—English, ton, spot	20 00	@— —
Do, do, to load	13 50	@13 75
	Spot.	To Load.
IRON—Glengarnock ton	27 00 @—	27½@ —
Eglinton, ton	26 00 @—	26½@ —
American Soft, No. 1, ton	—@31 00	31½@ —
Oregon Pig, ton	— —@30 00	— @ —
Clay Lane White	— —@24 50	25 @ —
Shotts, No. 1	28 50 @29 00	— @ —
Bar Iron (base price) ℔ lb	2½@ 3	— @ —
Chrome iron ore, ℔ ton	— —@10 00	— @ —

Coal.

TO LOAD.

	Per Ton.		Per Ton.
Australian	$ 6 50 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	6 00
Scotch Splint	8 00	Seattle	6 50
West Hartley	10 00	Coos Bay	5 00
Greta	8 00	Cannel	10 00
Westminster Brymbo	8 00	Egg, hard	16 00
Nanaimo	9 00	Cumberland, in sacks	18 50
Sydney	$ 8 00	do, bulk	17 50

Sales at San Francisco Stock Exchange.

THURSDAY, Apr. 25, 9:30 A. M.

300	Alta	100	Justice 1.40
300	Andes 90c	710	Mexican 5.62½
100	Alpha 2.25	150	Mono 1.70
150	Belcher 4.40	100	Navajo 90
110	B. & Belcher 4.40	100	New York 25c
300	Belle Isle 20c	100	Nev. Queen 2.30
550	Bodie 1 60	200	N. Commonwealth 1.20
400	Bonanza 30c	350	Overman 1.50
100	Bullion 1.05	300	Ophir 5.75
100	Chollar 2.80	50	Occidental Con 1.25
200	Commonwealth 5.12½	350	Potosi 2.10
20	Crocker 50c	100	Peerless 75c
50	Crown Point 4 60	30	Savage 3.10
100	Con Va & Cal 8.12½	500	Scorpion 60c
100	Con. Imperial 70c		S. F. & M 3.00
100	Delmpnt 1.30	239	Sierra Nevada 4.00
120	Eureka Con 3.00	100	Silver King 1.05
50	Gould & Curry 2.95	200	Utah 1.50
100	Hale & Nor 4.75	100	Union 5½
100	Iowa 50c	150	W Comstock 60c

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A practical exposition of the various departments of Geology, Exploration, Mining, Engineering, Assaying, and Metallurgy.

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BY J. S. PHILLIPS, M. E.

The work is divided into four parts—Rocks, Veins, Testing and Assaying. The geological chapters are intended to give miners a practical idea of the various formations. The chapters on mineral veins are derived from long observation, and the section on exploration has been carefully considered. All that relates to discrimination and assay of minerals has been kept as free from formulæ as possible. The work is written for practical men, and all the explanations and descriptions are clear and to the point. It is so prepared that it is useful to uneducated men as well as scientists.

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ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T. LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS
Belle Isle M Co	Nevada	12	10	Apr 19	May 23	June 13	J W Pew 310 Pine St
Bodie Con M Co	California	10	50	Mar 25	Apr 30	June 4	B L Burling 309 Montgomery St
Bulwer Con M Co	California	5	25	Apr 10	May 15	June 12	L Osborn 309 Montgomery St
Calaveras Blue Gravel M Co	Cal	2	05	Mar 28	May 27	B Burris 240 Montgomery St
Eureka Con M Co	Nevada	11	50	Mar 19	Apr 27	May 20	H P Bush 306 Pine St
Exchequer M Co	Nevada	27	25	Apr 2	May 7	May 28	C E Elliott 309 Montgomery St
Found Treasure M Co	Nevada	5	12½	Apr 10	May 16	June 6	J Stadfeld Jr 309 Montgomery St
Gray Eagle M Co	California	12	05	Mar 19	Apr 23	May 14	O H Bogart 327 Pine St
Grand Prize M Co	Nevada	20	30	Mar 15	Apr 20	May 13	R E Grayson 327 Pine St
Los Putos Coal, Iron & Mang Co	Cal	1	1½	Mar 25	Apr 30	May 20	W C Stadfeld 309 Montgomery St
Mexican M Co	Nevada	37	25	Mar 5	Apr 10	Apr 30	C E Elliott 309 Montgomery St
Mono M Co	California	27	50	Feb 28	Apr 2	May 8	B L Burling 309 Montgomery St
North Commonwealth M Co	Nevada	2	30	Apr 3	May 8	May 30	J W Pew 310 Pine St
Oak Con M Co	California	1	03	Feb 25	Apr 8	Apr 23	E J Ryan 230 Montgomery St
Occidental Cons M Co	Nevada	4	50	Apr 8	May 13	June 5	A K Dustron 309 Montgomery St
Peerless M Co	Arizona	12	25	Mar 25	Apr 26	May 21	A Waterman 309 Montgomery St
Pinal Con M Co	Arizona	8	13	Apr 13	May 20	June 12	A Cheminant 328 Montgomery St
Potosi M Co	Nevada	32	50	Apr 10	May 15	June 5	C E Elliott 309 Montgomery St
San Francisco Copper Co	California	3	10	Mar 18	Apr 23	May 21	G Ruegg 405 California St
Silver Hill M Co	Nevada	24	20	Apr 20	May 23	June 13	D C Bates 309 Montgomery St
Sierra Nevada M Co	Nevada	94	25	Mar 5	Apr 9	Apr 29	E L Parker 309 Montgomery St
Taylor M & M Co	California	17	3.00	Mar 20	May 1	May 18	A E Ball Mechants Ex
Utah Con M Co	Nevada	6	25	Mar 5	Apr 10	Apr 29	A H Fish 309 Montgomery St
Yellow Jacket M Co	Nevada	48	50	Mar 28	May 1	June 1	W H Blauvelt Gold Hill

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Commonwealth Con M Co	Nevada	H Deas	309 Montgomery St	Annual	May 8
Excelsior Water & M Co	California	W J Stewart	215 Sansome St	Annual	Apr 27
Justice M Co	Nevada	R E Kelley	419 California St	Annual	May 8
Con Imperial M Co	Nevada	O L McCoy	325 Pine St	Annual	May 2
Amador Volcanic Hydraulic M Co	Cal	M Casey	508 California St	Annual	May 1
Peabody G M Co		B Matorp	109 California St	Annual	Apr 29

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	Apr 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Apr. 4.		WEEK ENDING Apr. 11.		WEEK ENDING Apr. 17		WEEK ENDING Apr. 24.	
Alpha	1.55	1.80	1.70	1.75	1.55	1.95	2.00	2.75
Alta	2.05	2.25	2.15	2.25	2.00	2.10	2.00	2.60
Andes	.75	.80	.75	.80	.70	.85	.85	1.10
Argenta	....	.05	....	....	....	....	....	....
Belcher	3.05	3.50	3.15	3.35	3.15	3.50	3.45	5.00
Brophy	....	....	....	....	....	....	....	....
Best & Belcher	3.75	4.15	4.00	4.35	3.90	4.50	4.25	6.00
Bullion	.70	.85	.75	.85	.70	.80	.80	1.30
Baltimore	.25	.35	.25	.33	.25	.30	.30	.35
Belle Isle	.25	.30	....	....	....	....	....	.20
Bodie Con	1.00	1.20	1 60	1.20	1.05	1.10	1.10	1.45
Benton	....	3.75	3.50	....	....	3.00	....	3.00
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.30	.35	.35	....	.20	.30	.30	.35
Con. Va. & Cal	8½	89	7⅞	8.50	7⅞	8.5	8.00	9.00
Challenge	3.75	4.00	3.70	3 85	3.60	3 90	3.80	6.00
Chollar	2.10	2.40	2.10	2.40	1.95	2.3	2.30	3.50
Confidence	12	12⅛	12⅜	12⅜	11	11¼	10	11⅞
Con. Imperial	.55	.65	.55	.60	.55	.60	.65	.90
Caledonia	.30	.35	.30	.35	.30	.35	.35	.40
Con. Pacific	....	....	....	....	....	....	....	....
Crown Point	3.70	4.35	3 85	4.25	3.75	4.05	4.00	5.25
Crocker	.45	.60	.55	.60	.45	.55	.50	.60
Central	....	....	....	....	....	.20	....	....
Dudley	....	.25	.30	....	....	....	....	.20
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	.75	1.20	1.15	....	1.10	1.20	1.30	2.50
Exchequer	.65	.75	.60	.70	.60	.75	.70	1.10
Grand Prize	.65	.80	.70	.75	.70	1.00	.80	1.00
Gould & Curry	2.20	2.50	2.30	2.50	2.20	2.60	2.60	3.80
Hale & Norcross	4.05	4.45	4.15	4.50	4.10	4.40	4.30	5.25
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	....	.30	.35	....	.25	.35	.30	.45
Justice	1.20	1.30	1.20	1 25	1.10	1.25	1.20	1.60
Kentuck	1.65	1.75	....	....	....	....	1.90	2.35
Lady Wash	....	.40	.35	....	....	.35	....	.40
Locomotive	....	....	....	....	....	....	....	.10
Martin White	....	....	....	....	....	....	....	....
Mono	.50	1.00	1.25	1.30	.20	1.25	1 40	1.55
Mexican	3.00	3 45	3.35	4 45	3.85	3⅝	5.25	8⅜
Mt. Diablo	....	2.75	....	....	....	....	....	....
Navajo	.95	1.10	1.00	....	.85	.80	.80	.95
North Belle Isle	2.50	3.00	2.90	3.00	2.60	2.65	2.25	2 50
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.85	3.00	2.95	3.00	2.55	2.65	1.95	2.55
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.20	1.30	1.00	1.20	1.00	1 10	1.10	1.50
Ophir	5⅜	5⅝	5⅝	5⅛	5⅛	5⅜	5.25	7⅛
Overman	1.25	1.30	1 20	1.30	1.20	1.35	1.35	1.70
Potosi	1.85	2.15	1.80	2.75	1.60	1.85	1.80	2.75
Peerless	.40	.45	.40	.50	.40	.45	.40	.55
Pecr	....	....	.30	.35	.25	.35	.30	.35
P. Sheridan	....	....	....	....	....	....	....	.05
Silver Star	....	....	....	....	....	....	....	....
Savage	2.40	3.00	2.60	2.80	2.55	2.90	2.75	4.00
Sierra Nevada	2.65	2.80	2.70	2.90	2.45	2.65	2.60	3.60
Silver Hill	.50	.55	.50	....	.45	.50	.50	.65
Silver King	....	.85	....	....	....	....	.65	.70
Scorpion	.45	.50	.50	.55	.50	.65	.50	.85
St. Louis	....	....	....	....	....	....	.30	.50
Syndicate	....	....	....	....	....	....	....	....
Union Con	3.05	3.10	3.30	4.05	3.55	5⅜	5.00	7.75
Utah	.80	1.05	1.15	1 30	1.15	1.45	1.35	1.90
Yellow Jacket	3.25	3.80	3.25	3.40	3.10	3.40	3.10	4.20
	....	....	....	....	....	....	....	....

DELINQUENT SALE NOTICE.

Gray Eagle Mining Company—Location and principal place of business, San Francisco, California. Location of Works, Placer County, Cal.

NOTICE—There are delinquent upon the following described Stock, on account of Assessment (No. 12) levied on the 19th day of March, 1889 the several amounts set opposite the names of the respective shareholders, as follows:

NAME.	No. Certificate.	No. Shares.	Amt.
Blaney, W E	284	20	$ 1 00
Bogart, O H, Trustee	420	10,000	500 00
Chase, Q A, Trustee	419	3,814	190 70
Gray, H W, Trustee	181	500	25 00
Horton, Thos R, Trustee	51	5 000	250 00
Horton, Thos R, Trustee	315	5,000	250 00
Hall, H E, Trustee	372	1,000	50 00
Rosekrans, H M	39	600	30 00
Taylor, J N	102	1,000	50 00
Taylor, J N	330	40	2 00
Waller, L P F, Trustee	276	300	15 00
Waller, L P F, Trustee	367	3,000	150 00
Winter, T P, Trustee	396	500	25 00
Winter, T P, Trustee	397	500	25 00

And in accordance with law, and an order of the Board of Directors, made on the 19th day of March, 1889, so many shares of each parcel of such stock as may be necessery, will be sold at public auction, at the office of the Company, 327 Pine Street, Room 9, San Francisco, California, on Tuesday, the 16th day of May, 1889, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of the sale.

H. BOGART, Secretary.

Office, 327 Pine Street, Room 9, San Francisco, California.

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Some time ago an official of the Erie railroad is reported to have said:

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Geo. W. Thompson, formerly a rancher and partner with one of the proprietors of this journal in a 220 acre ranch near Oakland, who is now at Sag Harbor, N. Y., has made what he believes to be a practical and valuable improvement in metal railroad ties. The drawings and descriptions of the device are given on another page of this number of the PRESS.

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THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No 1, 32 ft; No. 2, 9½ ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

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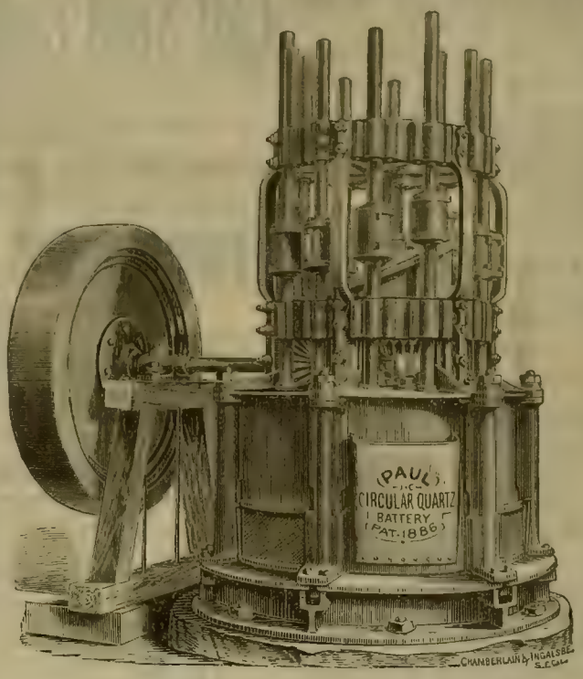

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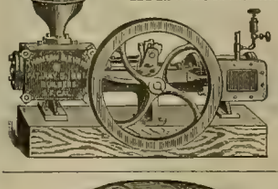

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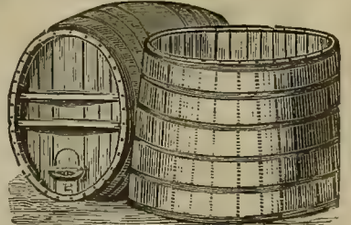

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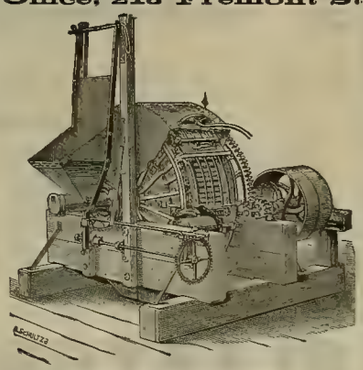
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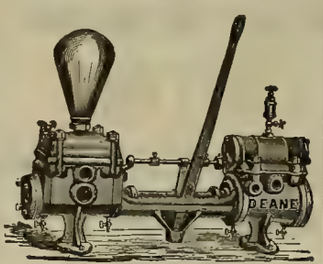

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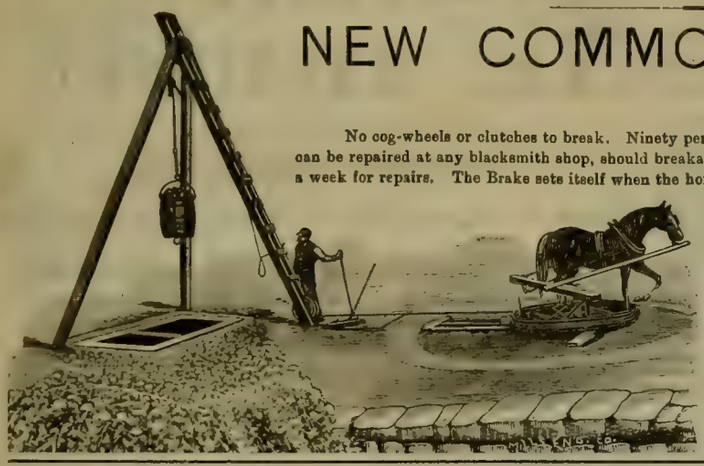

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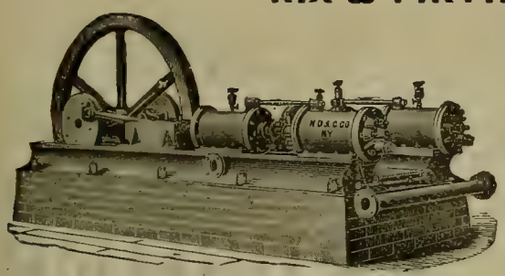

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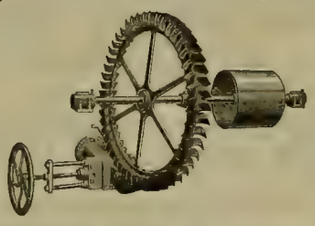

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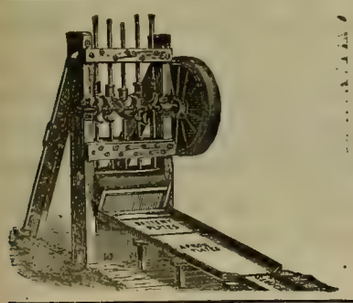

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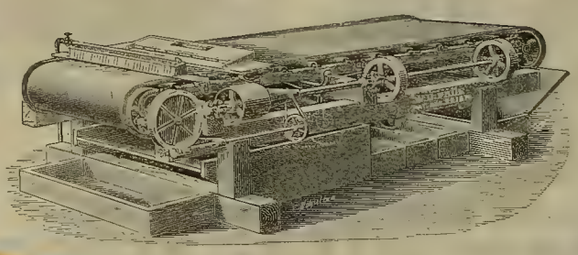

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DEAR SIRS:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

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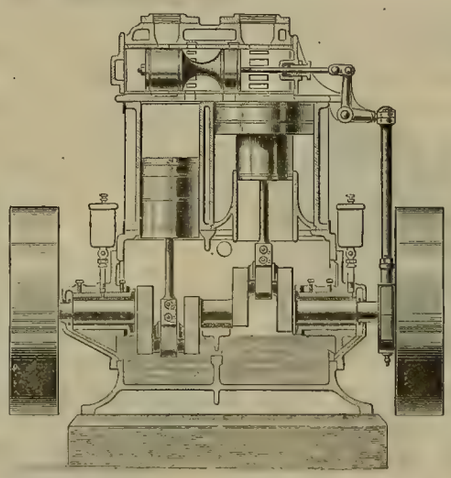

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PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 38 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

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Is beyond all question the most important improvement that has ever been made in this class of mining machinery. It will do more than twice the work with a given amount of wear than any other Crusher made, besides crushing so much finer that for mining uses, the capacity of the mill is greatly increased. It has the same relative superiority for macadamizing purposes, affording the cheapest and most reliable machine for this use.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

TWENTY-PAGE EDITION.

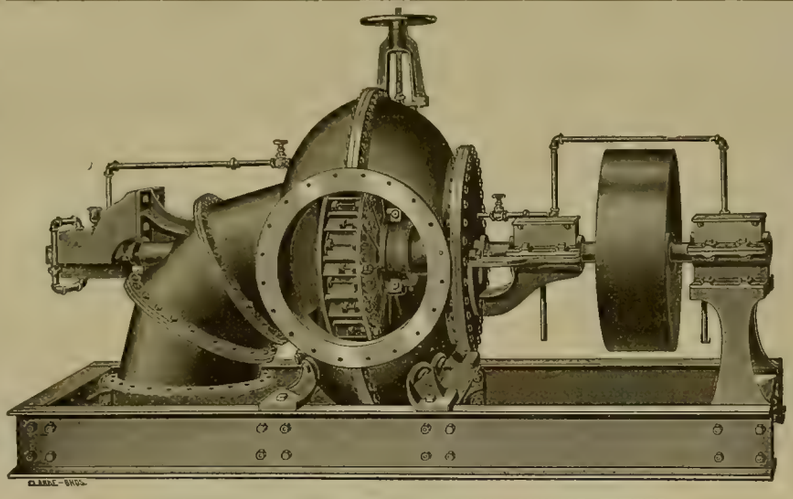
BY DEWEY & CO. Publishers.

SAN FRANCISCO, SATURDAY, MAY 4, 1889.

VOLUME LVIII. Number 18.

The Leffel Improved Water-Wheel for Mines.

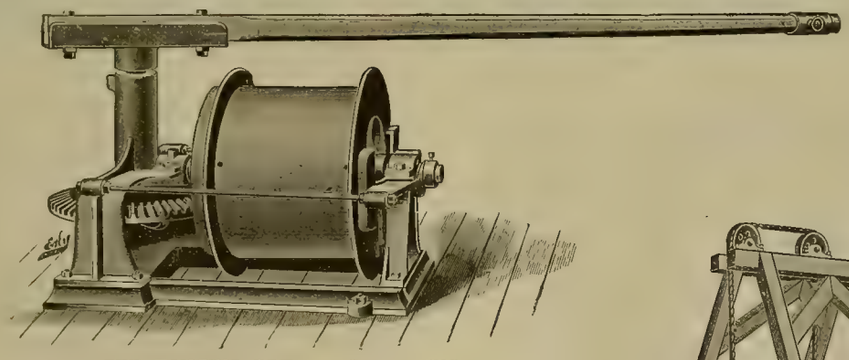
The illustration on this page of the Leffel Double Turbine water-wheel, for mining purposes, as mounted on iron frame and manufactured by Messrs. James Leffel & Co., Springfield, Ohio, is an improved form of the famous "Old Reliable" Leffel wheel, the result of many years of diligent study and practical experience. Its makers claim, that as now manufactured, this wheel gives more power using less water than any other wheel extant. There is in it a combination of two independent sets and kinds of buckets, one a vertical and the other a central discharge, each entirely different in its principle of action upon the water, yet each wheel or series of buckets receiving its water from the same set of guides at the same time. The water, however, is acted upon but once, since half the water admitted by the guides passes to one wheel, and the other half to the other wheel, being nicely separated and divided by the partition, or diaphragm, between the two wheels, the water leaving both wheels or sets of buckets at the same time and as quickly as possible. These two sets of buckets are so combined as to make really but one wheel; that is, both are cast in one piece and placed upon the same shaft. By this arrangement there is admitted the greatest possible volume of water, to a wheel of any given size, consistent with its economical use, at both full and part gates, and at the same time the greatest area for the escape of water is secured. The surface in the wheel is thus reduced to a minimum as compared with the quantity of water used, avoiding a very material loss by friction, which otherwise seriously diminishes the working power of a wheel; an arrangement, the value of which will be appreciated by those who understand the practical effect of the frictional surface in a water-wheel.



LEFFEL'S STANDARD DOUBLE TURBINE MINING WHEEL.

During the past few months new, extensive and convenient works have been built by the manufacturers. These have been fitted out with entirely new, expensive machinery, especially constructed for the sole purpose of imparting to the wheel the necessary accuracy in workmanship, and of reducing the cost of manufacture, so as to enable them to substantially cheapen, while really improving the machine. As may be seen from a recent catalogue issued by the manufacturers, among the most noticeable modifications and additions made in their wheels are the following: "The improved link for operating the gates; the process for lining the iron plates with brass or anti-corrosive metal (applied only when specially ordered); the combination of the toothed segment with the gate-arm in such a manner that the segment can be removed when the teeth become worn and a new one supplied; the spherical iron penstock; the use of steel gates or guides for some sizes instead of iron; and the improved method of casting solidly, in one piece, both wheels, by means of which the edge of the diaphragm can be made much thinner, and yet stronger, assisting also to separate more perfectly the due proportion of water to each wheel, while enabling the buckets to successfully withstand the shock of blocks, stones and other rubbish to which they are so often subjected. Half the buckets being good boiler iron, and the fillets retaining them improved both in form and strength, it is impossible to break or tear out any of them, as a result of which of the last 5000 Improved Leffel wheels put in operation not one has lost a single bucket."

There are now 11,000 of the Leffel Double Turbine water-wheels in successful operation in various industries, having been placed in almost every conceivable situation and under the highest and lowest heads. While all manufacturers of popular and superior machinery suffer in various degrees from imitations of their wares, it would seem that Messrs. James Leffel & Co. have been unusually unfortunate in this particular. They complain, for example, of the appropriation by other manufacturers of inferior wheels of the tabulated forms originated by Mr. James Leffel. These they have modified in some instances by raising the figures representing the amount of power furnished, in order to show an apparent increase of power over the Leffel wheel. These tables as originally arranged are only applicable to the Leffel wheel.



THE HOISTING DRUM AND GEARING.

The Davis Horse-Power Hoisting Whims.

In the initial stages of the opening or development of a mine, one of the most important factors which enters into the calculation of expense is the cost of the power required to sink to a given depth, or until such depth is attained as to justify the procurement of a steam or water power hoisting plant.

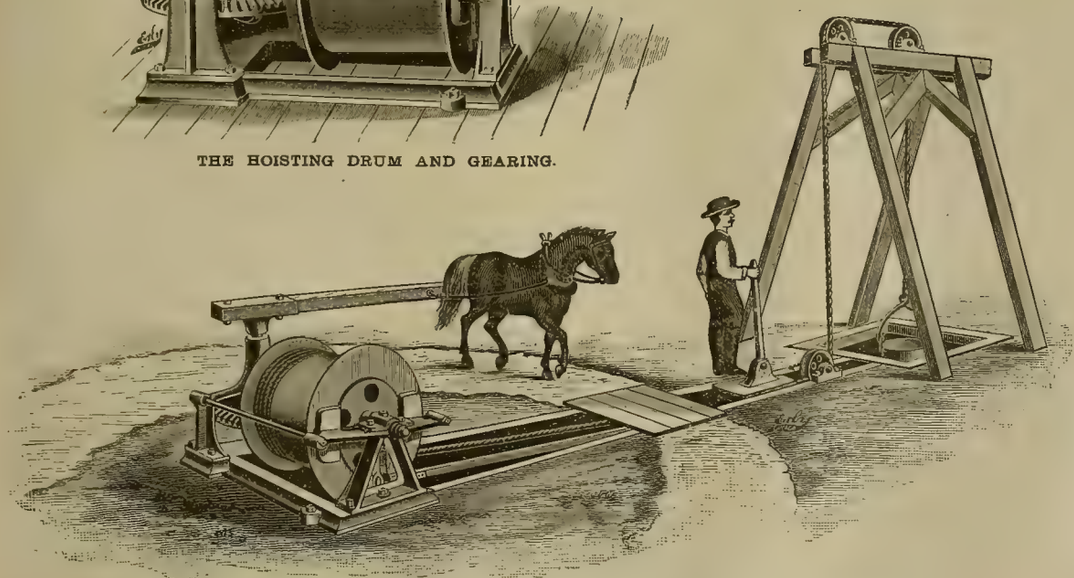
Many forms of horse whims, or, perhaps better, whims operated by horse-power, have been devised and used, but their construction and operation have been more or less unsatisfactory.

The hoisting whims illustrated on this page are built entirely of iron and steel, mounted on a heavy base plate, and, consequently, are very durable and cannot be affected by extremes of either cold or heat or climatic influences. An examination of the cut shows that the hoisting drum is completely under the control of the person in charge of the hoisting or lowering through the shaft of the mine.

Both the hoisting and lowering are regulated by one lever, and the operation is so simple that it can be readily handled by any person inexperienced in the use of machinery.

The bevel gear on the drum shaft is loose,

(*Concluded on page 320.*)



THE DAVIS HORSE-POWER HOISTING WHIM FOR MINING PURPOSES.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Rebel Creek Mining District.

EDITORS PRESS: — Having leisure time, I thought I would write you some facts concerning this mining district, which, in my opinion, ranks with any district in Nevada. There are several fine prospects in the district; among them the Penobscot mine, owned by Messrs. Lucas, Wolf & Gintz, is a very valuable piece of property. The Wild Deer mine, owned by H. H. McColley, is also very good property and can be worked to great advantage through tunnels. The Boston Globe Mining Company are in operation here. They have put up a mill but have not started to work any of their ore yet. The Ohio mine is about to put on a large force of men. This mine is owned by a Salt Lake company. The mine has been shipping its ore and the average has gone 900 ounces a ton. They are to put up a 40-stamp mill this spring. William Carruthers is the superintendent and is an experienced mining man. The Moonlight is another good prospect and is owned by F. P. Snapp. The Black Jack mine, owned by Andrew Shewsbury, is another very fine prospect—principally gold.

The Bismarck mine, owned by Elias Jones, is one of the leading mines in the district. The mine known as the Gold Hill, owned by Peter Cassady, has 2000 tons of ore on the dump which will average $70 a ton in gold. There is another piece of property owned by the same party, known as the Comstock, which is valuable.

There are over 500 locations here, and a great many of them show up very well. It is only a matter of time for this camp to be one of the leading camps on the coast. S. B. DYER.

Willow Creek, Humboldt Co., Nev.

Como, Nevada.

EDITORS PRESS:—The Eureka-Como Co. began overhauling and repairing their machinery on the first of this month; started their pumps on 22d inst. They have 80 feet of water in the shaft, over 200 feet of drifts, and all the surrounding country to drain before they can resume mining operations, but it is expected to accomplish this in about two weeks' time. They use two No. 9 Cameron pumps, one of them a plunger. At present the plunger pump is throwing the water to the surface, a distance of 250 feet, at the rate of 30 miner's inches.

About 30 men will be employed at this mine this summer, and it is confidently expected that important developments will be made before the season is over. Placer mining has commenced in the canyon below, with the water pumped from the Eureka-Como. S.

The Thrashers' Cook-Wagon.

An institution peculiarly Californian is the cook-wagon which attends our thrashing crews in pursuit of their vocation. The extent of our grain-fields calls for the location of the thrasher's outfit a mile or more, perhaps, from a human habitation. Traversing such a distance to and from meals was a serious loss of time or else a loss of available force to the thrasher, for the weariness of the tramp in the burning sun but added to the fatigue of the trying labor. Therefore in the interest of the thrasher and his crew, it is a benefit that the meal should come to the men and not the men to the meal. The rest in the shade of the stack at nooning recuperated strength instead of further exhausting it in tramping. On the part of the farmer's family, the relief from the killing work of boarding thrashers is too well known and appreciated to be described. The cook-wagon speedily established itself in general favor.

It was the happy thought of J. B. Greene of San Joaquin county which called the cook-wagon into existence, and the one which he constructed in the spring of 1876 was in constant use until last year, and is now on the farm of A. L. Cressey in Stanislaus county. Mr. Greene had been all his life a student of the art of invention, and had made other excellent strokes of inventive genius. He was born in Ohio in 1819, and was in early life thrown upon his own resources. He came to California in 1869, and became a farmer and thrasherman. His experience in 1874–5, with his men going to and from meals, turned his thought to an improvement in this respect. He conceived the idea of the cook-house which could be moved from place to place, the owner of the thrashing outfit boarding his own employes instead of quartering them upon the farmer, and to cover the cost he proposed to charge one cent additional a bushel for thrashing. In the spring of 1876, before harvest, he went out among the farmers and discussed the advantages and disadvantages of running a cook-wagon, and he found but two men who would agree to let him do their thrashing and board his own men. Still he was decided that it would be cheaper for the farmers, as well as a benefit to himself and his men, and he drafted plans for the cook-house, and it was built. Its value was speedily recognized and the cook-wagon became a part of every thrasher's outfit. They are all similar to the first one built by Mr. Greene.

Mr. Greene is now a farmer in Oregon, and in good health and prosperous. He has with him six sons, and others of his thirteen children are residents of this State.

The Work of an Astronomical Society.

[Address delivered before the Astronomical Society of the Pacific, March 30, 1889, by EDWARD S. HOLDEN, Director of the Lick Observatory.]

In the year 1820 the state of astronomy in England was somewhat as follows: The Royal Observatory at Greenwich was pursuing its regular routine observations of the positions of the sun, moon and stars under the direction of the Astronomer Royal, Pond, whose chief service to astronomy consists in the minute accuracy of his observations and in the faithfulness with which they were amassed and discussed. His controversy with Brinkley (astronomer of the Dublin Observatory) on the latter's determination of stellar parallaxes, cleared the way for the great researches of Bessel and Struve, on the same subject, which followed a dozen years later. The Radcliffe Observatory at Oxford was in operation, but no observations were published. The Cambridge Observatory was just founded. The observatory at Edinburgh was barely built and was not yet a public institution. The Armagh Observatory had no instruments of importance and was doing no work. Groombridge's private observatory at Blackheath was busy with his catalogue of 4243 circumpolar stars. Sir William Herschel, the greatest of practical astronomers and the glory of England (then 82 years old) was resting from his labors. His son, Sir John Herschel, had not begun that long series of observations which has made his name illustrious.

On the continent, the magnificent labors of Bessel, Gauss, Olbers and Struve were laying the foundations of the science of to-day. The spirit of their methods made itself known in England and deeply affected some of the younger men at the universities—notably Babbage, Dean Peacock and Sir John Herschel. These three entered into a compact, which was most fruitfully carried out, "to leave the world wiser than they found it." One of the most important results of this resolution was the founding of the Royal Astronomical Society of London, an institution which has done incalculable good in fostering the science not only in England, but throughout the whole civilized world. It is not part of my purpose to trace the influence of this society and to show in detail what its work has been. I rather wish to quote here a few paragraphs from the "address of the society explanatory of their views and objects," which was circulated in the year 1820, at the time of its foundation. And I wish to do this for two reasons; because first, the need of such an association in our own midst is much the same as that felt by Herschel and Babbage in England 60 years ago; and secondly, because the program of this society may point out to us along what lines we should proceed to make our own newly formed Astronomical Society equally useful in its own sphere.

The times have changed since then, no doubt. The immediate problems of astronomy are different; but the spirit of the methods by which they are to be attacked and solved is eternally the same; and the need for co-operation and concentration of forces is more and more pressing as the complexity of processes becomes greater and greater.

* * * * * * * * *

In our own case we must remember how various are the opportunities and attainments of our various members and try to lay the foundations of our efforts so broadly that every class will find a sphere of action in our program, a stimulus in our proceedings, and a support in our friendly association.

The few professional astronomers in our midst will here lose that sense of intellectual and professional isolation which is a drawback and a danger.

Nothing that is clearly conceived is too technical to be placed before an assemblage of intelligent men, and the very effort to explain gives a lucidity to the original conception which it might otherwise lack. There is a moral force, too, in knowing that one does not need to wait for sympathetic appreciation, but that it is to be found every day and all around one.

The opportunity to communicate the results of one's work readily and quickly is of the highest value; and "the end of all observation is communication."

By far the greater number of our members will be amateurs, and here again we must recognize the fact that there are many classes with many different opportunities and means for work and study.

Some among us already possess telescopes of no inconsiderable power. In 1820 there was no refractor in Europe more powerful than the five-inch telescope, with which Herschel and South observed their double stars.

It should be the aim of the society to point out the directions in which such instruments can be used, so that either some useful result will be attained for the science, or so that at least the maximum amount of pleasure and personal profit can be had by the owners. I presume there are few amateurs who have not experienced a sense of disappointment in the use of their telescopes. It is not that the heavens are less glorious, nor that the observer is less devoted and enthusiastic, but it is because he often comes to feel that there is an aimlessness in his work which he finds to be disheartening. If at this moment some word or hint can be given to him which will show him how to employ his time and energies to some real advantage either to science or to himself, the old enthusiasm will return and the labor will again become delightful. It is precisely such words and such hints that he may expect to find here among his colleagues.

There is an important class of our amateur members whose photographic experience and skill can bear the most useful fruits if they are directed toward certain astronomical ends. We also have professional astronomers among us whose photographic knowledge is second to none. The association which this society makes easy and puts into an organized form has already led to important results in the observations of the solar eclipse of last January by photographic means, and will, no doubt, continue to be fruitful. There are many other fields of research open to this method of observation.

We have other members, also, who have no apparatus for observation, but who have the ability, the leisure and the desire to forward astronomy by computing the observations of others. There is a boundless field for such amateurs, and I am not sure that their efforts, if rightly directed, may not be of more real importance than any others. The Lick Observatory alone could provide the observations to keep a score of computers busy, and this work could be so selected as to be of all grades of difficulty and to employ every variety of talent.

Finally, we have among us those who have joined as learners; who are here to listen, to observe, to read and to study. They in turn should find in our meetings what they seek for and require. Their reading and their study can be guided, and it is among them that we may look for the workers after the next few years. Every class of talent and opportunity ought to find its profit either in our meetings or in our publications.

One word with regard to the conduct of our meetings. My own experience in scientific societies has led me to think that their meetings should never consist of mere lectures, no matter how interesting. There should be discussion, questions, remarks, interchange of ideas, contact of active minds. Let each member feel that he has a part to bear, both in the actual meetings and outside of them, among his associates. In one word, let our society be a live one—active, intelligent, modest, competent.

It has a doubled interest in its two-fold place of meeting. The astronomers of the Lick Observatory can promise that the meetings held at Mount Hamilton shall be interesting and fruitful. The meetings held in San Francisco can also be full of interest.

One of the chief uses of the society will be to make an astronomical library available to the amateur observer. We have already made a beginning in this direction. It is not necessary that our collection should be very extensive. A complete astronomical library would contain perhaps 20,000 volumes. But it is desirable that we should own a full set of the most important astronomical journals. The progress of the science can be traced in their pages from day to day, and their past volumes give its history.

I have thought it worth while to give in a list which follows the titles of the more important astronomical periodicals, and I have ventured to add the names of some 20 or 30 books which our members would do well to own personally. It is not necessary to buy all of them at once, but the possession of one will lead to the desire for another, as the scope of observation or of reading is enlarged. The society library should begin by owning these volumes. It will grow subsequently as our wants develop.

Astronomical Journals.

Astronomische Nachrichten, 2 vols. a year, Kiel, price $8.

Astronomical Journal, Cambridge, Mass., $5.

Bulletin Astronomique, Paris. $4 75.

L'Astronomie, Paris, about $3 75.

The Observatory, London, $3 50.

Ciel et Terre, Brussels, $——

Himmel und Erde, Berlin, $5.

Sirius, Leipzig, $——

Wochenschrift fur Astronomie, Halle, $——

Natuwissenschaftliche Wochenschrift, Berlin, about $4

The Sidereal Messenger, Northfield, Minnesota $2

Nature, London, $6.

La Nature, Paris, $——

The Companion to the Observatory, London (published annually), price 1s. 6d.

[This latter work will take the place to the amateur observer which the Nautical Almanac holds to the professional.]

Publications of Astronomical Societies.

Publicationen der Astronomischen Gesellschaft, Leipzig, 4° (at irregular intervals).

Vierteljahrsschrift der Ast. Gesell, Leipzig (quarterly).

Memoirs and Monthly Notices of the Royal Astronomical Society, London (yearly and monthly)

Journal of the Liverpool Astronomical Society, Liverpool (monthly).

Bulletin de la Societe Astronomique de France, Paris (yearly).

Publications of the Astronomical Society of the Pacific, San Francisco.

List of Some Books of Reference in Astronomy.

HONZEAU: Vade Mecum de l'Astronome, 8vo.

WOLF: Geschichte der Astronomie, 8vo.

DELAUNAY: Cours elementaire de l'Astronomie, 12mo.

LOOMIS: Treatise on Astronomy, 8vo.

CHAUVENET: Spherical and Practical Astronomy, 8vo, 2 vols.

BALL: Elements of Astronomy. 12mo.

YOUNG: General Astronomy, 8vo.

HERSCHEL: Outlines of Astronomy, 8vo.

ARAGO: Astronomie Populaire, 8vo, 4 vols.

FLAMMARION: Astronomie Populaire, 8vo.

NEWCOMB: Popular Astronomy, 8vo.

WEBB: Celestial Objects for Common Telescopes, 12mo.

OLIVER: Astronomy for Amateurs, 12mo.

PROCTOR: The Sun, 8vo.

PROCTOR: The Moon, 8vo.

PROCTOR: Saturn and his system, 8vo.

LEDGER: The Sun, its Planets and their Satellites, 8vo.

WATSON: A popular treatise on Comets, etc., 12 no.

SMYTH: Celestial Cycle, 2d ed., revised by CHAMBERS, 8vo.

KLEIN: Star — Atlas (translation by MCCLURE).

GLEDHILL: Handbook of Double Stars, 8vo.

CHAMBERS: Descriptive Astronomy, 8vo.

GRANT: History of Physical Astronomy, 8vo.

CLERKE: History of Astronomy in the XIX Century, 2d ed., 8vo.

DELAMBRE: Histoire de l'Astronomie, 4to, — vols.

If our own publications are valuable and worthy, they will bring to us through exchanges many works of prominent value.

This brings me naturally to the question of what and how much we ought to publish. On this I shall give my own opinion freely, from my personal point of view. It may easily be that my ideas on this question, which are rather positive, require correction. If they do, the experience of the society will be sure to show it.

It seems to me, then, that we should be extremely careful to make our publications fully worthy of the society. Any observation faithfully made and properly recorded well deserves a permanent place. Our very constitution, as a society of amateurs, will usually prevent us from presenting those long series of observations which can be amassed by professional observers in fixed observatories. But we should be careful not to make our publications a vehicle for the expression of mere unsupported opinion. A theory should always be accompanied by its vouchers. I would give more for one careful measure of a double-star, for one faithful observation of a comet, than for pages of speculation regarding the origin of the Solar System. Such speculations have their place in science, no doubt, but to be valuable they must follow after years of work. We should make our papers a record of actual work accomplished. There is room, too, for *resumes* of the work of other observers, and for papers relating to the best methods of making our own observations. Important papers in other periodicals may well be translated and printed here. The pages of our journal should be truly representative of the work and thought of the society in general.

It would be easy for the Lick Observatory staff to contribute enough material to completely fill such a journal, but it appears to me that, in general, the work of our observatory should appear in abstract only, and that the observations and communications from the amateur members of the society should always constitute the greater part of the publication. At the same time, the observatory can serve a very useful end by furnishing a series of abstracts of work done and in progress, and by printing notes on work proposed, especially if it is such that our members can co-operate in it.

It will be a source of pride to us, if after many years we can look back over what has been printed by the society and see that every part of it is the record of useful work faithfully done.

It is for this reason that it seems to me we should not attempt to print at any regular intervals, as monthly or quarterly. Let us keep our papers until we have enough material to form a number of 8, 16, 24 pages, and then issue and distribute this to our members.

It is tolerably certain that the time has not yet come for us to perform another function of an astronomical society. I refer to the foundation and to the bestowal of the medal of the society as a reward for astronomical work of the highest class. It is certain, however, that in the future, if such a medal were founded and if it were bestowed only for work of the highest class, as I have said, and never under any circumstances to one of our own members, that the responsibility of the award would constitute an important stimulus to the society itself, which would have to judge of the merits of the various works proposed to be rewarded, and that such awards, if always bestowed with judgment and discretion, would soon make the voice of our society respected everywhere. In fact there is probably no way in which the society could do more good and in which it could be more quickly influential than by the bestowal of its medal upon those astronomers whose works fully deserve it. And there is probably no way in which a mistake of judgment would so quickly discredit us as in the bestowal of our highest award upon insufficient scientific grounds or for personal reasons.

It is probably quite time that I should leave these general considerations and come to the more special questions of the work which our members may reasonably expect to do. In any particular case this depends very largely upon

the time available for such occupation, upon the instrumental equipment at hand and upon the individual aptitude and ability. I have already said that for those of us who are willing to calculate the observations made by others, there is an endless variety of work to do of all grades of importance and difficulty. For those who have only the leisure to interest and divert themselves with observing, there is a rational and useful method to follow instead of a random one which will inevitably lead to disappointment. For those who are willing to spend a very little time and money there are many fields, both old and new, needing cultivation. Let me mention a few of these fields, speaking very briefly of each one.

A very cheap telescope will serve to photograph the sun, provided it be of tolerably long focus. It is highly desirable to obtain enlarged pictures of the solar spots, and to repeat in this country the solar photographs of Janssen, which are taken with extremely short exposures—say from 1-1000 to 1-2000 of a second of time. A series of careful counts of the number of new groups and new spots can be made with a very small telescope, and will be very useful. If any one of the society will charge himself with the necessary measurements, we, at Mt. Hamilton, will undertake to furnish daily photographs of the sun on a scale of 4½ inches to the solar diameter, for the purpose.

I believe that much can be done by studying the moon's surface with comparatively small telescopes. In such studies, I think it desirable to confine the attention to very limited areas, and to study and draw these over and over again under every possible variety of illumination, until the telescope and the observer can do no more.

In this way it may be that only small areas will be covered, but it is certain that our knowledge can be materially increased. The observation of the occultations of stars is most useful, provided the position of the observing station and the local time are accurately known. The Lick Observatory time-signals can be readily made available for this purpose. Probably little can be added to our knowledge of the surface features of the planets by observations with the smaller telescopes.

It is, however, well worth the labor for several of our members to maintain a series of observations of the eclipses of the satellites of *Jupiter*. There is nowhere in America, I believe, such a series maintained. The results of this work will be directly comparable with the observations on which the present tables are founded, and constants of reduction can be determined by which these observations can be employed in conjunction with long series already obtained elsewhere.

In this case, as in so many others, our great distance in longitude from the centers of observation will give to our work a peculiar value We are eight hours west of Greenwich and three hours west of Washington, and there is no astronomical establishment between us and Japan, and no active observatory between California and Australia.

Photographs of the planets and neighboring stars of about the same brilliancy on the same plate may very likely be of use in comparing their relative brightness.

Should a bright comet appear, no chance should be lost to photograph it, to study the changes in its head and to map the position of its tail among the stars.

The observations of Gothard on nebulæ by means of long-exposure photographs have proved that even comparatively small telescopes (provided with driving clocks) and properly used are capable of giving the most brilliant and important results. It is at least possible that the Zodiacal Light, the Milky Way, the twilight arch, the Aurora, can be photographed. I know of no direction where the skill of amateur photographers could be better spent than in experiments upon these subjects. The problem is of the same nature as the photography of the faint outlying streamers of the Solar Corona.

The field in which amateurs can render the greatest service, however, is in the observation of the variable stars. If these are to be observed by the eye, the use of a mere opera-glass or of a very small telescope is usually sufficient to fix the time of maximum or minimum light with accuracy, by comparisons with neighboring stars which do not vary. Professor Pickering has already presented to the society a set of printed instructions for making such observations. If the observer has a photographic telescope or camera, the most elegant and accurate method might be to allow the star's image to *trail* over the plate. When the trail is weakest the star has reached its minimum. A scale of time can be put upon the plate by capping or uncapping the lens at known instants. If the star is too faint to trail on the plate while the latter remains at rest, a very simple clock-work motion can be devised which will cause the telescope to follow the star toward the west at a slow rate. This rate can be so chosen by experiment as to make the *trail* of suitable brightness for measurement.

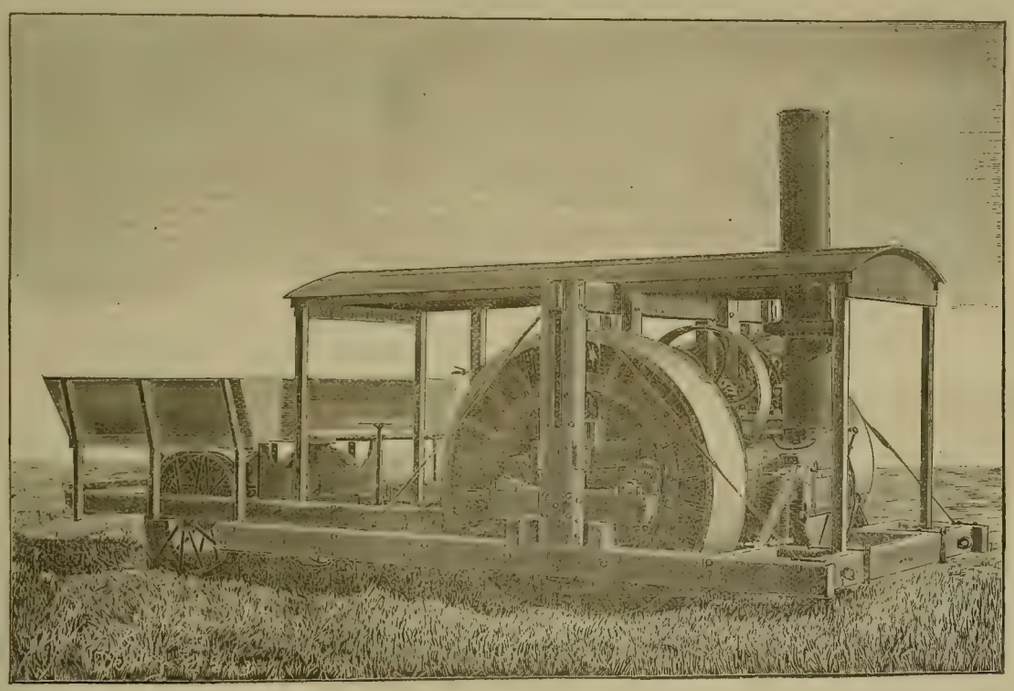
There are scores of other researches of interest and importance which I have not time to mention and which are well within the reach of amateurs. One competent sextant observer, acting in concert with the Lick Observatory, could render a real service to the geography of the State, with very little expenditure of time and money, by determining the latitudes and longitudes of important points. If such an observer were to fix the positions of the eclipse stations occupied by the various parties on the 1st of last January, he could thus make a positive contribution to science. Mr. Keeler of the Lick Observatory has just completed a determination of the position of Norman for this purpose.

I believe the radiant points of the brighter and more slowly moving meteors can be accurately fixed by photography, and at any rate the experiment is worth a trial. Statistics of the number of telescopic meteors in different parts of the sky and at different hours are very much needed and are extremely easy to obtain.

I have thus hastily gone over the principal lines along which we, as a society, may hope to work with success. If we undertake all or any of the work thus indicated, and if we carry it on with faithfulness and industry, we may be sure that our efforts will be a veritable aid to science. Whatever we do, let us do thoroughly. Whatever we say, let it be well considered. Let us clearly understand the objects for which we are organized, and let us pursue these with entire modesty and with entire confidence. The scope and membership of this society is such that it can have no antagonisms and rivalries with any other. But we may look forward to a career of real usefulness, not only to our members, but to the science of astronomy. In our own time and way we may hope to make advances in this path, and we are sure that we can diffuse information in its regard and help to increase the intelligence, the activity and the pleasure of all our membership.

EDWARD S. HOLDEN.

Lick Observatory, February 15, 1889.



LAUFENBURG'S TRACTION ENGINE.

Industrial Notes From Los Angeles.

Our correspondent at Los Angeles has found much to interest him in his circuit of the industrial enterprises of that city. Although none of the manufactories are running full handed at present, a deal of work is being turned out. The Baker Iron Works, located near the old S. P. Depot, employ 65 men. Their line of work consists of mill, mining, pumping and hoisting machinery, oil and well-boring rigs and tools, street cars, gears, wheels, axles, shafting and pulleys, while they are sole agents for various engines, boilers, pumps, etc., in which they do a large business. These works are the most extensive in the city.

The Union Iron Works, on First street, employ from 35 to 50 men, and turn out the usual line of work supplied by our leading foundries and machine shops. The establishment seemed to be in full operation at time of our correspondent's visit. Booth's Fulton Engine Works, on Alameda street, employ at present from 20 to 25 men. Engines are here made a specialty. The company are now putting in for mine-owners at Acton, on the S. P. R. R., a 10 stamp quartz-mill, which will be in operation soon. The Stearns Manufacturing Co. employ 30 men while running with a moderate force. This company manufacture engines, windmills, tanks, etc., and also special lines of furniture. Llewellyn Bros., at the Columbia Foundry, employ 15 to 25 men, and at present are directing their principal attention to architectural castings, building fronts, etc. They have the lead in this particular line of work. The East Side Planing-mill of Chas H. Creciat is a worthy institution, where 20 to 25 men are employed in a general line of sash and door work and other material for builders. On the east side there is also the sheet-iron manufactory of Lacy, Ward & Co., where a good force is employed. The Los Angeles and Pacific Furniture Companies employ each a large force, as do the iron works of Fruhling Bros. H. P. Gregory & Co., 117 N. Los Angeles street, handle an extensive line of woodworking and pumping machinery, besides engines, boilers, air-compressors, belting and mill and mining supplies of all kinds. P. R. Keith is manager of this institution. The Los Angeles Planing-mills often employ 60 to 75 men, but at present are running with a force of 30. The work of this factory is shipped largely to Riverside, Pasadena, San Pedro, Santa Monica and other places tributary to Los Angeles, and is also used in the local market. S. C. Dodge is president; Thos. Hughes, vice-president. The Kerchoff-Cuzner Mills and the Nuille-Nicoll Planing-mills are two other of the leading sash, door and blind factories of Los Angeles, where much work is turned out.

NATURAL SOAP.—There are in Nevada several deposits of mineral soap, one of which has been worked for some years. Similar deposits occur in Wyoming and Dakota. The soap is formed by natural combinations of soda, borax and mineral oils, and in some localities hot springs assist the process. In Owens and Mono lakes, the waters of which are full of borax and soda, there are numerous oily grubs which die and are washed ashore, and the oil in them becomes combined with the minerals in the water and forms deposits of soap on the shore, an inch or two thick in a year. Some of these natural soaps are cut up and sold as found, but they are oftener used in combination with other soaps.

Laufenburg's Traction Engines.

The cut of Laufenburg's traction engine on this page should attract more than ordinary interest, as it is made from the boiler and machinery of a portable engine that was used in running a Pitts separator. The new system of using the Combined Harvester that had its inception, and was brought to its present state of proficiency in the city of Stockton, has caused hundreds of portable engines and separators to be laid aside as useless farm machinery. Mr. M. Laufenburg of Stockton, a noted inventor of labor-saving farm implements, conceived and advanced the project of utilizing these portable engines by converting them into traction engines. The directors of the Stockton Combined Harvester and Agricultural Works encouraged the project by giving him the facilities of their immense works. It was looked upon as chimerical, but the crowning result has been consummated and a portable engine has been transformed into a traction engine that has been put in practical use this season. Grain sown on land plowed by this traction engine will, it is expected, be harvested by a Houser combined harvester propelled by the same engine, which will also haul the sacks of wheat to the railroad station. Thrashing straw will be used for fuel, which, taken in connection with the result of 20-horse power being equal to 26 horses, makes the cost of seeding and harvesting 50 per cent less than that of horse-power. Besides, the engine with electric lights can run day and night, thereby doing the work of 48 horses. We herewith give a succinct description of the mechanical features of the traction engine. There are no intermediate gears through which the power is transmitted. The traction wheels are driven by a pinion on countershaft, which revolves with gear engaging the pinion on the crank-shaft of engine. Thus the application of power is direct and not through a system of complicated gears which are liable to change their bearing by wear and break. The journals, which carry flange-wheels to control position of traction wheels and main gears, are provided with a device to regulate and parallel the face of cogs on the gear pinions and main gears, and natural wear can be taken up at all times. The main traction wheels, although high, carry the weight of engine and boiler on journals on a level with the line of draft when pulling a load. Thus the transportation of weight from traction to lead wheels is avoided, which is not the case when the weight of engine and boiler is journaled in hub of wheel center, more especially when a high wheel is employed.

What to Do With Our Boys.

Industrial schools for boys are a good commentary on our system of training. There is a tendency to draw a distinction between the boy who walks the streets with books on his way to school and one who carries a dinner-pail on his way to the shop where he is learning his trade. The high-school will probably turn out a graduate who feels above his father and mother, whose daily toil has educated him, and who is ill-prepared to buffet with the waves of this turbulent world. He has a training which would be useful had his parents money enough to start him in life. On the other hand, the boy who has a useful trade is less limited when he seeks employment; his training in the shop, too, has given him a knowledge of the world and self-reliance which the book-student will have to obtain when he seeks his own livelihood. We do not decry education, but we think many of the ornamental studies might be omitted and the time given to some useful pursuit. The German princes are all obliged to learn some trade; this enables them to sympathize with the masses and ennobles labor. In this country manual labor and work on the farm are shunned because boys feel that there is a discount on these employments.

Our schools should teach that some of the greatest of Americans worked on the farm—Elihu Burritt, the learned blacksmith, Robert Colyer; such men should be held up as models. Garfield's career from the tow-path to the White House, Grant the tanner, Lincoln the rail-splitter, and other heroes who chopped away the obstacles to their success, should be the models for the guidance of our youth.

We believe the day is not far distant when the overcrowded professions and the lack of skilled mechanics will turn the attention of our educators to technical schools and agricultural colleges as the needed institutions for our American youth. One difficulty is the opposition of trades unions to apprentices, another the continual invention of machinery to supplant hand labor; but such schools as Cogswell's, by saving the time which would be wasted in apprenticeship, will probably spring up in all our large centers of population.

UNCLE SAM'S PENSION-ROLL.—The number of pensioners on the rolls on June 30, 1888, were: Civil war, army, invalids, 323,029; widows, etc., 90,882; navy, 3815 and 2083 respectively; war with Mexico, survivors, 16,060; widows, 5104; war of 1812, survivors, 806; widows, 10,787; total, 452,557, and $79,646,-146.37 disbursed to them.

THE postal authorities have adopted Ventura as the name of the postoffice at San Buenaventura, and the *Democrat* says the next Legislature will be asked to change the name of the old town to the abbreviated Ventura.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

POTOSI.—Amador *Ledger*, April 27: The Potosi mill, running on rock taken from the North California mine, near Drytown, was shut down last Friday, and all work in the mine suspended. The rock that was run through was taken from near the surface, and we are told it did not pay, yielding only about $2 per ton, which was hardly sufficient to meet the expenses. Ore taken from the tunnels and drifts some time ago paid well, some of the ore going as high as $20 per ton. This company, composed almost exclusively of residents of Amador county, spent $20,000 in the development of this property, having levied 12 assessments. In the Pioneer district, at Mace's mill, mining matters are moving along at a slow gait. There are from 10 to 20 men prospecting. A gentleman named Bingham, lately from Arizona, has taken up what is called the Sand lead, a peculiar formation, carrying gold, but whether in paying quantities remains to be tested. He is talking of putting up a roller quartz-mill to work this ore. Fifty tons of rock taken from the old Mexican claim in Shober's field were hauled to the Moore mill and crushed lately. The result was a little over $5 per ton, which was hardly up to expectations, The seams of quartz are small, and often rich, but no large deposits of pay ore have been met with as yet. Four men are at work on the Middle Bar mine, on the Mokelumne river. This, together with the prospecting operations at the Morley or Wetzlar mine, is about all the work that is being done in the Middle Bar region at present. There is again some talk of starting up the old Hardenburgh claim. At the Kennedy mine a tunnel has been run into the Oneida hill a distance of 500 feet, and at this point a crosscut west has been driven 150 feet, and all this has been accomplished in the short period of one year. Most of the work has been done by contract, and it has cost on an average something over $3 per foot. The crosscut is being pushed ahead in the expectation of striking a west ledge.

CHINESE IN QUARTZ MINING.—Amador *Ledger*, April 27: It is with deep regret that we learn that the Allison mine, above Big Bar bridge, is run almost exclusively by Chinamen. We are told that 13 Chinamen mine and mill the rock, with a white man as foreman. This is the first instance that has come under our notice of the introduction of Chinese in quartz mining in Amador county. This new departure is to be regretted not so much because of the 10 or 12 white men who would otherwise be employed at this mine on the river, but because it may prove the entering wedge to the employment of the Mongolian in other mines in this county.

LAVEZZA.—Amador *Dispatch*, April 27: This property is owned by Chas. Lavezza and Lorenzo Arata, and is northeast of the Reed and Askey mine. A shaft 200 feet deep has been sunk, and a tunnel 500 feet in length taps the ledge 200 feet deep. An upraise connects the shaft with the tunnel. The average width of the ledge is two feet, and the ore averages $10 per ton. These enterprising young men have built a five-stamp mill, and being in a position where they could not run by water-power, secured a small engine to run it. The mill has now been running three weeks, and the owners are well pleased with the outlook.

NOONER.—A shaft is being sunk on this property from which they will drift after reaching a certain depth, in search of quartz. The Petty boys have struck a ledge of quartz near the Mokelumne river, above the Allison mine, which prospects well. They are now sinking a shaft on it. Near the surface the ledge seems to be broken up, but in all probability will unite at a greater depth.

DRYTOWN.—The machinery for the Drytown Consolidated is about all on the ground; the carpenters are through with their work. The North California mill has closed down for the present; prospecting the mine will be continued.

Calaveras.

A GOOD GRAVEL CLAIM.—Calaveras *Prospect*, April 27: The Benson gravel claim at Central Hill is turning out first-rate. They have four feet of gravel, and it is said to be worth $10 to the man, and gold can be seen anywhere in the gravel. The parties owning the claim have been trying to open it for some time, and have only lately accomplished the undertaking. Calaveras mining interests are looming up in great shape.

CHAPARRAL HILL.—A mine known as the Chaparral Hill mine, situated near Albany Flat, which is the property of the Calaveras Con. Mining Co., will be opened by that company in a few days, and will be superintended by Mr. Lawson, formerly superintendent of the Calaveras mine at Robinsons Ferry. It has always been the impression among miners in this section that there are no quartz mines in the Bear Mountain district, but the discoveries that are being made there from time to time will probably undeceive them. The McLean mine, situated in that district, is prospecting well and will no doubt, when thoroughly developed, prove a valuable property. Work on the Calaveras mine at Robinsons Ferry has been resumed, and we understand that lumber is being hauled there for building purposes. It is altogether likely that large reduction works will be erected as soon as practicable. The mine is in the hands of men of large capital, and it may be fairly presumed that no expense will be spared to thoroughly develop it.

MINE SOLD.—Angels *Record*, April 30: Last Tuesday the Nevill mine was disposed of to Hayward & Hobart, for the sum of, it is rumored, $250,000. This mine is considered one of the leading mines of the State, and no doubt under the new management will soon identify and equal the other bonanza yields of the State. In consequence of the change, the mine suspended operations for a few days, but have again resumed work.

ANGELS.—*Mountain Echo*, April 27: It is said by those who ought to know that the Angels mine never looked more promising than at present.

WHITTLE.—It is reported that an immensely rich strike has been made in the Whittle mine, situated near Albany Flat. The shaft in which the discovery was made is somewhat over a hundred feet deep, and the vein is nearly three feet wide. We are reliably informed that the Lane and Tulloch mine, near this place, is making an excellent showing. The lead is getting wider and the ore richer as the tunnel is driven into the hill. One of the owners informs us that the ore yields an average of about $10 per ton.

Contra Costa.

TAR.—Contra Costa *Gazette*, April 27: At the tar mine, work at San Pablo is going on actively. The derrick is about up, and Supt. Anderson will commence boring next week. A large vein of coal and bituminous rock has been found (a sample having been sent to this office). Quite a flow of tar can be seen. At the bituminous rock quarry a large gang of men will be put to work in a few days. The success of the mine looks flattering.

El Dorado.

PROSPECT.—Georgetown *Gazette*, April 27: We are pleased to learn that the Ben Franklin mine, a new prospect a short distance below town, is showing flattering prospects. It is a 3-foot ledge, and a shaft is being sunk which has reached a depth of 30 feet. The quartz frequently shows gold without the aid of a glass. There are about 75 tons of this quartz on the dump which the owners believe will pay well for milling.

Inyo.

GOLD-QUARTZ.—Inyo *Independent*, April 27: Last week when sinking on a lead vein at the White Hill, Barnes & Kehoe encountered quartz. The seam is about two feet wide and was taken out to give room. After a good deal of the quartz had been thrown over the dump Kehoe happened to pick up a piece of the rock and saw gold in it. Further investigation showed that the ore thrown away carried gold, Many samples have since been crushed in a mortar and prospected and all of them carry gold in big paying quantity. A shaft is now down on the ledge to a distance of 38 feet and the ledge gives evidence of widening out as it goes down. A thin seam of clay divides the quartz from the lead vein, and this is about three feet wide, being a mixture of clay and seams of lead. Some of the ore is carbonate of silver. The location of the mine is such as to afford the best possible facilities for working.

AT THE MINIETTA mine, Lookout district, a good paying business is done in working over tailings from the mill. The pile on tailings is estimated to contain about 4000 tons. The stuff carries 17 ozs. silver per ton and 40 per cent lead. The lead hinders the silver from amalgamating. Recently machines were put in operation that separate most of the lead from the tailings; the lead is then worth enough to pay all expenses of the operation and leaves a profit of about $3.50 per ton. After this operation the silver amalgamates readily and about 82 per cent of the assay value is recovered. The parties who are operating say it pays very well. For some time past John Barnes, of the Keeler, has had men working a mine adjoining the Lucky Jim, at Darwin. A few days ago a body of ore was struck in the mine. It will take some time to determine how extensive the deposit is.

CERRO GORDO.—Dunphy & O'Keefe have struck a big vein of ore at Cerro Gordo. The mine is an extension of the Union ledge, which yielded many millions of dollars in former years. The vein is described as being three feet wide, of solid galena, and is opened a considerable distance. Thirty tons of ore was recently sent to be tested at the Reno reduction works. The ore can be taken out in large quantities and very easily. There is every indication that this is likely to prove as big an ore body as the great find in the Union mine.

LEE DISTRICT.—Jerry Fitzgerald recently found some immensely rich ore in Lee district. One chunk of the ore is almost pure silver; the metal can be cut in shavings with a pocket knife, and these will curl over like wood shavings. Jerry says that one ton of such ore would make him a nice little stake. Several miners have gone out from Darwin to look at Jerry's claim and they all seem to think he has a good thing.

LOOKOUT.—Several mines over about Lookout are reported to be turning out a good deal of ore. From the St. John mine teams are now hauling ore to Keeler to the amount of a carload each train. The ore is reported to carry 102 ozs. of silver per ton and 40 per cent lead. Gunn & Fitzgerald are the owners of the St. John mine. Hon. A. J. Gould is taking out ore from the Gypsy Queen mine at Darwin.

ORE.—Bush & Lent have a good body of ore in the Alvord mine, near Big Pine. The ore prospects high in free gold. As soon as the concentrator is ready for work at the Maxim mill a lot of the ore will be worked. In addition to free gold the ore carries a great deal of sulphurets, and the gold in this would be lost unless concentrated.

Los Angeles.

MONROVIA.—Pasadena *Star*, April 27: Many conflicting reports have been circulated here regarding the Monrovia mines, and in order that we might be able to place the truth before our readers, the writer hereof went to the mines a few days ago and easily succeeded in digging out the important facts. These mines are located about a mile and a half eastward of Monrovia, on land owned by the Bliss Bros., which is a portion of the original Azusa de Duarte grant, and in a spur of hills separated by a deep canyon from the mountain range. We found seven men quietly working, some sluicing, others driving a tunnel in the direction of the Mojave desert. There was no excitement and no occasion for any. The company doing this work consists of 12 men. Jas. Dewey of Alhambra is the business manager, and A. Miller of Pasadena is the expert miner in charge of the work. The company is said to be backed by sufficient capital to push the work for months, and we were informed that it is the intention to keep things moving until gold is found in paying quantities, or it is evident that it does not exist there. We were shown some fine specimens of gold. The largest piece was about the size of a grain of wheat, and in all there were several dollars worth of the precious metal, but we were given to understand that the company has not yet cleared expenses. They are simply working quietly away in hope of finding something better, and everybody will rejoice if they succeed. Many miners have visited this spot, and all have expressed a goodly degree of faith in the indications, and none have gone away without looking pretty thoroughly over the surrounding country, and some have returned for further investigation. Gold is found in every shovel of dirt, but water is a scarce article. An inch pipe conveys all that is now used, but plenty of water can be secured in the Van Tassel canyon three miles eastward. It is very evident that many years ago a large amount of work was done here. Water was brought in a large open ditch from Saw Pit canyon, a distance of nearly three miles, but no one knows what amount of gold was secured, why or when work was discontinued.

Mariposa.

COULTERVILLE.—Cor. Mariposa *Gazette*, April 27: Our mining outlook is very encouraging this spring. The Rittenhoff mine, situated about 1½ miles below town on Maxwell's creek, has been sold, the deeds made, signed and recorded, and the new company is in possession, with Dan Wagner in charge, and active work will commence before the middle of May. The company has incorporated under the name of the "Tyro Mill and Mining Co." It is reported as a sure thing that the famous Cook property has been sold, and will soon pass into the hands of the purchasers. These mines will be worked by water-power from the Big Oak Flat ditch, which goes with the mines. Quartz Johnson is here with his face wreathed with smiles, he having negotiated the sale. The Bondurant mine is being worked and shows good ore and plenty of it. This is the only mine on this side that is productive just now. The Red Cloud mine is still idle waiting for its new owner to take charge and go ahead.

Nevada.

OPENING ANOTHER MINE.—*Transcript*, April 25: L. Duterte, a prominent San Francisco capitalist, is now the sole owner of the Grafton quartz mine, which is the adjoining location to the Eaglebird or Diamond Creek mine above the town of Washington. Mr. Duterte has gone up to the claim to put a force of men at work developing it.

TO RESUME WORK.—Mr. Chenoweth expects to soon resume work at the Washington quartz mine on the South Yuba near Edward's Crossing. Captain Richards will continue in charge of the operations.

Plumas.

QUARTZ TOWNSHIP.—Plumas *National*, April 27: The Gold Lake Mining Co., owners O. B. Dolley, Matt Willoughby and Ben Jones, has struck a 2½-foot ledge which prospects immensely rich. The rock is reported worth from $400 to $800 per ton. They are sinking a shaft on the ledge and the rock continues as rich as when first struck. A mill will be erected immediately. Gallagher & Matthews are opening a quartz mine on Squirrel creek. The ledge is from three to six feet wide, and good paying ore. They have started an incline, and the ledge improves in richness as they go down. They expect to build a mill this summer. Bell & Stratton on Poplar creek, are still taking out slugs in their placer claims. The boys have struck a bonanza.

Shasta.

DODGE MILL.—*Democrat*; April 24: A new Dodge mill is being erected on the Little Nellie mine on Slick Rock creek. F. H. Deakin last Saturday purchased the well-known Wiser place, situated on the old Shasta road, 1½ miles this side of Shasta, for $4500. He also purchased the White Oak and two other mining claims adjoining. The proprietors of the Mammoth mine in Old Diggins, last week had 15 tons of ore from that mine worked in the new Dodge mill on the Texas and Georgia mine. The mill worked the ore up to 90 per cent of the assay. If this is true, it is a splendid recommendation for the mill, as heretofore this ore by a free-milling process has not yielded 50 per cent of its assay value. Jack Wallace sent out a pack train of burros under charge of Fred Ten Eick and Charley Nolan, on a prospecting tour through the upper end of the county. It will be gone several months. Another pack train went out yesterday on the same errand in Siskiyou county. Prospecting is becoming active in all the three counties of Shasta, Trinity and Siskiyou, and we anticipate great activity in mining operations this summer.

Sierra.

MARGUERITE.—*Mountain Messenger*, April 27: Fred Morris, Supt. of the Marguerite quartz mine, was here last week on his way below. He has been up to the mine with E. J. Post, a mechanical engineer, to look at the situation and determine what course to pursue to keep the mine free from water, of which there is about 50 inches to contend with. Mr. Plant is connected with a firm at Sutter Creek which, among other things, makes the Knight water-wheel, one of which is in use at the mine. Mr. Plant saw no reason why the mine should not be easily kept free from water. We understand that it was decided to put in a 17-inch direct-acting plunger pump of eight feet stroke. A pump of this kind running at a speed of ten strokes a minute should raise far more water than has yet been encountered. To run this pump it is proposed to employ a water engine. It is the intention to remove the pumps put in by Mr. Humbert, and also the Leffel wheels and the wire rope by means of which power was conveyed from the wheels to the pump. The new pump and engine are expected to be at work soon after July 1st; in the meantime everything will be made ready for the reception of the new plant. Water from the old Dutch Co.'s ditch, now the property of the Marguerite Co., will be used for pumping and raising ore.

THE WALLIS CONSOLIDATED CO. are thinking of sinking a shaft on their claims above Cornish Ranch. Plenty of water has enabled the Bald Mountain Extension Co. to clear out the dumps at the new tunnel.

THE RED OAK Co. has put on three shifts and will push their tunnel rapidly from this time until the channel is tapped. For some reason the workmen at the Gold Bluff mine have been laid off. Presumably the suspension of work is only temporary.

WILLIAM TELL MINE.—Sierra *Tribune*, April 26: A two-stamp mill has been erected and is at work in the river just below the old Hoosier ledge, now called the William Tell, above town, and owned by residents of this place. Persons who ought to know say that the William Tell is sure to be a big mine. It is claimed that the little mill can crush one ton of ore per day. If this is true, there is big money in it for the four owners with only two stamps. The rock will pay all of $50 a ton. It only requires one man to run the mill, while the rest can be working in the mine. While in conversation with Frank Cook this week, he said to our reporter: "There will surely be a big mill pounding away over at that place yet. They are working their prospect just as a new prospect should be worked—by going at it on a small scale and gradually making improvements as the mine gets better. This business of putting up a 40-stamp mill before you know just what kind of a mine you have is no way to do."

Siskiyou.

AT SALMON RIVER.—Yreka *Journal*, April 25: The Ball Bros. of the Gold Ball Mining Company, have lately been taking out very rich quartz from the Mountain Laurel ledge at Salmon river, near the old Klamath ledge, and the latter also prospects exceedingly well. In the Mountain Laurel rich deposits of gold are found in the casings or hanging-walls as well as in the ledge itself, one quartz specimen shown us being at least half gold. The company have expended about $33,000 in opening this mine, and a year ago felt greatly discouraged, but would not sell out now at any price. They have over 10,000 tons of quartz on hand and in sight that will average over $20 to the ton, and their ledge averages three feet wide, with every indication of permanency. Their 16-stamp mill is kept running steadily and successfully. Mr. Pullen is finding some deep water where he is putting in his dam in Klamath river, Cottonwood mining district. He has gone in about 200 feet above his old dam of last year and will run down outside of his old wing, thus taking in the ground which he did not get worked out last year, and as much more new ground. He has a large force of men at work and is making things "hum." Jillson & Co. catch enough water in their reservoir at Cottonwood to hydraulic an hour or so at a time before the supply is exhausted. Wm. Jillson is getting along nicely putting in a wingdam at the lower end of the Pope ranch on east side of the Klamath river. He finds the water quite shallow.

KLAMATH RIVER.—Work on the Keweenaw mine, Klamath river, is going on rapidly, and the outlook is very flattering. If any reliance at all can be placed on reports, this ought to be one of the richest placer mines in the county. On the east side of the river is Carson gulch, at the mouth of which a wingdam was put in a good many years ago and a large amount of money taken out. The following year another dam was put in a little lower down and $12,000 taken out. This was less than one-third the amount taken from the other wing. On the west side of the river are two gulches which paid handsomely. One is known as Dutch gulch, the other as Printer gulch. It was in the latter that the large nugget weighing 109 ounces and $5 was picked up. This nugget was on exhibition at Washington at last accounts. The mouth of this gulch is immediately above the dam Osborne and Dee are putting in, hence it is reasonably supposed that there should be a large deposit of gold in the river just below, and we are informed that "colors" can be obtained from the top dirt at the edge of the water. The ground will probably be 12 to 16 feet deep, and, from this indication, will pay all the way down. Amos, Davis, Deyson and Goodrich are getting quartz from their ledges near the Anderson ranch, Klamath river, and expect to commence hauling rock to the mill this week, Experts from below call it $12 rock, though in smelting the rock it will probably run much higher.

San Benito.

QUICKSILVER.—Hollister *Free Lance*, April 27: A few days ago Messrs. W. F. Dalzell and N. C. Briggs with their wives took a trip up to the Gypsy mines above Lone Tree. They found the retorts had been filled, and the process of obtaining the metal from the ore was going on. The ore proved to be exceedingly rich and the retort yielded 67 pounds to the run. This at a little over 50 cents a pound makes the mine already a good paying property. It will be remembered that a few months ago S. F. miners bonded this property and sank some shafts expecting to find some good prospects in the vicinity. Their attempts proved to be failures, owing, it is believed, to the fact that they either did not prospect far enough, or else worked in the wrong direction. At any rate the old company, which consists of Griffith & Dalzell and the Woodie Bros., are striking good ore in large quantities and are making it pay. What this mine needs is an expenditure of at least $25,000 in running new shafts, levels, etc., and building reduction works.

San Bernardino.

THE SEARLES BORAX WORKS.—Inyo *Independent*, April 29: Searles' borax works is a big institution. The buildings cover about two acres of land a little south of the Inyo county line. The borax field appears to be inexhaustible. When a crop of borax is gathered, at the end of a year the same ground can be gone over again and the supply is renewed and as great as the first. In boring for artesian water a large vein of borax was passed through at a depth of 300 feet. At the works are machine shops, blacksmith, carpenter and cooper shops. Everything from a fish-hook to a prairie schooner can be made at the works. Water for domestic use is conveyed seven miles in pipes from the mountains; the quality is excellent and the supply abundant. Within the limit of Inyo county a tract of land is cultivated that yields an abundant supply of fruits and vegetables. Oranges and bananas are grown. A visitor who was recently at the works says that a thermometer exposed to the sun showed a temperature of 140. The buildings at the works are constructed so as to secure as much comfort as possible in a warm climate. From the works to Mojave the distance is 80 miles.

Trinity.

EAST FORK.—Cor. Trinity *Journal*, April 27: Capital is just as hungry as the labor it buys, and one or two successful starts in this district, in milling her abundant supplies of paying ore, will bring prosperity to the patiently-waiting prospector, the long-suffering dealer in supplies, staggering under his load, willingly borne for the general good. Stiller, Krumpe & Co. are having about 60 tons of ore from the White, Red and Blue (names cost nothing here) crushed by the Golden Chest Mining Co., which will probably turn out light, as the immensely-rich assays of that ore have shown the wealth is in the tellurides that cannot be saved by the free-milling process. The returns from their 15 or 20 tons of rock from their Mountain Bell will show up better. The stopes of the Golden Chest are looking well, and they are accumulating ore for a big run next month; the ledge in the No. 1 tunnel is of fair grade, but has been troublesome on account of the intervening Horse. Still they are now 60 feet under-

ground and gaining depth, and more regularity to the ledge as they penetrate. The Yellow Jacket people are beginning to show new life, and the fine prospects of that district would seem to indicate the prime necessity of continuing "that wagon-road."

KNOW-NOTHING CREEK.—*Aurora*, April 27: James Griffith, a former Canyon Creek boy, now employed at the Know-Nothing creek mines, was in town the first of the week and says that camp is in a very prosperous condition and all signs point to a successful summer's work. Work is progressing steadily on the Know-Nothing mine owned by Hansen, Black, Bennet & Riley. A four-stamp mill is running on good ore and the mine is developing well. The last cleanup was very satisfactory.

Tuolumne.

RIVER CLAIM.—Tuolumne *Independent* April 27: Preparatory work has begun on J. K. Moffitt's river claim for the summer run. Only a few men are at present employed, but the force will be gradually increased until the river falls, which is generally in July, when operations will be rushed along full-handed until again brought to a close by the rising waters in the fall.

NEVADA.

Washoe District.

ALTA.—Virginia *Enterprise*, April 27: The mill is running steadily. Are sinking from the 925 level in ore of good quality. An upraise from the level below will be connected in the ore stopes.

SAVAGE.—On the 400 level the joint west crosscut has been advanced 18 feet in soft vein material. There is considerable water coming from the face, and the ground requires close timbering from No. 1 and No. 2 west crosscuts. Are stoping ore of good grade from the main north and south drifts, and are extracting ore from the old stopes. On the 500 level, from the upraise in No. 2 west crosscut, have started a west drift midway between this and the 400 level; this drift was advanced 32 feet. Expect to encounter the downward continuation of the 400 level ore body in this drift for the same purpose. Are also extending No. 3 west crosscut, which has been advanced 30 feet. Are extracting ore from the old stopes, also from the east crosscut, 600 level. During the week have hoisted 460 tons of ore, have shipped to the Rock Point mill 488½ tons and have milled 480 tons; average battery assay, $20.52. Have shipped $7175.77 in bullion.

HALE & NORCROSS.—On the 400 level the stopes in the north drift from No. 1 west crosscut continue in excellent ore. The winze in the south drift from joint west crosscut is now down 20 feet in ore of good quality. From the top of the south upraise have extended a drift south, which connected with the north drift from the 300 level of the Chollar. This connection greatly improves the ventilation of this portion of the mine, and enables them to drift north from this point to intersect the upward continuation of the 400 level ore body. During the week have hoisted 1200 tons of ore. Have shipped to the Nevada mill 1057½ tons, and have milled 937 tons; average battery assays, $31.60. Have bullion on hand, previously shipped this month, amounting to $64,000.

CROWN POINT.—In stoping east on fifth floor of 400 level, the quantity and quality of quartz has increased since last report. Have commenced extracting ore from the old stopes above No. 1 crosscut and started a south drift from No. 1 to No. 2 crosscut, 400 level. The north drift on the fifth floor has encountered o'd ground, and are now raising on the streak of ore in sight. The other openings show no change. Have shipped to the Mexican mill during the week 854 tons of ore.

BELCHER.—The 200 east crosscut is out 213 feet and has stopped. The west crosscut is out 153 feet, and, having reached the west mole, was also stopped. Have started two more crosscuts 100 feet farther north, one east (No. 2) and one west (No. 2) opposite each other. The 1100 west crosscut is out 102 feet, having advanced 48 feet during the week. The material in the face consists of quartz and porphyry, the former assying from $6 to $8 per ton.

CONFIDENCE.—The joint Challenge and Confidence north drift from east crosscut No. 1, on the 1300 level, is in 10 feet, having been started during the week. Have shipped during the week 40 the Brunswick mill for reduction 308 tons of ore, the average battery sample of which shows a value of $26.83 per ton.

CHOLLAR.—North lateral drift, 558 level, has reached the Hale and Norcross south line. The north lateral drift, 850 level, is out 135 feet. The face is in hard porphyry.

POTOSI.—The south drift, 850 level, is out 197 feet. The face is in hard porphyry. The south drift, 930 level, has been repaired a distance of 498 feet south of the shaft.

CHALLENGE CON.—There was shipped to the Brunswick mill for reduction 56 tons of ore, the average battery sample of which shows a value of $26.83 per ton.

OVERMAN.—Extracted 244 tons of ore and shipped to the Vivian mill 323 tons, 660 pounds of ore; stopes yielding the usual quantity of ore of fair grade.

SEG. BELCHER.—The 1100 west crosscut advanced 47 feet during the week and is now out 285 feet. The face continues in soft porphyry.

JUSTICE.—The mill is running steadily. Are putting up a new double hoist engine to explore the mine at a greater depth.

SILVER HILL.—Drifting southeast southward and northeast on the 260 level. The northeast drift is an old drift.

BULLION.—Will soon commence to drift north on the ledge on the 760 level from the new station.

ALPHA.—Crosscutting east on the Imperial line on the 500 level; also crosscutting west.

BALTIMORE.—Drifting west on the 225 and 338 levels, and saving ore on the dump.

EXCHEQUER.—Drifting north on the 500 level and crosscutting west.

NEW YORK.—Crosscutting west on the 800 level.

SCORPION.—Crosscutting west on the 300 level.

Aurora District.

THE DURAND.—Walker Lake *Bulletin*, April 27: A three-foot ledge of high-grade ore is said to have been recently uncovered in the Durand mine, Aurora but that the great influx of water precludes the possibility of working it with the pumping machinery now in use. Efforts are being made to procure pumps of sufficient capacity to drain the mine, in which event Aurora will emerge from her present dull condition.

Hawthorne District.

PAMLICO.—Inyo *Independent*, April 27: The Pamlico mine, near Hawthorne, is producing some wonderfully rich ore. Recently a sack weighing 124 pounds yielded $8200. Seven sacks yielded $14,000. The vein is thin and the ore is found in bunches. The mine is owned by Messrs. Knapp & Forbes and has already paid them a large amount.

Morey District.

MILL TO START.—Belmont *Courier*, April 29: M. J. O'Brien informs us that Supt. Cohen arrived at Morey from New York on the 19th instant. Mr. Cohen will soon start up the company's mill at that place on ores from the mines of Morey district. All the mining properties in that section of Nye county are looking well. Mr. O'Brien is confident that Morey will be a lively camp next summer. He also informs us that a number of miners are chloriding in Revelle district, and that some of them are encountering good ore.

Palmetto District

PROSPECTORS.—Walker Lake *Bulletin*, April 27: There are many prospectors at work in Palmetto district, and several promising discoveries are reported. The district attracted a good deal of attention in the early sixties, but was neglected and almost abandoned until recently. A few of the early prospectors never lost faith in the district, remained and struggled with it, and appearances now indicate that their reward is at hand. John Kinsella is one of the fortunate prospectors in Palmetto. He has taken out and shipped some rich ore and is reported to be making money fast.

Pioche District.

REDUCTION WORKS.—Pioche *Record*, April 20: A material advance toward completion is noticeable during the past few weeks. The improved weather permits work to be forwarded more rapidly, and with the present rate of progress the dry, concentrating plant will be in operation early in June. The two main buildings are practically finished, a small addition only is necessary to connect them with the old leacher building. The dryer is in place and the mason-work about the dust-chambers, and the dust-flue connected with them, which extends 75 feet or more up the hillside, is finished; likewise, the dust-chambers connected with the Bruckner roasters are about completed, and it is thought the masons will finish their part of the work by Tuesday next. W. Culverwell started teams for Eureka early in the week to bring in two Bruckner roasters from the old Geddes Bertrand mill at Secret canyon. The roads are now in good condition and he expects to get them in without delay. The machine shop at the Raymond works has finished the necessary shafting, etc., for the plant, and it will be put in next week. The boilers and engine are in place, and the woodwork of the bins, pipes, etc., connected with the dry separator, is going ahead. When finished, it will represent a model reduction plant capable of handling any character or grade of ore produced hereabout, and in large quantities. It will also stimulate outside prospect work, since it will furnish a paying market for ores of different classes which cannot now be profitably disposed of.

Silver King District.

TO DEVELOP.—Pioche *Record*, April 20: Nothing has been going on at Silver King district for some months past, but from D. McCarter, who was in town early in the week, we learn that Dave Felsenthal and others of Taylor, who have interests in the district, have sent out mining supplies and propose to develop their properties. Ore of a low grade is plentiful, and the advisability of putting up a small furnace is under consideration. The line of the projected railroad, via Bristol Pass, runs within ten miles of the district.

Sunrise District.

TO DEVELOP LOCATIONS.—Virginia *Chronicle*, April 26: This morning four miners left for Sunrise district to develop locations made last year. On the waste dump of an old shaft on one of the locations ore assaying $150 per ton was found. This shaft will be reopened to ascertain the extent of the ore vein supposed to be located at the bottom. The shaft is about 290 feet in depth and timbered with cedar cut in ravines adjacent to the mine. Gold predominates in the ore found in the district, which is located about 24 miles northeast of the Comstock.

Tuscarora District.

BELLE ISLE.—*Times-Review*, April 27: North drift from west crosscut, 250-foot level, extended 12 feet.

COMMONWEALTH.—225-foot level: Winze has been started and sunk 7 feet. Average assay of ore in the bottom $501.28 per ton. South drift from No. 2 crosscut has been extended 15 feet, all in the vein, assaying $11 to $18 per ton. North drift from bottom of No. 1 winze is in 51 feet and opening up in fine ore. South from this same point the ore is high grade but is not so wide. 300-foot level: South drift from No. 1 west crosscut has been extended 13 feet. North drift from same point has been run 15 feet. Assays from the face of drift return $44 per ton.

NAVAJO.—South drift, from the 350-foot level crosscut, extended 21 feet; rock somewhat harder. No. 7 upraise, same level, advanced 8 feet. South drift on intermediate 250-foot level has been extended 16 feet, showing some high-grade ore. The usual quantity of ore has been sent to the mill.

GRAND PRIZE.—400-foot level: West drift, from north crosscut, extended 22 feet; face showing a large vein of low-grade ore. East drift No. 2, from same crosscut, extended 18 feet without change. Face of south drift advanced 18 feet, and west crosscut from south drift 18 feet.

NORTH COMMONWEALTH.—South drift, 225-foot level, extended 24 feet; will connect with the drift from the Commonwealth line in the coming week. South drift, 100-foot level, extended 20 feet. The face continues all in vein matter carrying some high-grade ore.

NEVADA QUEEN.—The mill has run steadily and is working well. Shipped bullion valued at $10,364.75. Concentrator is working all right; 290 tons of ore received and 135 tons concentrates sent to the mill. At the mine the stopes are yielding fully as well as at any time since starting the concentrating plant.

DEL MONTE.—North drift, on the 225-foot level, extended 22 feet, the face looks favorable for ore. North drift, 100-foot level, extended 24 feet. The face continues to show some high-grade ore, neither wall showing in the drift.

NORTH BELLE ISLE.—North drift, 500-foot level, extended 8 feet; rock black and hard in the face, with the usual flow of water. Stopes yielding some medium-grade ore.

ARIZONA.

SOUTHERN BELLE.—Prescott *Courier*, April 27: The Boaz Co. is operating a 20-stamp mill and four concentrators on the Southern Belle mine, about midway between Walnut Grove and Bradshaw districts and about 30 miles south of Prescott. Supposition is that the company is making money. It is proposed to add 20 more stamps to the mill, so we learned from Mr. Rankin, a member of the company. The Hillside mine is in fine condition. The vein is not large, but it furnishes plenty of ore that works $1000 a ton in silver. N. C. Sheckles, a man who has devoted money, time and talent to developing mines in Bradshaw district, has worked up a scheme that promises great things to our section. It is nothing more nor less than the working in proper manner of the Tiger and other great mines by the capitalists who have examined the properties and are satisfied with them. All our people hope that old owners of the Tiger will see the necessity of prompt action in the matter. Frank Kuhne of Walker district reports great activity among miners there. The Copper Basin Co. is moving right along, treating ores and planning for the future. Shipments of bullion are frequent. Mrs. Randolph and Mike Ryan, owners of the Goodwin lode, Turkey creek district, are shipping very rich silver ore.

LOWER LYNX CREEK.—Prescott *Courier*, April 25: The Idaho mine, which is near the Happy Jack on Lower Lynx creek, carries from 10 to 18 inches of pretty good silver rock; 1276 pounds of it have just sampled $105.07. The owners are Dunlap & Tipton. They have a 20-foot shaft and propose to go deeper. As the mine is near Prescott, cost of bringing the ore here is light. John F. Blandy, M. E., arrived recently from Walker district. From him the *Courier* learns that the Dixie Co. and Frank Kuhne are employing a great many men. Mr. Williams, superintendent at Copper Basin, is running the smelter with, we hear, good success. The old chimney of the Senator is yielding plenty of ore. The Howard mill is kept running night and day. United Verde continues to ship bullion. Placer miners keep on sending in "dust." As water will soon give out, they are working hard just now.

COLORADO.

THE GUNNISON SMELTERS.—*Dispatch*, April 27: The Tomichi smelter at Gunnison is still idle. It is not in contemplation to start it up again before the commencement of shipments from Lake City in some bulk. The domain of this smelting point includes White Pine and Tomichi, Pitkin or Quartz, Gothic, Irwin, Crested Butte, Lake City, Ouray and Telluride. The two last smelting superintendents at the Tomichi or Gunnison works were Schlapp and Rapp, both of whom came from the Pueblo Smelting and Refining Co. Mr. Schlapp is now in Australia at the head of a large smelter. Mr. Rapp is with the Anaconda in Montana. Both gentlemen share the views of the writer that with an increase in roasting capacity and of capital for the purchase of enough ore in summer to last during winter months or snow blockade of mines, the Tomichi smelter can be made to pay handsomely. The necessary difference in the haul of ore to Gunnison City from the haul over Marshall Pass, the nearness of excellent coke and limestone are great advantages. By the roasting of pyrites, carrying silver and gold, the smelter will have to secure enough of iron to dispense with the purchase of iron ore at Leadville. The many smelting failures at Gunnison are no criterion. The last six months' run at the Tomichi proved the possibility of profitable treatment of ore by smelting at Gunnison.

IDAHO.

CŒUR D'ALENE MINES.—Wardner *News*, April 27: The prospects for mining during 1889 are better and brighter than in any previous year in the history of the West. It is a significant fact and one worthy of notice, the amount of foreign capital at present being put into American projects and investments of all descriptions. This desire on the part of foreigners speaks trumpet-tongued of the faith they have in all our industries; and when we see a similar desire existing among Eastern men to become interested in this portion of the great Northwest, it is sufficient proof that they recognize the vastness and undoubted possibilities of our mining regions. A glance at what has been already accomplished in our mountains cannot fail to prove satisfactory, while a further investigation will show the marvelous opportunities still offered to the enterprising and ambitious. Speculators are on the alert and are unusually sanguine, and the general impression exists that better times have come to stay, and the outlook is more satisfactory than ever.

VIENNA.—Ketchum *Keystone*, April 27: Late news received from Vienna states that the explorations now being made in the works of the Vienna mine are exceedingly encouraging, and the prospects of opening up another rich ore chute in this noted mine is daily expected. From the same source of information we learn that the Solace mine, near the Vienna, which is being worked under a lease by Jacobs, Davis & Bollew, is contantly improving and ore is being extracted valued at from 600 to 800 ounces silver per ton.

SILVER.—Idaho *World*, April 27: Samuel Boorn informs us that another silver-bearing ledge has been discovered near Garden valley, across the river from McBride's ranch, and about a mile up in the hills. The discovery was made by Edwin Smith, who, with Mr. Boorn, made the first discovery out there several weeks ago. This last discovery is about five miles from the one first made, by Boorn & Smith. Both ledges carry good silver ore at the surface. The first carries pay for a distance of 600 feet.

LOWER CALIFORNIA.

CAMP ALAMO.—San Diego *Sun*, April 25: A letter from A. G. Rockfellow at Camp Alamo, or as he interprets it, Camp Cottonwood, gives a very graphic picture of life in the gold-fields. A few ledges have already been discovered that must prove bonanzas to those who shall be so fortunate as to become their future possessors, while many more are being brought to light of sufficient promise to make this a famous quartz mining district by and by. While ledges are being discovered all around us, placers are also being brought to light that are a marvel to the oldest foreign miner in the country. In the grass roots, over hundreds of acres, they are found of sufficient richness to excite the cupidity and enlist the muscle of hundreds of stalwart men—and women too—men of almost every nationality, the women being aborigines. The pay dirt which is nearer the very surface than any other portion of the ground, is skimmed off with a shovel, thrown into a wagon or in sacks on burros, and hauled or packed to the nearest water, where it is either panned out or washed out in a miner's cradle. The natives, male or female, are great experts at panning, for which purpose they use a wooden bowl. While a small amount of gold is also extracted by the dry wind-mill method, by far the greater portion is collected in the miner's rocker or cradle above referred to. Of these there are about 200 in use in these mines. But these modes of mining are to be of but short duration, for the amount of ground skimmed over in a day by 100 earnest workers is an unpleasant surprise to those looking for permanence. Besides, water for even this kind of work is becoming scarce. The same is true of gulch or arroyo mining. In the rivers and creeks it may be prosecuted later, but to great disadvantage, as there is no water for piping or sluicing—enough for the rocker only.

MONTANA.

FROM CASTLE.—Cor. Montana *Mining Review*, April 27: The work of sinking 200 feet on the Cumberland has been completed and fine sand carbonate was found at the bottom of the shaft, below water. Fifty feet more of sinking has been contracted for, 22 feet of which is already down, all the way in ore of a high grade. One specimen assayed 1090 ounces. Of course confidence is restored to the camp by these developments. The Hensley Bros. started work on the American and Yellowstone last week and will start the smelter up again soon. A steam hoist is to be put on the American and whims on the Yellowstone and California. The Hidden Treasure, Hamden and Powderly are being worked, also the California, all good mines. A new strike was made on the Iron Chief this spring, after a winter's work by the owner, and another valuable property is added to the many in the camp.

ANACONDA.—Butte *Inter-Mountain*, April 27: The only rumor of any importance is to the effect that the Anaconda will rebuild its lower smelter which was destroyed by fire. This report came up from Anaconda yesterday, and on investigation a reporter of the *Inter-Mountain* traced it to engineer McFarland of the Anaconda Co. Mr. McFarland went East about two weeks ago and has just returned. It is understood that he has told some of his friends privately in Anaconda that the company had let a contract for an iron building to replace the smelter destroyed by fire and that it would be built at once. While this report is second hand, there is no doubt whatever that it comes as stated.

UTAH.

REVIEW.—Salt Lake *Tribune*, April 27: The receipts in this city for the week ending April 24th inclusive, were to the total value of $124,013, of which $25,134 was bullion and $98,879 was ore. The week previous the receipts were $28,834 in bullion and $29,411.80 in ore, a total of $58,245.80. The Ontario product for the week was, from ore sales, $11,655.01; bullion, fine ounces, 34,329; an approximate total of $45,984.01. Seventy shares of Ontario stock sold in New York last week, on the 16th, 17th and 18th, at the uniform price of $35. The regular monthly dividend of $75,000 is announced, payable in New York April 30th. The Daly output for the week was in ore $8424.84; sulphides, $51,354.91; fine ounces of bullion, 9013.63; a total, approximately, of $68,793.38. The regular monthly dividend of $37,500 is declared, payable next Tuesday. Base bullion receipts for the week were to the value of $13,794. The Hanauer smelter bullion product for the week was of the value of $11,350. Ore receipts in this city for the week were to the value of $37,279 by Wells, Fargo & Co., and $61,600 by McCornick & Co., the latter including $37,300 Crescent and $750 Queen of the Hills.

WASHINGTON TERRITORY.

OKANOGAN MINES.—Ellensburgh *Dispatch*, April 25: There is a tremendous rush to the Okanogan mines from Eastern Washington, the means of transportation being inadequate to accommodate the number desiring to be "first on the ground." The mining country to which this refers was formerly embraced in the Moses Indian reservation, and was thrown open to settlement over two years ago, the first settlers to avail themselves of its advantages being from Ellensburgh. Miners and ranchers had been over the country prospecting and exploring it as thoroughly as the embargo placed upon it by the Government would permit, and had discovered rich and extensive mineral-bearing ledges and also fine agricultural lands and stock ranges, abundantly watered and well supplied with timber. It was a fair land to look upon and an attractive country for the pioneer whose neighbors were becoming too numerous and near, serving notice upon him to move further to the front or bide with civilization. The ledges have since been uncovered, revealing the precious and baser metals, and development, although retarded by limited means, has shown permanent veins of great merit. Capital is now coming to the assistance of the miner, and the tide of immigration has set toward the mines of Okanogan in a manner that is certainly gratifying to those who desire to see the great Northwest settled, and its wonderful resources developed.

MECHANICAL PROGRESS.

Evolution in Mechanics.

To the ambitious and progressive mechanic of the present time, the study and knowledge of the history of the mechanical arts is one of the pleasantest and most interesting of pastimes. Nor is it alone for the purpose of following out the line of progress that has been made, that this study is of interest. It serves as an encouragement, and lends a new value to the efforts that are being made toward the perfection of that great art that has done more than aught else toward the elevation and advancement of civilization and business enterprise.

To the young mechanic, also, this study is of especial value and should be carefully followed out, as it will prove a valuable assistant and the source of interesting information, that will assist materially in the practice of his profession.

There is very little, even in the sacred history of the world, which takes us back to the earliest period of man's existence, that does not show, even at that early period, when man is supposed to have first inhabited this earth, some appreciation of the art of mechanics. Probably among the first articles of manufacture were agricultural implements and the necessary tools for their production. We may infer this from the fact that upon this depended the existence of the first inhabitants. We may also infer that as the products of the land were increased by this means, there became a necessity or a desire to branch out into lines of production, and the manufacture of other articles, that, while perhaps not absolutely necessary to their existence, in the primitive stage which then existed, was yet necessary to the advancement that has since the time of Adam been the object and aim of mankind.

Something of an idea of the inventive genius with which mankind is endowed may be gained from the fact that nothing in the line of manufacturing or mechanical appliances then existed, and whatever we of the present day enjoy in this line is wholly due to the growth and evolution of that genius, which must have then existed and which has taken thousands of years to develop, and which is yet but imperfectly wrought out, every year opening up new ideas and advanced stages of perfection. This establishes the fact that man is an inventive genius, and we will now try to follow out as nearly as possible to what purpose he has employed that gift.—*The Practical Mechanic.*

ELASTIC FOUNDATIONS FOR DYNAMOS, ETC.—As dynamos and steam engines are being introduced more and more into private houses and in neighborhoods where the vibration occasionally accompanying their operation is objectionable, some means of preventing the trouble is of special interest. In a recent communication to the Societe des Ingenieurs Civils, M. G. Anthoni describes a method of overcoming the difficulties caused by vibration and noise from engines, and the point upon which he lays special stress is, in the case of machinery, the increase of the mass of the system to be isolated and its carriage by an elastic body, such as rubber. A large trench is dug out, at the bottom of which is placed planking surmounted by a covering of sheet iron, on which are distributed a number of rubber cylinders, constituting at the same time an elastic and electric insulation. On the top of these cylinders there is placed a second plate of sheet iron riveted to a framework so as to give stiffness to the whole. On this is built a foundation in the usual way, provision being made for the foundation bolts, and sufficient space being left to properly allow of periodically cleaning the trough of any extraneous matter without disturbing the elastic support. The foundation need not be of masonry, and in some cases it might be advantageous to replace it by a caisson filled with sand, which may be easily transported. The trench surrounding the foundation is covered at the top by a plank forming a border, but so as to allow of horizontal movement. The steam and exhaust pipes are given a spiral turn at their upper ends so as to permit of their being elastic under the movement which takes place, and so as to avoid the springing of joints.

THE COMING STOVE MAKER.—"I predict the day is coming," remarked Charles H. Filley, vice-president of the Excelsior Manufacturing Company, St. Louis, "when as much inventive ingenuity will be exercised in the manufacture of stoves as in any other manufacturing industry. There is no limit to the possibilities of heat properly applied, and the stove of the future will be as far superior to the stoves of the present, as stoves now are to those of 50 years ago. It will not be many years until the successful stove manufacturer must be an inventor or else quick to secure and utilize the invention of others."

CAST-IRON JOINTS.—A writer in a foreign paper says he is of the opinion that a permanent and durable joint can be made between rough cast-iron plates by the use of mineral asbestos with sufficient mixed white lead to make a very stiff putty. This will resist any amount of heat, and is unaffected by steam or water. His attention was first called to it by a German chemist using it for mending or closing cracks in cast-iron retorts that were used for the distillation of oil and gas from cannel coal. The heat being applied to bottom of retorts and the temperature of iron maintained at a bright red heat, after a time the bottom of the retorts would crack, the larger portion of the crack being downward toward the fire. The method the chemist employed was to prepare the mixture and place it on top of a brick, then place the brick on a bar of iron or shovel and press the cement upward to fill the crack in the iron, holding it for some time until it had penetrated the cavity, and somewhat set. Of course, during this operation, the cap was removed from the retort so that no pressure of gas or oil forced the cement outward until set.

ARTISTIC WORK IN IRON.—A lecture was delivered recently at the South Kensington Museum, by Mr. J. Starkie Gardner, on "Iron and Artistic Ironwork." The lecturer began by tracing the development of ironwork used in mediæval architecture, and stated that Greece was the first country that seemed to have shown any appreciation at all for iron as a material capable of artistic use. It was also the first country that discerned the difference between art and ornament. Unfortunately, all we knew of Greek art in iron work was from Roman and Greek historians and geographers who traveled during that period. We found them, one after another, speaking in the most rapturous terms of the ironwork of Greece, and comparing it in value to the work in gold, silver and ivory. We must, therefore, recognize the fact that the Greeks were very expert blacksmiths. Of Roman ironwork we had the most complete knowledge. They revivified the work, and brought it nearer to the use we make of it at the present time. Britain, about the fifth century, was conquered by the Saxons, and the latter found that art in ironwork already existed in this country. We had examples of what early British ironwork was like in Guildhall and other places in London. The difference was in no respect great from that of Rome, except that the Britons were rather more expert than the Romans.—*Glasgow Engineer.*

OUR TIN RESOURCES.—The extraordinary demand for cans to put up fruit and vegetables on the Pacific Coast has led to the organization of a company with a capital of $1,000,000, nearly all contributed by Englishmen, to develop the California tin mines and make tin-plate. Another company, with similar purposes in view, is also said to have been organized to develop some of the tin mines in the Black Hills. Last year it is said that one hundred million cans were used on this coast. Great Britain has 203 tin-plate mills, employing, it is said, 100,000 men. It is a mere matter of a few years when the bulk of this business will be transferred to the United States, and some $30,000,000 which now goes out of the country every year in the purchase of tin-plate, will be kept at home and divided among our own miners and mechanics. When that time arrives, tin plates will be greatly reduced from their present price by American competition.

AN IMMENSE BUSINESS.—Some idea may be formed in regard to the immense business which the Westinghouse Company is doing from the fact that the Pond Company of Plainfield, New Jersey, with a large plant, are using their best efforts to supply the Westinghouse Company with lathes and other tools required by that company, who are now engaged in fitting up numerous plants in various parts of the country. The Pond Company has found the demand ahead of the capacity of their works and have just negotiated with F. E Reed of Worcester, Mass., to assist them to the extent of building no less than 200 lathes of various kinds.

ENORMOUS DEMAND FOR RAILROAD MATERIAL, ETC.—The iron and steel makers throughout America and Europe are contemplating the possibility of enormous expansion of demand for iron and steel all over the world for railroads, mills, etc. Bowthian Bell, the great British ironmaster, so predicted at a recent dinner of England's great iron-makers. Railroads are wanted everywhere. South America is filling up with English, French and Germans, who are trying to carry their trades and industries with them. Enormous quantities of steel rails and railway material are also wanted in India, Africa, Japan, etc.

THINGS MECHANICAL THAT WILL NEVER BE SETTLED.—The *Engineer* says that among them are the following: Whether a long screw-driver is better than a short one of the same family. Whether water-wheels run faster at night than they do in the daytime. The best way to harden steel. Which side of the belt should run next the pulley. The proper speed of line shafts. The right way to lace belts. Whether compression is economical or the reverse. The principle of the steam injector.

TO HARDEN METALS.—A powder for hardening metals is thus described in an English patent specification. After extracting the color from the cochineal insect, 100 parts of the residue are mixed with 202½ parts of phosphoric acid, and sufficient nitrogenous organic substance to give 32½ parts of nitrogen; the mixture is then evaporated, dried, and 50 parts of soot added. Sheet iron may be hardened by heating in contact with this powder in hermetically closed boxes.

SCIENTIFIC PROGRESS.

The Air We Breathe.

Nothing in the entire material world is today so little known to positive science as the air that surrounds us. It is fairly well known that 80 parts in 100 are of a gas called nitrogen, and 20 parts are of oxygen, but why its constitution is that of an elastic gaseous mixture, and not a chemical compound of these same gases, we can find no solution. The same gases form nitrous oxide and nitrous acid, with intensely active qualities, capable of condensation as liquids and of explosive expansion as gases again. The neutral element, nitrogen, which in the air is not condensable; which is an asphyxiating body if breathed into the lungs, and a non-supporter of combustion, is, at the same time, if chemically combined with this same oxygen, the most powerful of alteratives if not of destructives.

Are we sure that four-fifths of the vast aerial volume that surrounds the earth is so absolutely neutral as has been admitted or assumed? Is there no change of its volume or constitution possible, analogous to the changes by which oxygen unites with many other elements under the processes of oxygenation, acidification or combustion? Nitrogen is not obtained from the air by any process of separation, or combination with another element, as oxygen is separated. It is obtained only from pre-existing natural compounds, the nitrates of potash, or soda chiefly. The animal organizations to which nitrogen is a necessary element, do not assimilate it by absorption from the atmosphere; they must be fed with nitrogenous food, and must derive their requirement from pre-existing combinations of nitrogen. To breathe it in the common air, is to offer the oxygen of the air only to the assimilating power of the vital forces; the nitrogen, which is an absolute necessity to sustain the animal system, can only be obtained through the action of the digestive organs, fed with animal or vegetable nitrates or nitrogenous compounds.

As the air readily yields its oxygen, its ammonia, its compounds of carbon with oxygen, and all other volatile constituents than nitrogen itself, is it not reasonable to examine the constitution of this refractory and immovable 80 per cent of the aerial volumes, to see whether it has no capacity as yet undisclosed and no element as yet undefined?

As at present defined, the air is primarily important as a vehicle or sustaining body to distribute and supply other compounds, as oxygen and hydrogen in the form of water, and the many other gaseous or liquid compounds of subordinate gases. Much of the solid matter of the earth has had, and may again have, a gaseous form, but all these were impurities of the air, and were necessarily eliminated in order to prepare it as a medium for sustaining animal and vegetable life. Nitrogenous and ammoniacal gases are rather impurities than otherwise, and the nitrogen is in no case derived from or returned to the nitrogen of the atmosphere. In short, atmospheric nitrogen is not the nitrogen of animalized bodies or of native mineral nitrates, and it is never a gas of sensible properties or of capacity for assimilation or chemical combination.

We cannot burn the oxygen and hydrogen out of the air and leave isolated nitrogen. Theoretically, we produce certain "products of combustion," being compounds of carbon with oxygen, but not any form of nitrogenous residuals. We cannot find any nitrogen after the fire, although we may have a local atmosphere of asphyxiating carbonic acid or carbonic oxide.

In applying a powerful blast of cold air to a body of incandescent fuel, we furnish much more oxygen than the fuel unites with as carbonaceous combustion, and the outwardly delivered products of such combustion are much less in volume than the inwardly delivered quantities of air and gas, or of air alone. There is always much condensation, and also much excess of heat over the theoretical equivalent derived from the carbon consumed. It is possible to light the fire of an air-blast with a very small relative volume of carbonaceous gas, and to burn the combined volumes with the flame and without residuals or products, such as are derived from carbonaceous combustion. There is no carbonic acid or carbonic oxide gas produced when pure hydrocarbon gas is burned with 70 to 100 parts of dry air, nor is there any nitrogenous or other residual, nor any solid carbonaceous fuel required, although the heat attained reaches 3500°.

It cannot be unknown to metallurgists, whose works require the highest degree of heat, that the most perfect melting heat is that of the air-blast upon incandescent carbon, and as free from actual carbonaceous combustion as possible, the presence of the incandescent surface and the action of a powerful blast being the principal conditions. It cannot be a wholly new principle to assume that the heat is chiefly derived from a burning air-blast.

The common air, with its admitted proportions of oxygen and passive or neutral nitrogen, is in reality a compound of oxygen and *pyrogen*, the gaseous form of heat itself, and which is evolved as heat and converted into sensible heat of the greatest intensity by the blast of air delivered upon a surface of incandescent carbon.—*Lorin Blodget.*

A SCIENTIFIC ODDITY.—The model of an earthquake is a unique piece of apparatus that has been constructed by a Tokio seismologist. Patiently and laboriously following out the accurate records of a modern seismograph, Prof. Sekiya has succeeded in shaping a long coil of copper wire, so as to represent, with the utmost precision, the intricate path described by a shaken spot of the earth's surface. The model magnifies 50 times the ground's absolute motion during 72 seconds, and resembles a ball of twine unwound and thrown down in a confused heap Numbered tags show the progress of the shock for each second of time.

Why Sixty Seconds Make a Minute.

Why is our hour divided into 60 minutes, each minute into 60 seconds, etc.? Simply and solely because in Babylon there existed, by the side of the decimal system of notation, another system, the sexagesimal, which counted by sixties. Why that number should have been chosen is clear enough, and it speaks well for the practical sense of those ancient Babylonian merchants. There is no number which has so many divisors as 60. The Babylonians divided the sun's daily journey into 24 parasangs, or 720 stadia. Each parasang or hour was subdivided into 60 minutes. A parasang is about a German mile, and Babylonian astronomers compared the progress made by the sun during one hour at the time of the equinox to the progress made by a good walker during the same time, both accomplishing one parasang. The whole course of the sun during the 24 equinoctial hours was fixed at 24 parasangs, or 720 stadia, or 360 degrees. This system was handed on to the Greeks, and Hipparchus, the great Greek philosopher, who lived about 150 B. C., introduced the Babylonian hour into Europe.

Ptolemy, who wrote about 140 A. D., and whose name still lives in that of the Ptolemaic system of astronomy, gave still wider currency to the Babylonian way of reckoning time. It was carried along on the quiet stream of traditional knowledge through the Middle Ages, and, strange to say, it sailed down safely over the Niagara of the French revolution. For the French, when revolutionizing weights, measures, coins, and dates, and subjecting all to the decimal system of reckoning, were induced by some unexplained motive to respect our clocks and watches, and allowed our dials to remain sexagesimal, that is, Babylonian, each hour consisting of 60 minutes. Here you see again the wonderful coherence of the world, and how what we call knowledge is the result of an unbroken tradition of a teaching descending from father to son. Not more than about 100 arms would reach from us to the builders of the palaces of Babylon, and enable us to shake hands with the founders of the oldest pyramids and to thank them for what they have done for us.—*Max Muller.*

EFFECT OF DRAINAGE ON SOIL TEMPERATURE. Because in working the soil in sunny weather the surface becomes quickly dried, which is not the case when there is no movement of the soil, leads to the impression that if the soil becomes more thoroughly aerated, either by cultivation or by underdrainage, and the formation of air spaces by the withdrawal of any water that may exist in the soil, it must as a consequence become warmer and so more liable to injure any growing crop. This is an erroneous impression, as can be demonstrated by the continual stirring of the soil on one plot and leaving the same without stirring in another, in which case crops will endure dry weather longer in the first case than in the other. While the surface in the first case may appear to be dry and hot, a little below the surface will almost always indicate a fair degree of moisture and no greatly unusual degree of heat. Loosening of the soil seems to set into activity a capillary action that draws moisture from below, and so in reality renders the soil more moist. In recent years tests have been made with the thermometer, and it is found that the soil temperature of underdrained land is but a little higher than where it is not drained. This was tried at the Canebrake Experiment Station, Alabama, during the months of August to December inclusive, and the temperature in no case was increased over two degrees, which might easily be attributed to the passage of warm air. But no injury can result so long as the soil moisture is in reality increased.—*Ex.*

AN EXPERIMENT WITH THE MEMORY.—Starting with the word Washington, write down 100 words just as they occur to you. Let your second word be the one which Washington naturally suggests to you. Possibly it will be capitol. It may be president. Take the word which first comes into your mind. In the same manner let the third word be suggested by the second, the fourth by the third, and so on. Be careful that the third word is not suggested by both the first and second. Drop the first entirely, and let your mind go from the second alone to the third. Having written this list of words, you will have furnished yourself with a cheap but very useful mirror of your mind. If you are able to use this mirror you may discover some very serious defects in your mental processes. You may discover that you think along certain lines too frequently. You may discover that you are using superficial principles quite too much to the neglect of more important laws of mind. You will thus be led to avoid certain linkings and to encourage others of a more philosophical nature.—*Chautauquan.*

THE EARTH'S CURVATURE.—The surface of the earth in one geographical mile "falls away" or departs from a straight line 8.04 inches.

USEFUL INFORMATION.

The First Sleeping-Cars.

It seems that the first car for the sleeping-car business was built under the supervision of Mr. T. T. Woodruff at the Wason shops, Springfield, Mass., in the early part of 1857. Mr. Woodruff and his associates built this car without a fixed arrangement for its use or even a prospect for a contract for operating such cars. The privilege to use these cars was by the inventor offered to several railroads free, for an indefinite time, if any road would be at the expense of building and introducing them to travel, but without effect. However, the money, credit and labor were furnished as follows: O. W. Childs of Alton, Ill., furnished some cash and indorsed some paper; John Miller of Alton, Ill., and George R. Dykeman of Alton furnished some money. T. T. Woodruff of Watertown, N. Y., having no money, gave his own labor to the extent, including patents, of one-fourth interest, the other three gentlemen holding a fourth each. The total cost of the first car was between $5000 and $6000.

Trial trips were made in the latter part of 1857 over several railroads—the New York Central, Buffalo & Cleveland, Michigan Central, Chicago & Alton, Terre Haute, Alton & St. Louis, Cincinnati & Indianapolis and Pittsburg, Fort Wayne & Chicago—without any encouragement being given to its adoption. Finally the Pennsylvania Railroad Company put the car in service on that road, where it was subsequently burned.

The first berth fare collected was by G. R. Dykeman. It was a Spanish 25 cent piece, and I have heard him say that he would give $100 for that quarter. The four pioneers named subsequently became quite wealthy and closed out their interest to the Pullman Palace Car Co. early in 1870. Geo. R. Dykeman is the only one of the four living. It is said that Jonah Woodruff ran as conductor between Philadelphia and Pittsburg 365 days in 1858 without the loss of a single trip.

But 30 years have elapsed since the first sleeping-car began to run, and only see what has come out of so small a beginning.—*Railroad Gazette.*

FIRES IN OLD ROME.—From a work on "Ancient Rome in the Light of Recent Discoveries," it has been ascertained that the police-firemen of the Eternal City had their hands pretty full. Rome seems to have harbored many incendiaries, and to have been singularly inflammable, even after most of the buildings were of stone or marble. There were no insurance companies in those days to tempt to arson, but there was a system which operated in the same way. When a citizen was burned out it was the custom of all his friends to make him handsome presents, and so it happened that a poor man might easily find his fortunes improved by the destruction of his dwelling. Such a custom, of course, was absurd, and this alone led to the appointment of officers who appear to have exercised functions closely akin to those of our fire marshals. Prof. Lanciani is puzzled by the burning of many of the Roman temples and public buildings, in the construction of which no wood was used, and he instances the destruction of the Temple of Apollo. Possibly some phenomena of the great fires in Chicago and Boston might help to clear up this mystery. It was shown in those conflagrations that when a body of fierce heat had been created by the burning of naturally inflammable structures, those which were thought fireproof may then take fire and burn, and quite possibly this is what happened in Rome. No doubt it was the case on the memorable occasion when Nero, desiring to secure more land for his palaces, and to reconstruct the city, caused it to be set on fire in several places at once, after having thoughtfully provided a quantity of wooden booths for the shelter of the citizens he had resolved to burn out. Great fires in those unlighted streets must have been enjoyed far more by the Roman thieves than by the Roman police-firemen. How the latter fought the fires is not known, save that they had no steam fire engines. Plenty of water they certainly did have, for no city was ever so magnificently supplied with aqueducts as Rome, and yet she used the Tiber as a sewer.— *Fire and Water.*

PRACTICING WITH THE BOOMERANG.—An exhibition of boomerang-throwing was recently given by a party of Australian natives at Munster before some German scientific men, who are endeavoring to discover the cause of the boomerang's curious flight. The instruments used were of two sizes, the larger being a slender crescent about two feet long, 2½ inches wide, and one-fourth inch thick, made of an exceptionally heavy Australian ironwood. This boomerang was jerked up into the air about a hundred yards, when it flew straight away, then turned to the left, and returned in a curved line back to the thrower, whirling around constantly and whizzing unpleasantly. One badly directed projectile passed through a spectator's hat and with a cut as clean as that of a razor. We have not heard what conclusions the German scientists have come to, or whether they have satisfactorily solved the problem; but, according to a German manufacturer, who has made some 11,000 toy boomerangs, the mystery of the movement lies in the shape, the boomerang having a sharper curvature in the middle, with unequal length of the two arms, which must be made of equal weight by unequal thickness. The peculiarity of motion is said to be due to the difference in the length of the arms, which diverges the curve of rotation from the circular.

EXPERIMENTING WITH SOILS.—The necessity of experimenting with soils to ascertain what elements they require is well shown by tests at the Kentucky experiment station. An illustrated report of these forms a feature of the *American Agriculturist* for March. The pictures show the entire crop of cornstalks and grain grown on one-tenth acre plats manured with nitrogen, phosphoric and potash alone, and in various combinations. The striking result is, that on potash alone the yield was at the rate of 80 bushels of ears per acre and nearly three tons of fodder, whereas on a complete fertilizer furnishing all three elements, the yield of both grain and fodder was much less, and it was still less where the other elements were applied, showing conclusively that the great want of this particular soil was potash. Similar experiments at the Massachusetts experiment station, which have been continued for several years, show the same result, and are also finely illustrated.

THE LATEST APPLICATION of the velocipede principle has been made by a sportsman, who made a sled to run upon the ice, which he propelled by means of foot pedals, the same as a bicycle. The wheel which is rotated by the pedals is fitted with steel spurs, which take hold of the ice, and it may be revolved at various ratios of speed to that of the pedals. The resistance of friction is so slight that it is said very high rates of speed are attained by it. When the wind is favorable the propelling-wheel is lifted off the ice and a canoe mast and sails used instead.

HOLLOW POROUS EARTHENWARE used in a Chicago auditorium ceiling was thoroughly, although accidentally, tested recently. A coping stone, weighing nearly two tons, fell from the outer wall of the auditorium building, cut its way as with a chisel through the tiling of the first intervening floor, and stopped on the next, where it was allowed to remain on exhibition for several days to show the strength of the material. When the hole was patched up, the floor was as good and strong as new, not having been disturbed in any other part.

A HANDY LUBRICANT.—Persons who are annoyed by a creaking door do not always have oil at hand, or do not care to use it for fear of soiling the hands and the woodwork. But nearly everybody carries a lead pencil. If the hinges are rubbed with the point of a pencil the creaking will cease, graphite or plumbago being one of the best known lubricants.—*Iron.*

GOOD HEALTH.

REGULARITY OF HABIT.—One of the most difficult of all the minor habits to acquire is that of regularity. It ranks with that of order. The natural inclination of most persons is to defer until the last possible moment, or to put off to another time, where this can possibly be done. Yet habits of regularity contribute largely to the ease and comforts of life. A person can multiply his efficiency by it. We know persons who have a multitude of duties, and who perform a vast deal of work daily, who set apart certain hours for given duties, and are there at the moment and attend rigidly to what is in hand. This done and other engagements are met, each in order, and a vast deal accomplished, not by strained exertion, but by regularity. The mind can be so trained to this that at certain hours in the day it will turn to a particular line of duty, and at other hours to other and different labors. The very diversity is restful, when attended to in regular order. But let these be run together, and the duties mixed, and what before was easy is now annoying and oppressive, and the exact difference between many is just at this point. There are those who confuse and rush, and attempt to do several things at once and accomplish little, while another will quietly proceed from one duty to another, and easily accomplish a vast amount of work. The difference is not in the capacity of the two, but in the regular methods of the one, as compared with the irregular and confused habits of the other.

THE INFLUENCE OF THE ELECTRIC LIGHT UPON THE EYES.—Some very interesting statements regarding the influence of the electric light on the eyes were recently made at the Russian Medical Congress by Dr. Lubinsky of Cronstadt, says the Chicago *Inter-Ocean*. During the last ten years he has had the opportunity to observe 30 cases of diseases of the eye in young seamen who were obliged to serve in the vicinity of the electrical apparatus. The symptoms of the disease, which Dr. Lubinsky calls photo-electric eye inflammation, are quite unique. They appear only during sleep; the patient is suddenly awakened during the night by a copious flow of tears which pour from the eyes, accompanied by a vehement pricking pain. At the same time there arises an unusual aversion to light. Upon examination of the patient there is found a swelling of the eyelids and a strong flow of blood from the corner of the eye. On further examination of the inner eye it is discovered that the entry-points of the optic nerves in the skin are reddened and the arteries of the same filled to excess. These evidences of illness are modified within one and a half to three hours, the patient again renews his interrupted sleep, and awakes the next morning perfectly well, save possibly for a slight weariness of the eyes, such as is experienced after a long reading by lamplight. That sleep is an absolute necessity for the appearance of the disease is evinced by the fact that the persons who have submitted their eyes to the rays of the electric light in the morning and have fallen asleep after dinner were then attacked with the disease, but were free of the same the following night. So long as the person is not in a state of sleep there is no evidence of the appearance of the disease, and he is able, during the evening before, to read and write. Even if the exact nature of this peculiar disease is veiled in darkness, it is nevertheless clear that it is accompanied by a strong flow of blood to the nerves of the eye and an inflammation of the cornea.

BRIGHT'S DISEASE IN AMERICA.—An Albany physician declares that Americans suffer more generally from Bright's disease and nervous disease than any other people, and he says that the reason is that Americans sit down so persistently at their work. He says: "Americans are the greatest sitters I ever knew. While Englishmen, Germans and Frenchmen walk and exercise, an American business man will go to his office, take a seat in his chair and sit there all day without giving any relief to the tension of the muscles of the back. The result is that these muscles surrounding the kidneys become soft and flabby. They lose their vitality. The kidneys themselves soon become weak and debilitated. If Americans would exercise more, if they would stand at their desks rather than sit, we would hear less of Bright's disease. I knew of a New York man who had suffered for some years from nervous prostration until it was recommended to him that he have a desk at which he could stand to his work. Within a year he was one of the healthiest men you ever saw. His dyspepsia and kidney trouble had disappeared and he had an appetite like a paver!"

MARRIAGE STATISTICS IN ENGLAND.—It is said in the *Pall Mall Gazette* that each year 15 people out of every 1000 marry. Of each 1000 men who marry, 861 are bachelors and 139 widowers, while of each 1000 women only 98 have been married before and 902 are spinsters. Twelve marriages out of every 100 are second marriages. The average age at which men marry is about 27, while the average at which women marry is about 25 years. Out of every 1000 persons, 602 are unmarried, 345 are married and 53 widowed. Over one-half of all the women between 15 and 45 are unmarried. Married women live two years longer than single ones. If the mother dies first the father survives 9½ years, but if the father dies first the survival of the mother is 11½ years as an average. Two thousand four hundred and forty-one births occur in England daily—about 33 for each 1000 inhabitants. February is the month in which the greatest number of births occur, June the month in which occur the fewest. The average number of births for each marriage is 4.33. In every 1000 births 11 are twins.

DISORDERS OF THE LEFT SIDE.—Dr. Henry Duchenne has drawn up a list of the disorders which especially affect the left half of the body, and concludes therefrom that it possesses a biological inferiority to the right. He says obliterating arteritis affects the left Sylvian artery oftener; tubercle affects the left lung oftener; calculous nephritis and renal cysts the left kidney; ovaritis the left kidney; orchitis the left testicle; varicocele the left spermatic veins; neuralgia, chorea, hysterical anæsthasia, the left side; cancer of the breast the left mamma.

TELEGRAPHY AND FINGER-NAILS.—A correspondent mentions that two telegraph operators, a male and female, both otherwise healthy subjects, are being treated in Berlin for a newly developed ailment, namely, the dropping off one after another of the finger-nails. Prof. Mendel attributes this curious affection as the result of the constant jar caused by hammering and pushing with the finger-ends in working the Morse system of telegraphy.

VACCINATION IN PARIS.—In Paris, where vaccination is but feebly enforced, the annual mortality from small-pox averages about ten in 100,000 inhabitants, and in the Canton of Zurich since the compulsory ordinance was repealed the mortality has risen from eight per 100,000 to 85. On the other hand, in the German cities, where vaccination is compulsory, the mortality is 1.44 per 100,000, and in London only 0.6.

POISONED BY GREEN FLANNEL.—A young daughter of Milton Blake of Keene, N. H., became seriously and mysteriously ill. Finally it was suggested that the illness might be due to the new green flannel dress she had been wearing. A piece of the goods was analyzed by a chemist, and found to be heavily loaded with arsenic. The girl had been poisoned.

DEATH FROM LIME-JUICE.—Mary Ellen Sullivan, a three-months-old baby, died at her parents' residence, 204 Van Ness avenue, recently, from the effects of an overdose of lime-juice, which had been administered by her mother.

ELECTRICITY.

MODERN ELECTRICAL THEORIES.—As time passes, and the heretofore unconnected links are supplied and put together in the chain of evidence to support our hypotheses on the nature of electricity, says the *Electrical World*, the truth is forced upon us that the theory which at the present time may be said to be an established one among men of science is fairly accurate, and certainly comprehensive enough to embrace all the phenomena which are known. In discussing the modern views regarding the electric current, Prof. H. A. Rowland shows that a few striking phenomena, taken together and reduced to one primal cause, point quite conclusively to the necessary existence of some medium by which electrical action, whatever its nature may be, is transmitted, this medium being placed in a state potentially which it did not possess before the electrical influences were applied to it. Prof. Rowland points out very forcibly that we have to consider not only actions which go on within the conductor, transmitting the so-called manifestation of force, electricity, but that that peculiar state is equally existent beyond the limits of the conductor in space; and, indeed, that electrical disturbances are transmitted into space far beyond what is generally supposed to be the case, due entirely to the transmitting medium, the ether. "The electric current is an unsolved mystery," says Prof. Rowland, "but we have made a very great advance in understanding it when we know that we must look outside at the disturbances in the medium before we can understand it."

DETERIORATION OF COPPER BY ELECTRIC CURRENTS.—M. Firmiu Larroque has been investigating the question of the deterioration of copper under the long-continued action of electric currents. His experiments have been four years in progress and would seem to fairly establish the fact that the action of long-continued currents is to cause a great alteration in the molecular structure of the copper. M. Larroque takes 36 strips of copper each ten millimeters in width and three millimeters in thickness. Some are bent into spirals, some into zigzags, some are annealed and some hard-drawn. A constant current is sent through each strip; in one set it is continuous, in the other it is alternating (75 reversals per second). The strips are suspended from a frame and kept stretched by weights of ten grammes, the loss of elasticity being measured by the elongation of the spirals. For the first eight or nine months nothing was observed, but after that slow elongation set in, the effect being more marked with alternating than with continuous currents, with large currents than with small. From the fact that all the specimens of copper wires which have deteriorated in this manner present many of the properties of ordinary electrolytically deposited copper, it might be useful to investigate the effects of long-continued currents on conductors, built up by electrolysis. It might be reasonably assumed that there would be no further tendency to alteration of texture in this case.

THE VALUE OF BRAINS.—There is romance in the announcement that the four leading Edison companies are to consolidate into one general electric company, with a capital of $12,000,000. What a proof this gives of the value of first-class human brains! Here is a business aggregation that springs from the ingenious wits of one man. A few years ago Thomas Edison was a poor and obscure telegraph operator. To-day, by devising machinery of advantage to the human race, he is a millionaire and the means by which others acquire immense wealth. Yet no one is injured. The new fortunes come from traits of observation and mechanical wit that lay hid in the brain of one poor, wise man. There are mines of the mind that are richer than any which the geologist finds in the mountains.—*Dover Democrat.*

IMPROVEMENT IN THE ELECTRIC-WELDING PROCESS.—The ordinary methods of electric welding, by passing the current through the points to be fused together, are not convenient for all purposes, and Professor Samuel Sheldon of Harvard University suggests what he believes would be better for many cases. The pole of a powerful magnet strongly attracts or repels the electric arc, which may by this means be driven out sidewise into a point very similar to the point of flame projected from an ordinary blowpipe. At the end of this point the heat is intense, being sufficient to melt large copper wire instantly and to fuse any of the metals. It would serve admirably for welding, and a slight alteration would fit any arc lamp to perform the double function of lighting and welding.

WELDING CUT-BALE TIES.—This thing has been made possible by the electric-welding process, and the Thompson Electric Welding Co. has perfected a machine for this purpose. By its use cut ties can be easily united, and the pieces that accumulate at the compresses, which are so well known in the South, can be very quickly made up into proper lengths for use.

JAPAN is taking up the subject of electricity with the same promptness which she has shown toward other branches of applied science, and a society for the furtherance of electrical research has been formed there with a membership of 800.

MINING AND SCIENTIFIC PRESS.

A. T. DEWEY. W. B. EWER.

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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO
Saturday Morning May 4, 1889.

TABLE OF CONTENTS.

EDITORIALS.—The Leffel Improved Water-Wheel for Mines; The Davis Horse-Power Hoisting Whims, 313. Passing Events; A Peculiar Sand; Mexican Mining Districts; The Celebration; Proxy Voting at Mining Elections, 320. The Blake System of Fine Crushing; A Miner's License, 321.

ILLUSTRATIONS.—The Davis Horse-Power Hoisting Whim; Leffel's Standard Double Turbine Mining Wheel, 313. Sections of Blake Mill, 321.

CORRESPONDENCE.—Rebel Creek Mining District; Como, Nevada, 314.

MISCELLANEOUS.—The Thrashers' Cook-Wagon; The Work of an Astronomical Society, 314. Industrial Notes From Los Angeles; Laufenburg's Traction Engines; What to Do With Our Boys, 315.

MECHANICAL PROGRESS.—Evolution in Mechanics; Elastic Foundations for Dynamos, Etc; The Coming Stove Maker; Cast-Iron Joints; Artistic Work in Iron; Our Tin Resources; An Immense Business; Enormous Demand for Railroad Material, Etc.; Things Mechanical That Never Will Be Settled; To Harden Metals, 318.

SCIENTIFIC PROGRESS.—The Air We Breathe; A Scientific Oddity; Why Sixty Seconds Make a Minute; Effect of Drainage on Soil Temperature; An Experiment with the Memory, 317.

USEFUL INFORMATION.—The First Sleeping-Cars; Fires in Old Rome; Practicing with the Boomerang; Experimenting with Soils; A Handy Lubricant, 319.

GOOD HEALTH.—Regularity of Habit; The Influence of the Electric Light Upon the Eyes; Bright's Disease in America; Marriage Statistics in England; Disorders of the Left Side; Telegraphy and Finger-Nails; Vaccination in Paris; Poisoned by Green Flannel, 319.

ELECTRICITY.—Modern Electrical Theories; The Value of Brains; Improvement in the Electric-Welding Process, 319.

SHOP NOTES.—Graphite Lubrication; Points for the Mechanic; Mechanics' Associations, Miscellaneous, 322.

MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 316-7.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 328.

Business Announcements.

[NEW THIS ISSUE.]

Rubber Goods—W. F. Bowers & Co.
Sawmill For Sale—Risdon Iron & Locomotive Works.
Sargeant Drills—Ilex Gold Mining Co.
☞ *See Advertising Columns.*

Passing Events.

The celebration of the anniversary of the inauguration of George Washington as the first President of the United States, has occupied public attention this week. In all the larger cities there were appropriate ceremonies, New York taking the lead. In San Francisco the day was celebrated by a general holiday, a procession, literary exercises, etc.

Considerable prospecting is now going on all over the State, especially in Shasta, Trinity and Siskiyou counties. These northern counties have been more or less neglected for years, but of late have come to the front, and still afford a broad field for the prospector to work in.

Owing to numerous accidents on the cable-car street roads in this city of late, there is a public demand for additional safety appliances. There is a good opportunity for inventive genius in this direction. A number of guards have been devised, but none as yet seem to meet the requirements of the roads which have steep grades.

There seems to be a generally revived interest in mining matters in the southern part of the State. This is not only apparent in quartz mines, but in the development of clay beds, stone quarries, oil and gas wells, bitumen, etc. Many of these substances are now being eagerly sought for, since there is now a market for such products.

Proxy Voting at Mining Elections.

The failure of the last Legislature to pass a more stringent law defining the voting by proxy at corporate elections has awakened renewed attention to the suit now in the Superior Court of this city of Coll Deane et als. vs. the Challenge Consolidated Mining Co., Roger Johnson and J. M. Nougues, attorneys for plaintiffs.

This action was commenced on Dec. 24, 1888, to enforce the provision of Sec. 312, Civil Code of California, which provides that only bona fide stockholders shall vote at corporate meetings. A practice has prevailed here of issuing all the stock of a mining company to a few individuals as "trustees" and permitting it to stand as issued on the company's books, while the stock itself has been transferred by indorsement to bona fide owners and scattered throughout the country, notwithstanding which the few stockbrokers in whose names it appeared to stand on the books of the company were permitted to vote either in person or by proxy at the annual meetings and thus control the elections of officers without having any individual responsible pecuniary interest therein. This practice has been upheld by the claim that the Supreme Court of California had sanctioned it when it decided that for all the purposes of an election the company need look no further than its books to see who was entitled to vote, and in consequence thereof a demurrer to the complaint was introduced in this case. On Jan. 11, 1889, the demurrer was overruled, and thereby the principle contended for by plaintiffs was established. Among the better informed it is claimed that Judge Wilson's decision will, no doubt, be sustained by the Supreme Court.

The Celebration.

The celebration of Washington's inaugural was carried out in this city very well indeed. The main feature was a procession in which the Government troops, State militia and civic societies participated. It was well arranged, started promptly, and was, altogether, one of the best we ever had here. The shipwrecked sailors from the Vandalia, who walked in the procession, were cheered all along the line. One of the most interesting features was arranged by the California Pioneers. After the Veterans of the Mexican War came a band of vaqueros. The next picture consisted of a representation of an emigrant train crossing the plains. Five emigrant wagons and three pack mules performed the allotted parts. The first was a thoroughly broken-down old wagon, covered with white canvas, in which a number of men were seated. On a piece of calico were the words: "Californy or bust."

Behind came another equally dilapidated looking turnout, drawn by four oxen. It bore the legend, "Pike county, by gosh." A third was drawn by a team of three horses and on the front seat a woman and a number of children were seated. A string of pack mules, laden with flour-bags, shovels and frying-pans, came next. At the hind strode prospectors in their red shirts and high boots. A scout with his gun across his saddle-bow rode beside them.

There were then some floats representing mining days. On the first were a number of miners seated round manzanita bushes in front of a tent and playing cards.

A second represented a mining camp, with rockers, pans, etc. The third contained a big bear inclosed in a cage, and he attracted a tremendous amount of attention along the route.

The main body of the pioneers followed, the majority marching as courageously as if they had only arrived on the coast in 1889 instead of in 1849. To a large proportion of the crowd on the streets these representations were entirely novel, showing that we have outgrown the era of mining as far as early customs connected with surface mining are concerned.

THE Plumas-Eureka Mining Company has declared a dividend of 50 cents per share, aggregating $72,312, payable immediately. This makes a total of $2,495,313 paid to date.

The Davis Horse-Power Hoisting Whims.

(*Continued from page 313*)

and, in hoisting, drives the drum through a friction clutch. This avoids the frequent accidents occurring with other machines, occasioned by the breaking of the gear teeth when throwing them in and out of gear. In lowering, the drum is pressed by a powerful screw lever against brake woods at the opposite end. Perfect means of adjustment are provided for the friction clutch and brake blocks.

As the drum is entirely independent from the driving gears, the operations of hoisting, dumping bucket and lowering can be performed with the horse in constant motion, a feature that greatly increases capacity by avoiding the loss of time due to stopping and starting the horse.

They are very light and compact and can be packed for transportation by mules. Their cost of erection is very slight, two men in half a day being able to put one in place, ready to work.

With each machine working drawings are furnished, showing in detail the proper construction of gallows-frame and foundation for hoisting whim.

The capacity stated below is nominal. In actual trial the No. 1 whim has hoisted 1200 pounds with one horse and single line without undue exertion on the part of the horse.

No. 1—Capacity with one horse and single line, 800 lbs., 75 feet per minute. No. 2—Capacity with one horse and single line, 500 lbs., 125 feet per minute. Dimensions of hoists Nos. 1 and 2—Drum, 22 inches in diameter, 18 inches long; bed plate, 3 feet 10 inches long by 2 feet 8 inches wide; ½ inch wire or 1¼ inch hemp rope is the proper size of rope to use.

Weight of machine, 1200 lbs. Total shipping weight, including sweep, levers and sheaves, 1400 lbs.

The Joshua Hendy Machine Works of Nos. 39 to 51 Fremont street, this city, are the agents for the sale of these whims, and they assure us that they are prepared to furnish them at a lower price than any other form of whim of equal capacity now offered in the market.

A Peculiar Sand.

W. E. Bainbridge showed us this week some sands from San Bernardino county, in which there are many garnets and other small and brilliant stones. He informs us that an examination by parties in Boston reveals the existence of very small diamonds, and he is going back to see if larger ones can be found. Some of the garnets are as large as a pea, and the small ones are very numerous.

This sand is found in a sort of conglomerate filled with fossils. It is in layers and in the decomposed material numbers of the garnets and small stones are found. On one side of the deposit the country rock is slate and on the other sandstone. The sand comes from the conglomerate after it is washed.

Mr. Bainbridge brought up a lot of this sand thinking that from its sparkling and brilliant nature it could be utilized for a finish to fine wall paper. He had no idea there were any small diamonds until he heard so from Boston, where the sands were sent for examination. But now he will make further search to see if some larger ones may not be found.

DEATH OF CYRUS PALMER.—News has been received of the death of Cyrus Palmer at Westfield, N. J. Mr. Palmer was very well known in San Francisco. He came to this city in 1849, and continued a resident here until he went East in 1883 on business for the Golden State and Miners' Iron Works of this city, of which association he was an active member. He was one of the founders of the Miners' Iron Works, afterward consolidated with the Golden State Iron Works. He served with credit in two terms of our State Legislature. Mr. Palmer was a popular man among his associates, being of a genial nature with generous attributes. His death was probably due to heart disease, as he has been subject to attacks resulting from heart trouble.

THE Jay Gould mine in Montana has produced bullion to the amount of $773,000 and divided $365,000 among stockholders. The dividend rate is not large, but the dividends come around as regular as the months.

Mexican Mining Districts.

Birimoa.

In last week's PRESS we gave the results of an interview with Mr. Alex. H. Dubois concerning Mexican mines and miners. This week the subject is continued. Mr. Dubois informs us about many camps which are scarcely ever heard of here. He has prepared for the PRESS a map of these districts, which we shall publish next week with further descriptions of the mines.

Ten miles south of Canelas is the important mining camp of Birimoa.

Here there are strong veins, which, however, are barren, except where intersected by cross-veins, thus forming two valuable and important mines. Santo Nino has a chimney of ruby silver ores, frequently massive pyrargirite. It was extensively worked about 1850-60 by M. M. Careaga, a Spaniard, then owning Juliana and other mines in Topia. It produced several million dollars, of which a large amount was net profit. Most of the ore was exported. It is not worked at present. The San Francisco, also a large chimney of ore on another intersection, small on top, but increasing downward like a sugar-loaf. So far, it is only moderately developed. The owner is D. Eraclio Amador. In 1886, I sampled 500 tons for sale, consisting of one-half pyrite and one-half quartz, and found an assay value of 85 ounces troy silver and 3 ounces troy gold per ton. These ores were being sold to small leaching works in the same camp and worked very roughly, and yet with fair result (as to the silver), although the crushing was through a No. 4 or 5 screen. A slight amount of copper in said pyrite will account for the docility of the ores.

Lately, I understand, another mine adjoining the San Francisco, and probably on the same vein, has produced large quantities of rich exporting ores worth $300 to $400 per ton, mostly Ziegelerze carrying silver chloride.

Many other mines in the same camp are at present unworked or worked only on a very small scale. This is a very likely camp for legitimate work by real mining parties. The main drawback is lack of water, and fuel is rather expensive. Water is abundant, and perhaps water-power available some five to six miles away over rugged ground.

Northwest of Topia, 40 miles on Sianori river, is

Sianori, an Old Spanish Mining Camp.

The mines are gutted above water level. They are now worked by D. Eraclio Amador. There are steam pumps on the Xicotencatl mine, which is 400 feet deep. The ores are copper-silver glance, mainly worked by stamp and Frue vanners in a mill originally (1886) steam-power. There were 10 stamps, 4 Frue vanners, 2 pans and settler, I hear, the mill now enlarged and moved by water-power. Here there is a very deep valley and very bad roads; indeed, the worst met with in 20 years' traveling in Mexico in the mountain mining camps.

Other valuable mines are the Animas and others on the same lode, rich ores of copper-silver glance and argentite carrying some gold. The mine is gutted above water level. This camp, which was completely abandoned after the expulsion of the Spaniards, was taken up by D. Zeferino de Anitua (Sombrerete and Topia), who cleaned out the old mines, but found them gutted above water level and was unable to handle the water, which was quite abundant. Subsequently Amador placed a steam pump in the Xicotencatl mine and reached 11 rich pillars, which produced $200,000 of exporting ores besides some 6000 to 8000 tons good milling ore worth $50 to $80 per ton, which, proving rather rebellious, has been worked up by concentrating on Frue vanners. Xicotencatl is still being worked and produces considerable fair ore.

This is a very important camp; in fact, one of the best left by the Spaniards, who had not had time to work it out when expelled. It is worthy of serious enterprise in mining below water level. Water is abundant in the mines.

The water-power is sufficient. There is a good ditch several thousand feet long with large fall. The river is treacherous, rising suddenly many feet and destroying all on its passage.

Small Mining Camps Worthy of Investigation.

Southeast of Sianori is a small mining camp, La Galana, with superficial workings by gambusinos on numerous veins, frequently producing very rich ores bearing gold and the silver minerals proper; these are either exported or ground in arastras.

North of Sianori we find the Fresno mine, a large deposit of $30 to $40 free-milling silver ore, mainly worked by gambusinos; and the Ciruelo mine, also an extensive deposit of silver ores, intermingled with lead sulphurets fit for concentrating.

West of these is Norotal, where we find the old Spanish mine, Villamoros, of great repute. I am informed that it has been lately partially drained out and abandoned, as no ore was found in sight; true, no development work was attempted. Do people actually suppose that the natives will abandon a mine as long as pay ore is in sight?

Near this we find the Cinco Senores mine, a half-developed prospect on a deposit consisting of a large fissure vein some 60 feet in width (in the red porphyry), and in this we distinguish several bodies of quartz carrying rich fahlers ($2000-$2500), pyrite ($250), and rarely pyrargyrite; also bunches of galena ($50 per ton);

these ores are fit for jigging. A "fault" checked the further development of this mine, which is likely on investigation to prove a valuable property, susceptible of being worked by levels on the deposit. This mine is worthy of attention; besides, the Norotal district contains many mineral veins well worthy of serious investigation.

Quebrada Honda Gold Mines

Further west yet Quebrada Honda is an almost abandoned mining camp, with several strong veins which have at surface yielded rich gold ores. Veta Grande is a body of quartz standing out boldly and shows some gold. On this is an old shaft full of water and said to be 200 feet deep. I saw a few years ago average $25 gold ore broken from superficial workings, now full of water, on a branch of the Veta Grande. This ore, besides the gold, carried argentite and haematite rich in silver.

A New Camp on Virgin Ground.

Turning to the north one day's journey brings us to the Ferry on the Humaya river at Embarcadero. Crossing here, we proceed up the San Fernando creek and soon reach an undeveloped mining camp of great possibilities if properly developed. This is called San Fernando.

La Providencia is a prospect 60 feet in depth on a lode 15 or more feet in width, the average assay value of which I found to be 20 ounces silver and $5 per ton consisting of galena, blende pyrite, and evidences of fahlerz in a greenish-gray felsitic matrix showing some quartz. Near the bottom of the workings veins of massive fahlerz from half an inch to one inch in thickness assaying 480 ounces silver and 8 ounces gold per ton have made their appearance. The bulk of the output would dress (by jigging) to about one-sixth of clean sulphurete.

A very favorable location for reduction works lies within 2000 feet from the mine, sufficient water for a large establishment being available, and plenty of fuel, the fire-wood and charcoal being cheaply obtainable. Timber is also available, and the base of supplies, Culiacan, within reasonable distance.

In the immediate vicinity exist numerous strong veins, some of them somewhat developed by prospect shafts, all carrying base ores, mostly pyrites, copper pyrite, blende galena, and some fahlerz, all of which usually show good assay values in gold and silver.

There is an abundance of limestone within seven or eight miles for fluxing purposes.

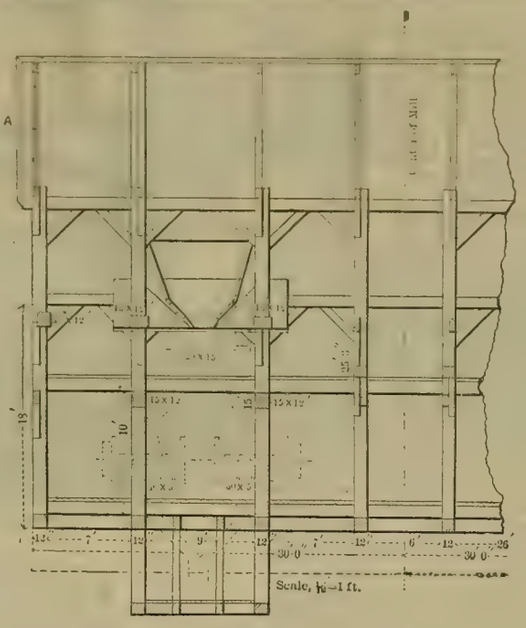
The San Fernando district is virgin ground, not even well prospected, and invites enterprise.

THE Port Townsend *Call* says that a Castle Rock man procured a bushel of the best English coal at Seattle and sent it to experts in Portland as a sample from his own mine. After some time the reply came: "The sample of Cowlitz river coal you sent us is worthless, and we would not advise you to ask much for your mine." When informed that the "worthless" coal was a good imported article, the "experts" had very little to say.

WHEN the addition to the Treadwell mill at Sitka is finished the mill will be the largest in the world, 360 stamps.

The Blake System of Fine Crushing.

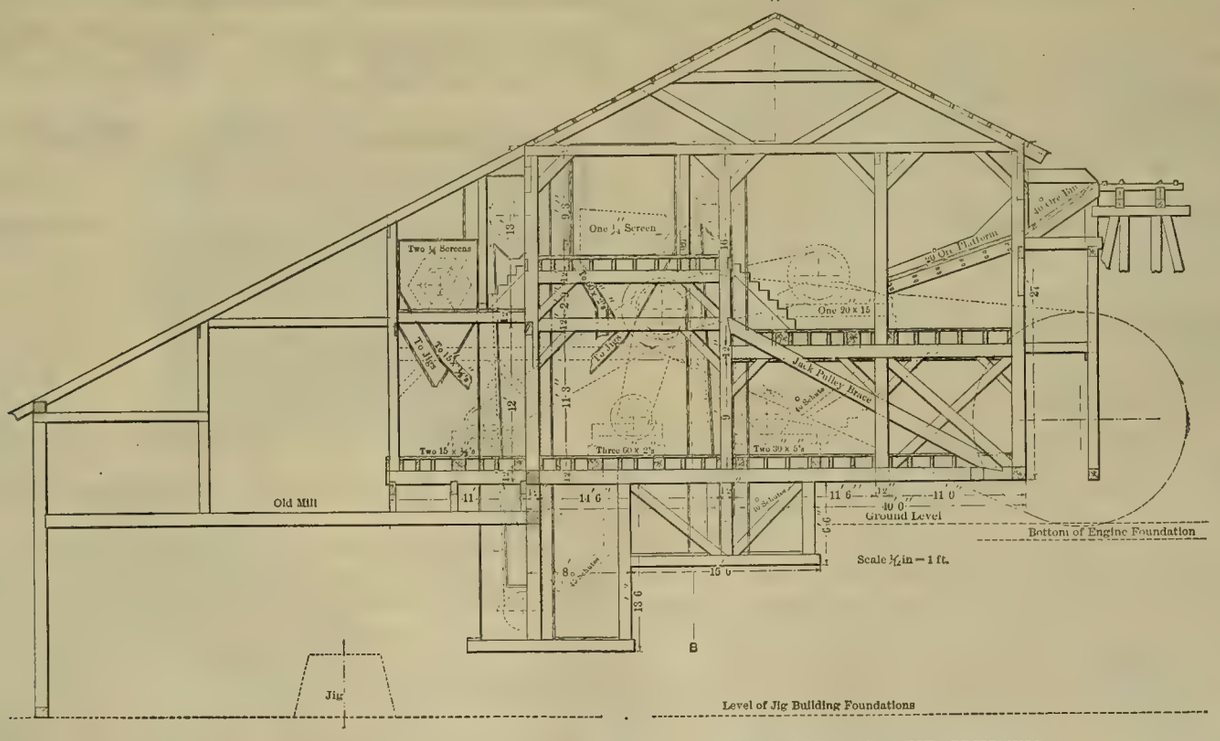
The PRESS of last week was published a description of the Blake system of fine crushing of ores, in which Blake multiple-jaw crushers and Chile mills are used. In 1886 plans and machinery for the second mill on this system were furnished to the Chateaugay Ore and Iron Co., Lyon Mountain, N. Y. Illustrations showing the design of this plant are herewith presented. This was a complete crushing and concentrating plant, the crushing being done entirely by Blake crushers, and with a daily capacity of 600 long tons, from 15 inches down to one-fourth of an inch, and it was built in accordance with plans shown in the figures. The iron-ores of this company are known as being among the best, if not the best, Bessemer ores in the country. The deposit or vein of magnetic iron-ore is enormous, and the output from this mine often exceeds 1500 tons daily. The richer portions are sorted out and shipped; the leaner ores, consisting of magnetic iron-ore in grains, disseminated through a tough quartz-ose and feldspathic gangue, are sent to the mills for concentration. In order to effect this by jigging, with best results, it must be reduced to a size to pass a one-fourth-inch or five-sixteenths-inch round hole. The jigs used are those known as the Conkling, with an annular revolving sieve and central discharge, said to be the invention of Mr. Hooper of the American Graphite Co. and improved in some details by W. B. Hodgson. The concentrates pass into a hutch, from whence they are taken out by belt elevators. The capacity of one of the jigs, as run at Chateaugay, is 100 tons of crude ore in 24 hours, or five tons per hour.



SECTION OF LINE A—B OF BLAKE MILL.

The elevation of this mill in the accompanying plates shows very clearly its construction. The ore is brought to the mill by rail in side-dumping cars, carrying on an average 7½ to 8 long tons. It consists of two groups or systems of crushers with elevating and screening appliances, each group being an exact duplicate of the other, a jack-pulley on main line shafting being placed centrally between them. Power is derived from a 250-horse power engine, with three 100-horse power steel boilers. Each group consists of the following crushers, all of Challenge pattern, one 20x15, crushing from 15 inches to 2 or 2½ inches.

Product of each 20 by 15 is divided, going to two 30 by 5s. Product of 30 by 5s is elevated and screened; that passing a ¼-inch round hole is finished product, as far as crushing is concerned, and is carried to the jigs. The "coarse," 1½ to ¼ inch, goes to three 60 by 2 Multiple crushers, each with three jaw openings 20 by 2 inches. Product of these is elevated in No. 2 elevator and screened, formerly through holes ¼ of an inch in diameter, now through five-sixteenths holes. That passing through the five-sixteenths screen holes goes to jigs; that going through eleven-sixteenths inch holes goes two by two fine crushers. Each by ½ crushers has 7 jaw openings, with 7 openings each 15 by ½ inch. Material not passing eleven-sixteenths inch holes, but going out the end of screen, goes back to the 60 by 2 Multiple crushers. Product 15 by ½ fine crushers is elevated and screened, material not passing five-sixteenths holes returning to them. Each group of crushers has three Conkling jigs. In the PRESS of next week we shall give a plan of the mill with an account of the results accomplished.



SECTION ON CENTER LINE OF MILL FOR ORES ON BLAKE SYSTEM OF FINE CRUSHING.

A Miners' License.

Up in British Columbia the Mineral Act requires miners to pay a license, and the miners of Kootenay district petitioned the Legislative Assembly to repeal the section bearing on this, but that body did not pay any attention to it.

Moreover, the following amendment to the Mineral Act has been passed: "Every person engaged in mining for miners's other than coal shall take out a free miner's certificate, and any person who mines or WORKS FOR WAGES as a miner in any mining claim, or on any bedrock flume, bedrock drain or ditch, without having taken out and obtained such license, shall, on conviction thereof in a summary way, forfeit and pay a penalty not exceeding twenty-five dollars, besides costs."

This seems to be an absurd arrangement, especially as other workingmen do not have to obtain a license to do their work. The policy is a poor one by which to develop the mineral resources of any country. When it is more settled and developed, any industry may be able to stand such restrictions; but while they are trying to open new districts and mines, and induce capital to come in, such measures as this retard the whole business. If the laws now in vogue concerning gravel mining in California had been enforced 30 years ago, before the agricultural or quartz-mining possibilities of the State were known, we would not have one-tenth the population we now have, and California would be more than 30 years behind its present condition. The British Columbia people cannot afford to call for such an unjust and foolish license tax on a class which is productive and engaged in developing material resources.

THE terra cotta works at Elsinore are daily turning out 3000 feet of pipe.

SHOP NOTES.

Graphite Lubrication.

In the development of the world's history, the time has arrived, it would seem, when a change is to come about in the mode of lubricating machinery, carriages, wagons, etc.

This change is to be brought about by substituting graphite for oil or grease in whole or in part.

For more than 50 years it has been known that graphite was one of the best lubricants extant, but no way has been discovered to hold it in position and utilize it as a lubricant except by mixing it with oil or tallow, and yet its use in this form has gradually been growing for the last 20 years; and it is now quite extensively used in oils for heavy bearings, and particularly for packing-boxes for railroad cars.

A few years ago the process was invented and patented for holding graphite in its position in a journal-box, thus furnishing dry lubrication.

Like all other useful inventions, the graphite bushing or journal-box was greatly in advance of the times, and after being invented the invention came near to being lost to the world for want of recognition. Graphite bushings and boxes could not be sold; in fact, they could not be given away with an agreement that they were to be put in use and used. Scientists were against the invention, engineers condemned it, and capital could not be found to introduce it; and while it was successfully introduced in the block trade in the fall of 1877, and on machinery in the fall of 1883, and on carriages and wagons about the same time, we are informed that its progress in actual use has been very slow. Graphite bushings went into use in the block trade in 1877, but the difficulty then presented itself of getting a box into use upon a machine in a mill or factory, and the first one put to use was in the factory of the Norfolk & New Brunswick Hosiery Company at New Brunswick, New Jersey, and was started Nov. 20, 1883. On the 5th of March, 1884, the company, by their superintendent, issued the following certificate:

"We have one of the graphite-boxes in use on a fancy move of our cards since Nov. 20, 1883. We oiled it a few times after putting it on, but it has been running since Nov. 28th without oil at a rate of about 600 revolutions a minute, and about ten hours per day. The bearing surfaces at this date are found to be in good condition, without showing signs of cutting or beating." From this single bushing the graphite-boxes on machinery started, and mechanics and others using machinery can see how the revolution is being brought about of discarding oil and substituting graphite in its place.—*American Engineer.*

Pointers for the Mechanic.

Never work with a dull tool.

Take time to sharpen and put your tools in good order; it saves time in the end.

Above all, never use a dull or badly "set" saw. It will ruin your work, sour your temper and make you disgusted with the whole world.

If you are varnishing or polishing a piece of work, have the room or shop warm, exclude draft and dust, and don't be in too big a hurry.

If you are polishing in the lathe, see to it that all dust and dirt are removed from the lathe-bed before you commence work.

It is better, when possible, to polish all turned work in the lathes. It always has a better appearance for it.

In making patterns for castings, if you have no experience you had better consult some person who has had experience. Patterns are difficult things for amateurs to make if they do not understand the principles of molding and founding.

White pine or mahogany makes the best work for patterns. Lead, brass, copper, and sometimes plaster of paris, are used for making patterns; especially is this so for small, fine castings.

Shellac varnish is the best material for coating patterns.

Beeswax may be used for stopping up holes or to cover defects in patterns if it is coated with shellac varnish afterward. The beeswax will "take" the varnish readily, and will not cling to the "sand," like ordinary putty.

Shellac varnish may be mixed with a little lampblack to give it body and make a black pattern.

Sometimes pattern makers use stove-polish, for "black lead," as it is called, to finish their patterns. It is applied nearly dry, then polished with a brush.

Wood used for patterns must be of the very best finish, straight grained, free from knots or shakes, and well seasoned.

A clean pattern gives a clean casting, and much labor may be saved by making the pattern the right size, and smooth and clean.

After patterns have been used they should be kept in a dry place, as damp will distort and otherwise injure them.

Always make a drawing of patterns before making. Much time and labor will be saved.

Put on your best workmanship when pattern-making.—*Universal Tinker.*

THE MACHINE SHOP is one of the promoters of civilization. The acts of politicians are subordinate to it. Without the aid given by machines many of their schemes would fall dead; without the locomotive, the printing press and the telegraph, they could not speedily reach the ears of men who move in certain lines of thought. The ability to design a machine which will execute with automatic precision any given form requires a special development of brain-power, and this development is by no means confined to the operator, but is shared by many persons. One machine leads to another, and as a consequence the intelligence of men turning out machinery of a high class is very marked, although they are unknown, for the most part, except locally. The machinist speaks through the work of his hand and brain. He adds to the population of the world when he sends forth a machine capable of increasing its working force; he frees his fellows from the bondage of mere handwork, and sets them higher problems to solve. In every way he advances the cause of his race, and leaves the world richer by his labors.

Mechanics' Associations.

There have been some movements of mechanics of late years in the direction of forming educational associations or societies, but such movements have been quite too few. The most noticeable of these movements has been in the instance of the stationary engineers, who, to the number of several thousand, are engaged in educational work that has and will show good results. No one who is at all familiar with the inside working of the engineers' associations will deny this.

Besides the engineers, the iron-molders have done something in the way of industrial organization. Their progress will be watched with interest, because, as a body, foundrymen have made great progress during the last 10 years in the way of getting better theoretical and practical knowledge of their trade.

But the stationary engineers and the iron-molders are but a small portion of the skilled workmen. There ought to be mechanics' educational societies in every manufacturing town in the country, modeled, perhaps, something after societies that have a central association, with subordinate branches here and there. While there should be but little machinery in the organization of such associations, and that of the simplest kind, all experience shows that there must be some. Nothing of consequence can be done except it be done decently and in order, and in every association there must be some rules that are inflexible. Men cannot join together for any purpose, and succeed for any length of time, unless there are some fundamental principles that all agree to recognize. On the contrary, more than one promising society has been strangled by too many rules—smothered by machinery, as it were.

A trouble of the skilled workmen of this country, in the way of educating themselves, is a lack of independence in the matter. In all other things they have plenty of independence, but, curiously enough, when it comes to improving themselves in a way to make it possible to rise in the world, they expect some one else to supply the facilities and run the machinery for them. A man prizes what he works hard for, and knowledge that costs something—some self-denial, for instance—to get, is apt to be used to advantage. If mechanics want educational associations, they will have to plan them and support them, neither of which is a job of great difficulty or cost. If it is a matter of importance for mechanical engineers to travel hundreds of miles to discuss and hear discussed matters pertaining to their business, why should it not be of importance for mechanics to have places for meeting for similar purposes, without the expense of going away from home?—*American Mechanic.*

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. ".) from week to week and year to year.

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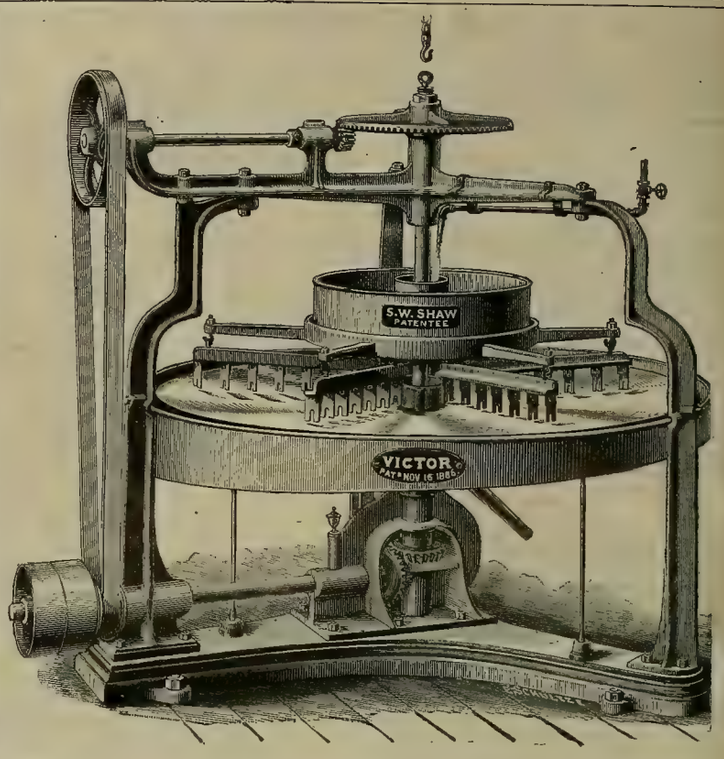

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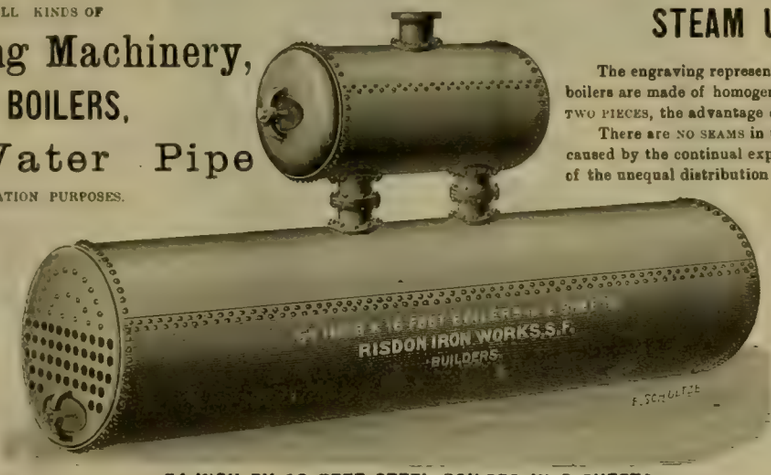

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1 Set Binder Braces and Bolts for Brickwork.
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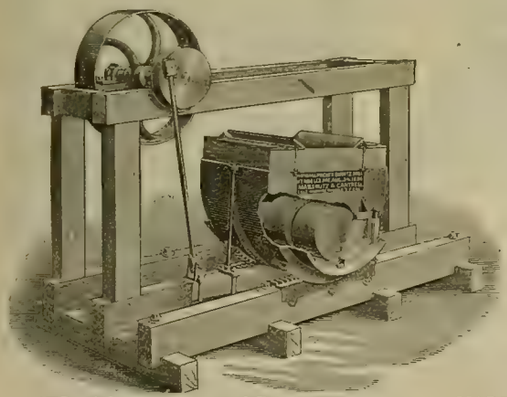

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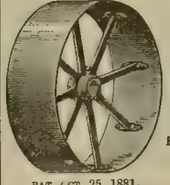

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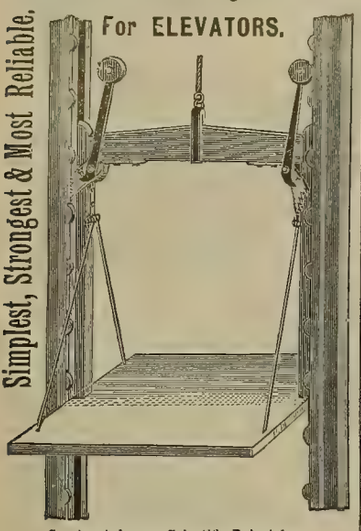

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ALWAYS IN FULL SIGHT, BUT NEVER REQUIRING ANY ATTENTION.

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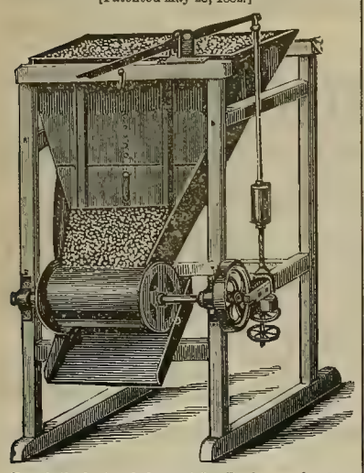

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It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.
In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

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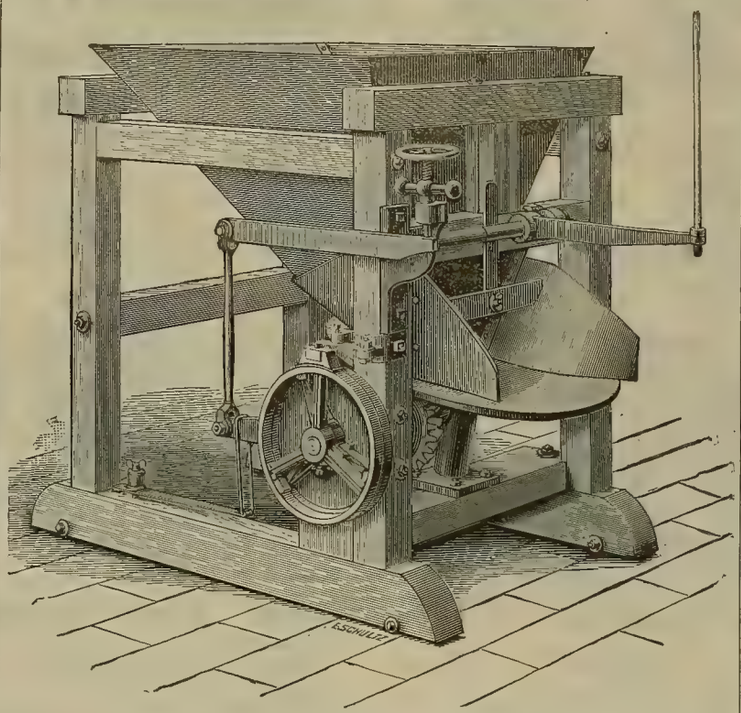

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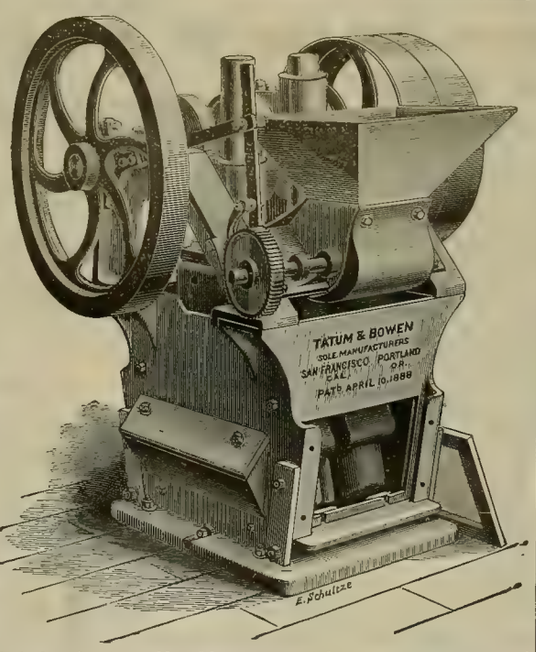

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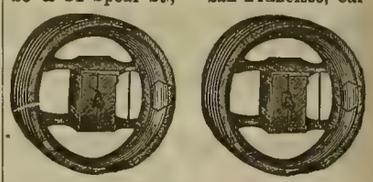

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING APRIL 23, 1889

401,929.—PIPE WRENCH.—L. J. Bergendahl, Pendleton, Or.

401,879. SAWMILL SET WORKS.—Wm. A. Campbell, Portland, Or.

401,878.—ROTARY PULVERIZER.—M. B. Dodge, S. F.

401,937.—GANG PLOW.—E. H. Farmer, Gilroy, Cal.

401,828.—PREPARING SULPHATE OF SILVER.—F. Gutzkow, S. F.

401,884.—ROLLER BEARING.—R. W. Hent, S. F.

401,893.—BOX FASTENER.—J. L. Lilienthal, S. F.

401,845.—STEP FOR VEHICLES.—Mattie M. Marsh, Moscow, I. T.

401,895. CABLE GRIP.—S. F. McDill, S. F.

401,964. ORE-GRINDING MILL.—Jos. McKenzie, El Dorado, Cal.

401,908.—MACHINE FOR DRIVING MANDREELS, ETC.—J. Richards, S. F.

401,926.—PLUGS FOR SINKS, ETC.—W. B. Smith, S. F.

402,045.—SWAGING DEVICE.—Jos. Taylor, Shingle Springs, Cal.

401,867. WINDMILL.—Geo. P. Thurston, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

WINDMILL.—G. P. Thurston, S. F. No. 401,867. Dated April 23, 1889. This relates to that class of windmills known as "power-geared," the patent covering several forms of constructions and combinations of devices.

GANG-PLOW ATTACHMENT.—E. H. Farmer, Gilroy. No. 401,397. Dated April 23, 1889. The attachment is applied to what is known as the "walking gang-plow," having a pair of wheels which support the front end of the frame, and a trailing wheel which, while supporting the rear end of the frame, is allowed to turn freely when it is desired to turn the plows around. The invention consists of a means for temporarily fixing this wheel at any desired angle with the line of travel of the plow.

SAW MILL SET-WORKS.—W. A. Campbell, Portland, Oregon. No. 401,876. Dated April 23, 1889. This improvement to the set-works of a saw-mill carriage consists in a retarding-clamp or friction brake applied to the set-shaft or head-block set-screw and in the novel construction and arrangement of the same and the means for relieving it. The object of the invention is to prevent any overthrow which might take place while rapidly setting the blocks.

CHIMNEY OR STACK PROPELLER AND GOVERNOR.—James A. Robb, San Jose. No. 401,516. Dated April 16, 1889. This invention relates to a windwheel driven by the upward current of air within the stack or chimney, and a governor in connection therewith whereby its speed and power may be controlled, and a means for rarefying the air within the stack. The chimney is formed of iron, and upon the sides which are exposed to the sun are fixed glass disks or lenses, the object of which is to receive and concentrate the heat of the sun's rays inside the stack so as to rarefy the air within the stack and increase the upward draft. The propeller is actuated by the upward current of air.

CABLE GRIP.—Samuel F. McDill, S. F. No. 401,895. Dated April 23, 1889. This invention relates to a means for adjusting the jaws of cable grips and thereby compensating for the wear of said jaws so as to take them up from time to time as this wear occurs. The invention is specially designed to be applied to that class of grips wherein the cable is seized between two jaws, one of which is above the other, either one or both of said jaws being movable. The invention consists of a screw-shaft turning in a slot at the lower end of the grip-lever, a nut fitted upon said screw-shaft and connected by links with the parts which carry the fixed jaw of the grip with gears by which this screw-shaft is rotated, and a shaft extending up beside the grip-lever and having a ratchet and pawl mechanism whereby it may be turned. By the construction devised by this inventor, it is possible for the gripman to adjust the jaws at all times, whether the car be moving or stationary, and without delaying or stooping to get at the screw and nut, as has been heretofore necessary in such cases. The device is quite ingenious, yet simple in operation.

ORE-GRINDING MILL.—Joseph McKenzie, El Dorado, El Dorado county, assignor to De Witt C. Morgan. No. 401,964. Dated April 23, 1889. This is an improvement in that class of ore-grinding machines known as "centrifugal crushing mills," in which the grinding rollers are suspended from a rotating driver by a pivot or hinge connection, and are adapted by centrifugal force to swing outwardly to the rim of the pan. It often happens that a piece of ore will swerve a roller from its course, and it takes a few moments to have it return to its work when centrifugal force alone is relied on. When the rollers do not act constantly against the rim of the pan, their shoes are apt to be worn unevenly. To overcome these disadvantages, this inventor has applied peculiarly arranged springs. These springs hold the rollers out to their work positively, and yet allow them to yield sufficiently, according to circumstances; but after yielding from any cause they are thrown out again immediately and with certainty, and the operation does not have to depend on centrifugal force alone.

PLUG FOR SINKS, TUBS, ETC.—Wm. R. Smith, S. F. No. 401,976. Dated April 23, 1889. The invention relates to the class of plugs for stopping up the discharge-holes of sinks, tubs, basins and other similar vessels or receptacles. The improved plug is a tubular piece with the bottom open and the top closed, with a chain attached. In the sides of the plug are made openings of various shapes. The plug is seated in the discharge-hole and can be lifted and lowered down therein. When fully down, the top finds a seat in the plate of the discharge-hole and serves as a stopper. To let the water out of the vessel the plug is raised, whereby the apertures come above the plate and the water passes through them and out the open bottom of the plug; but the foreign matter is stopped by reason of the apertures straining the water, and it collects on the outer surface of the plug. The plug cannot be raised all the way out of the hole, and is also so arranged that when raised it remains so until it is desired to close the hole again.

ROTARY PULVERIZER.—Miles B. Dodge, S. F., assignor to Parke & Lacy. No. 401,878. Dated April 23, 1889. This patent covers improvements in that class of pulverizers in which the ore or cement is crushed or pulverized in a rotating cylinder or chamber by means of mutual attrition of particles, assisted by pieces of iron or other material which is contained in the chamber with the material to be crushed. The interior of the machine is hexagonal in shape, and the sides are formed of bars laid side by side, with small spaces between for the escape of the pulverized material. These bars are laid in independently, and, by peculiar mechanical devices, they are forced against each other and securely backed in place, and at the same time may be easily removed and replaced whenever necessary.

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WEST AMERICAN OAKS.—We are indebted to Prof. Geo. Davidson for a copy of *Illustrations of West American Oaks*, a beautiful quarto volume just coming from the press of the Bosqui Company. The 24 full-page plates are from drawings by the late Dr. Albert Kellogg and the text is by Prof. E. L. Greene. The publication was rendered possible by the generosity of Capt. Jas. M. McDonald. There is prefixed a brief but most appreciative sketch of Dr. Kellogg's life and work by Prof. Davidson. We shall have more to say hereafter of this elegant and valuable monograph.

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NOTICE There are delinquent upon the following described Stock, on account of Assessment (No. 12) levied on the 19th day of March, 1889 the several amounts set opposite the names of the respective shareholders, as follows:

NAME.	No. Certificate	No Shares.	Amt.
Blaney, W E	284	20	$ 1 00
Bogart, O H, Trustee	429	10,000	500 00
Chase, Q A, Trustee	419	3,814	190 70
Gray, H W, Trustee	181	500	25 00
Horton, Thos R, Trustee	51	5,000	250 00
Horton, Thos R, Trustee	315	5,000	250 00
Hull, H E, Trustee	372	1,000	50 00
Rosekrans, H M	31	600	30 00
Taylor, J N	102	1,000	50 00
Taylor, J N	330	40	2 00
Waller, L P F, Trustee	276	300	15 00
Waller, L P F, Trustee	367	3,000	150 00
Winter, T P, Trustee	396	500	25 00
Winter, T P, Trustee	397	500	25 00

And in accordance with law, and an order of the Board of Directors, made on the 19th day of March, 1889, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, 327 Pine Street, Room 9, San Francisco, California, on Tuesday, the 16th day of May, 1889, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of the sale.

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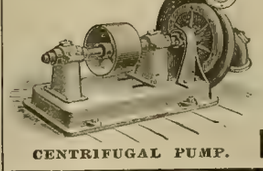

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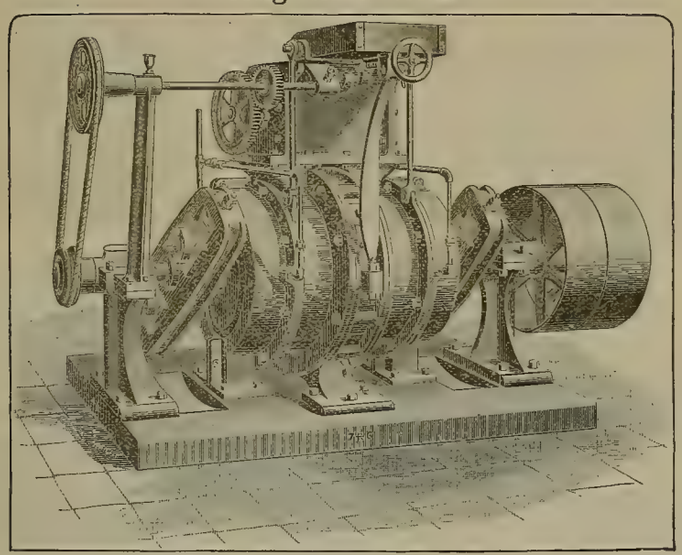

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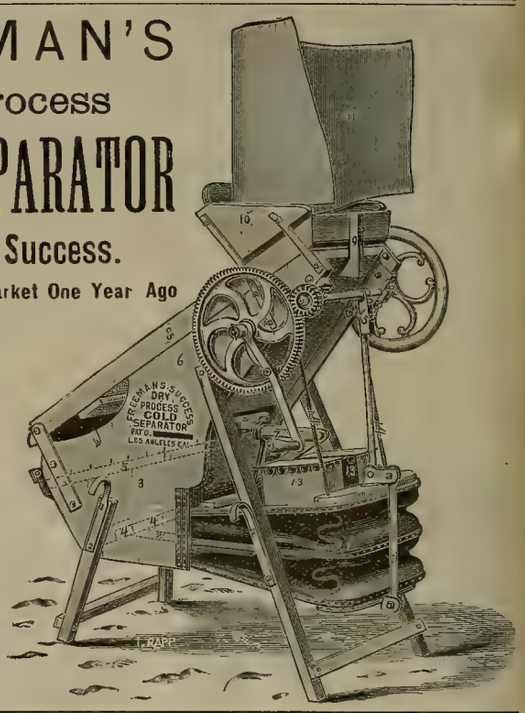

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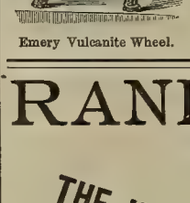

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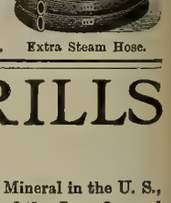

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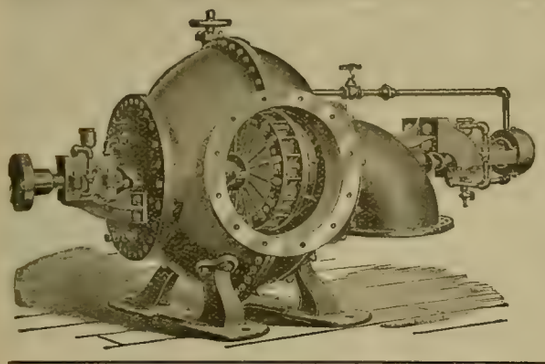

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

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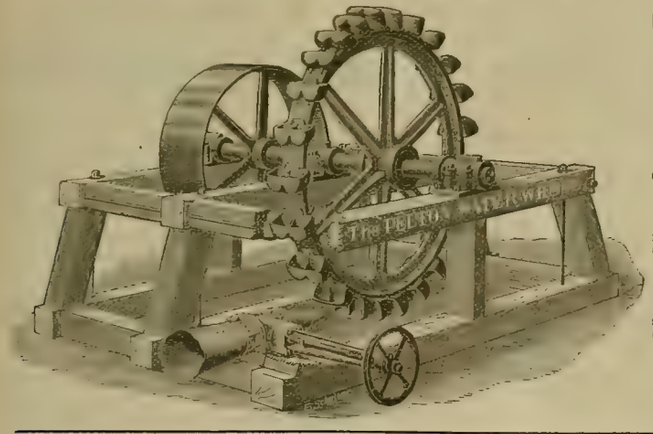

THE PELTON WATER WHEEL

GIVES THE

Highest Efficiency of any Wheel in the World.

A MARVEL OF ENERGY AND POWER.

Over 600 in use on the Pacific Coast alone, aggregating upwards of 50,000 Horse Power.

It is not only most economical of water, but the most simple and reliable power for Quartz Mills, Compressors, Hoisting, Pumping, or any other purpose where water power can be used.

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Power from these Wheels can be transmitted long distances with small loss, and it is now being extensively used in this way in all parts of the country for producing both light and power.

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Propositions from principals only entertained.

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Ores worked by any Process.
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Working Tests (practical) Made.
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I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

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QUICKSILVER

For Sale in Lots to Suit by
PARROTT & CO.,
306 California St., San Francisco, Cal.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, May 2, 1889.

General trade in commercial circles, the past week, was fairly active. All business appears to be controlled by a conservative spirit, which, in itself, is commendable. Among iron-workers and contractors in general, business is reported to be dull, yet they entertain hopeful feelings regarding the future. The banks continue to report an easy money market, with outside money offering fairly free. The opinion prevails that the demand for funds with which to move the crops will be very heavy, variously placed at from $15,000,000 to $25,000,000. Last year, at this time, large sums of money were tied up in old-crop wheat, whereas this year there is very little, but this year more money is tied up in other directions, which probably offsets the lessened amounts on wheat.

Treasure imports by sea the past week aggregate $228,128.

The London *Money*, April 13th, compiles a table of the gold and silver movements in England for the first quarter of this year, from which we learn that the gold imports aggregated £4,172,363 against £2,434,199 for the like time in 1888, and the silver imports aggregated £2,290,608 against £1,843,176 in 1888. The exports for the first three months of the year aggregated as follows: Gold, £3,259,243; and silver, £2,823,199. For the like time in 1888, the exports were as follows: Gold, £3,259,243; and silver, £2,470,126.

SILVER—The market showed more strength up to Monday, with an advance paid, but toward the close values are weaker with 92 to 92¼c, quoted in sympathy with a decline in London. To-day's cable came through at 42 1-16d per ounce. The market is reported to be quite dull.

MEXICAN DOLLARS—The market is quiet but steady at 72¾ to 73¼c. Imports are only fair, but fully up to export requirements.

QUICKSILVER—The market is said to be steady, with only a fair call reported. Receipts the past week were as follows: Forty-five flasks, Parrott & Co.; 205, Haas Bros.; 32, Bradford. Total, 277 flasks. There was shipped by sea to Mexico, 310 flasks.

BORAX—Receipts the past week aggregated 1139 ctls., and shipments, 445 ctls. to Chicago, and 205 ctls. to Kansas City. The market is quiet, but steady.

LIME—The market is fairly active, but not up to expectation. Some slight cutting is reported. Receipts aggregate the past week 5651 barrels.

TIN—Tinplate is dull at a slight decline for spot. Pig is stiff. For shipment, tin is obtainable at quotations, with bids slightly lower. English advices indicate that the market will not probably go lower, but may possibly advance for plate, owing to better prices for steel. The exports by water the past week aggregated to Mexico, 95,770 lbs.; Victoria, 311,516 lbs., and 5006 lbs. pig.

IRON—The market for prompt shipment from England is very strong, owing to the advance in iron being more proportionately than is the decline in freights to this port. The quantity on passage is said to be small, but the stock here is large and well held. The consumptive demand is disappointingly small.

COAL—Imports the past week were as follows: From Tacoma, 6300 tons; Australia, 6234; Coos bay, 450; Seattle, 2955; Departure bay, 6900; Nanaimo, 3187; Baltimore, 1207. Total, 27,233 tons. It is claimed that the market is working into better position for sellers, still consumers, as yet, do not express any anxiety regarding higher prices. The consumption of steam is increasing, but that of house coal is light. Egg hard is marked up for spot. For prompt shipment $6.62½ is bid for Australian. A bid of $6.75 for August and September is reported, but not accepted. Outward freights in Australia are reported to be strong.

Eastern Metal Markets.

By Telegraph.

NEW YORK, May 2, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42½	92	$13 50	$3 65	$20 70
Friday	42 3-16	92¼	13 50	3 65	20 70
Saturday	42 3-16	92¼	13 60	3 65	20 70
Monday	42½	92½	13 60	3 65	20 70
Tuesday	42½	—	—	—	—
Wednesday	—	—	—	—	—

NEW YORK, May 2.—Borax and quicksilver are unchanged. Late foreign advices make the tone in copper somewhat smoother. There are no large operations to note. Pig lead is easy, with a fair trade. Four hundred tons sold at $3.62½@3.65, early May delivery. Refined petroleum, barrels, $6.85; plain cases, $8.85.

Coal.

TO LOAD.

	Per Ton.		Per Ton.
Australian	$ 6 50 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	6 00
Scotch Splint	8 00	Seattle	6 50
West Hartley	10 00	Coos Bay	6 00
Greta	8 00	Cannel	10 00
Westminster Brymbo	8 00	Egg, hard	17 00
Nanaimo	9 00	Cumberland, in sacks	18 50
Sydney	$ 8 00	do, bulk	17 50

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, *or beyond the time he intends to pay for it*, let him not fail to write us *direct* to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or of some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, May 1889.

ANTIMONY	— @ 14
BORAX—Refined	7½@ 7¾
Powdered	7½@ 7¾
Concentrated	7 @ 7½
COPPER—	
Bolt	26 @ 27
Sheathing	26 @ —
Ingot	17¾@ 18½
Fire Box Sheets	— @ 26
LEAD—Pig	4½@ —
Bar	5 @ —
Sheet	8 @ —
Pipe	7 @ —
Shot, discount 10% on 500 bags Drop, ℔ bag	1 45 @ —
Buck, ℔ bag	1 65 @ —
Chilled, do	1 85 @ —
STEEL—English, lb	16 @ 20
Canton tool	9@ —
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Toe Calk	4½@ —
TINPLATE—B. V., steel grade, 14x20, P. S	4 80 @ 4 85
B. V., steel grade, 14x20, spot	5 00 @ —
Charcoal, 14x20	6 50 @ 7 00
do roofing, 14x20	5 37½@ 5 50
Pig tin, spot, ℔ lb	24½@ 25
do, do, prompt shipment	25 @ —
QUICKSILVER—By the flask	— @41 00
Flasks, new	1 05 @ —
Flasks, old	85 @ —
COKE—English, ton, spot	20 00 @— —
Do, do, to load	13 50 @13 75

IRON	Spot.	To Load.
Glengarnock ton	27 00 @— —	27½@ —
Eglinton, ton	26½@— —	26½@ —
American Soft, No. 1, ton	— — @31 00	31½@ —
Oregon Pig, ton	— — @30 00	— @ —
Clay Lane White	— — @24 50	25 @ —
Shotts, No. 1	28 50 @29 00	— @ —
Bar Iron (base price) ℔ lb	2@2 3	— @ —
Chrome iron ore, ℔ ton	— — @10 00	— @ —

Mining Share Market.

Trading in mining stocks the past week was fairly active, with the bulk of the business done in the Comstocks being cross orders from the pool so as to manipulate for a lower range of values. Prices continued to shade off with slight reactions up to Monday, when a small jump was made, only to be followed by another decline, with another jump yesterday (Wednesday) morning, succeeded by lower prices than at any time during the week. Evidences are not wanting that the pool is concentrating stocks, and to better aid them strong bear points are put out, such as Col. Mackay and the "Young Mining Magnate" will leave soon for the East, a light water supply in the Carson river, large sums of money will be required to move the crops, that Senator Jones and D. O. Mills will, soon after arriving here, leave for Alaska, and last, but not least, so as to help things along on the bear side, assessments are being levied. The bulls, on the other hand, say that even if Col. Mackay and Flood do leave, they still have here Finlay of the *Post* and Spring of the *Report*, besides which they ought soon to be in ore in some of the Gold Hill mines, also in the Mexican crosscut and in the Union drift, not crosscut, besides other favorable re orts looked for in the middle mines at an early day, with Hale and Norcross expected to pay a 50-cents-per-share dividend, provided the bullion produced is not mysteriously spirited away by unlooked-for expenditures. The Tuscaroras and Bodies have been more active, with higher prices for Commonwealth, Bodie and Mono. The movements in Commonwealth are made on a milling proposition, but what those in Bodie and Mono are grounded on is not known.

Confidence will pass the dividend this month, but Con. Virginia will declare a 50-cent dividend to-morrow, Friday.

The Brunswick mill, Virginia City, has stopped crushing ore from the Challenge and Confidence mines, and is running on ore from the Yellow Jacket mine, and this, too, in the face of the Santiago mill, which was fitted up to run on ore from the latter mine being idle. Official information from the first two mines report that while ore-crushing is suspended, more active prospecting work will be done in them.

Kentuck and also Gould and Curry levied assessments the past week, each of 30 cents per share.

The ore yield of the Comstock last week aggregated 7213 tons, divided as follows: Con. Cal. and Virginia, 3001 tons, assay value, $27.15; Best & Belcher, 116 tons, assay value, $22.85; Savage, 488, assay value, $20.52; Hale and Norcross, 1057 tons, $28.40; Chollar and Potosi, 500 tons; Challenge, 66 tons, assay value, $26.83; Confidence, 308 tons, assay value, $26.83; Crown Point, 854 tons; Overman, 328 tons; Alta and Justice, 500 tons. The total bullion yield of the above was $155,000.

To-day's (Thursday) stock market opened weak and lower, which was followed in the informal session by quite a jump in the Gold Hill stocks under a reported improvement in Belcher, and a report that D. O. Mills, Senator Jones and Newland will be on the Comstock by the 5th or 6th.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

SUNSET TELEPHONE TELEGRAPH CO., April 27. Capital stock, $3,000,000. Directors—George S. Ladd, John I. Sabin, Louis Glass, W. G. Oliver, Monroe Greenwood, Percy T. Morgan and David Gage.

WOODBRIDGE CANAL AND IRRIGATION CO., April 29. Object, acquiring water rights on the Mokelumne river and other streams in San Joaquin and Calaveras counties. Capital stock, $3 0,000. Directors—M. B. V. Watson, B. A. Laws, N. E. Green, B. D. Beckwith and Thomas Creighton.

AMERICAN OPERA-GLASS NOVELTY CO., April 29. Object, dealing in opera-glasses and spectacles. Capital stock, $25,000. Directors—S. Blumenberg, Emil and Boniface Kehrlein, Alexander Mann, Jr., and W. J. Glasson.

PACIFIC WRITING TELEGRAPH CO., May 1. Capital stock, $2,500,000. Directors—M. L. Hoadley, H. W. Brown, John F Murray, E. L. Campbell, L. W. Storrer, J. B. McChesney and Thos. H. Barry.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. California and Virginia, April 27, $69,292; Hanauer, 26, $3750; 27, $3350; Hale and Norcross, 29, $8276; Nevada Queen, 29 $19,000; Savage, 25, $7175; Hale and Norcross, 25, $64,000; Crown Point, 29, $15,375; North Belle Isle, 29, $10,000; Alice, 25, $26,064; Alice, 27, $26,064; Bluebird, 27, $15,440; Moulton, 27, $13,152; Lexington, 27, $12,848.

THE Fresno *Expositor* says: Pixley is an anomalous railroad town. It consists of but three buildings, all of which are fine brick edifices. The condition upon which lots are disposed of is that none but buildings of this character shall be erected.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T. LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINES
Belle Isle M Co	Nevada	12	10	Apr 19	May 23	June 13	J W Pew	310 Pine St
Bodie Con M Co	California	10	50	Mar 25	Apr 30	June 4	B L Burling	309 Montgomery St
Bulwer Con M Co	California	5	25	Apr 10	May 15	June 19	L Osborn	309 Montgomery St
Calaveras Blue Gravel M Co	Cal	2	05	Mar 28	Apr 30	May 27	B Burris	240 Montgomery St
Eureka Con M Co	Nevada	11	50	Mar 19	Apr 27	May 20	H P Bush	306 Pine St
Exchequer M Co	Nevada	27	25	Apr 2	May 7	May 28	C E Elliott	309 Montgomery St
Found Treasure M Co	Nevada	5	12½	Apr 10	May 16	June 6	J Stadfeld Jr	309 Montgomery St
Gray Eagle M Co	California	12	05	Mar 19	Apr 23	May 14	O H Bogart	327 Pine St
Grand Prize M Co	Nevada	20	30	Mar 15	Apr 20	May 13	R E Grayson	327 Pine St
Kentuck M Co	Nevada	18	30	Apr 26	May 29	June 19	J W Pew	310 Pine St
Los Putos Coal, Iron & Mang Co	Cal	1	1¼	Mar 25	Apr 30	May 20	W C Stedfeld	309 Montgomery St
Locomovive M Co	Arizona	4	50	Apr 25	May 29	June 18	A H Fish	309 Montgomery St
Mono M Co	California	27	50	Feb 28	Apr 2	May 8	B L Burling	309 Montgomery St
North Commonwealth M Co	Nevada	2	30	Apr 3	May 3	May 30	J W Pew	310 Pine St
Occidental Cons M Co	Nevada	4	50	Apr 8	May 13	June 5	A K Dustron	309 Montgomery St
Peerless M Co	Arizona	12	25	Mar 25	Apr 26	May 21	A Waterman	309 Montgomery St
Pinal Con M Co	Arizona	8	13	Apr 13	May 20	June 12	A Chemicant	328 Montgomery St
Potosi M Co	Nevada	32	50	Apr 10	May 15	June 5	O E Elliott	309 Montgomery St
San Francisco Copper Co	California	3	10	Mar 18	Apr 23	May 21	G Ruegg	405 California St
Silver Hill M Co	Nevada	24	20	Apr 30	May 23	June 13	D O Bates	309 Montgomery St
Sierra Union M Co	California	1..10	00	Apr 10	May 13	June 5	Wm V White	2 S Sansome St
Trinity Riv Tun & M Co	California	1..7	1·2	Apr 11	May 24	June 13	L H Parkman	Cor Bush & Montgy Sts
Taylor M & M Co	California	17	3.00	Mar 20	May 1	May 18	A E Ball	Mechanics Ex
Yellow Jacket M Co	Nevada	46	50	Mar 28	May 1	June 1	W H Blauvelt	Gold Hill

MEETINGS TO BE HELD.

NAME OF COMPANY	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Commonwealth Con M Co	Nevada	H Deas	309 Montgomery St	Annual	May 8
Church G M Co	California	J M Buffington	303 California St	Annual	May 6
Diana G M Co		J W Pew	310 Pine St	Annual	May 7
Justice M Co	Nevada	R E Kelley	419 California St	Annual	May 8
La Grange Ditch & Hy M Co	California	A Halsey	328 Montgomery St	Annual	May 6
North Star M Co	California	D Jennings	401 California St	Annual	May 8
Piedmont M Co		J J Scoville	309 Montgomery St	Annual	May 16
Scorpion M Co	Nevada	G R Spinney	310 Pine St	Annual	May 10

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	Apr 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co			Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Apr. 11.		WEEK ENDING Apr. 17.		WEEK ENDING Apr. 24.		WEEK ENDING May 1.	
Alpha	1.70	1.75	1.55	1.95	2.00	2.75	1.80	2.25
Alta	2.15	2.25	2.10	2.10	2.00	2.60	2.10	2.10
Andes	.75	.80	.70	.85	.85	1.10	.80	.90
Argenta	....	....	....	.05	....	.05	....	....
Belcher	3.15	3.35	3.15	3.50	3.45	5.00	3.80	4.40
Best & Belcher	4.00	4.35	3.90	4.50	4.25	6.00	3.90	4.40
Bullion	.75	.85	.70	.80	.80	1.30	.90	1.05
Ballmore	.25	.35	.25	.30	.30	.35	.25	.30
Belle Isle	....	....	....	....	....	.20	....	.20
Bodie Con	1 00	1.20	1.05	1.10	1.10	1.45	1.60	1.90
Benton	3.50	....	....	3.00	....	3.00	....	....
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.35	....	.20	.30	.30	.35	.30	.35
Commonwealth	....	....	....	....	....	....	5.00	5.50
Con. Va. & Cal	7⅞	8.50	7⅞	8.50	8.00	8⅜	8.00	8.25
Challenge	3.70	3.85	3.60	3.90	3.80	6.00	3.80	4.00
Choliar	2.10	2.40	1.95	2.35	2.30	3.50	2.60	2.80
Confidence	12⅜	12⅜	11	11¼	10	11¼	10	10¼
Con. Imperial	.55	.60	.55	.60	.65	.90	.65	.70
Caledonia	.30	.35	.30	.35	.35	.40	.35	.40
Con. Pacific	....	....	....	....	....	....	....	....
Crown Point	3 85	4.25	3.75	4.05	4.00	5.25	4 00	4.60
Crocker	.55	.60	.45	.55	.50	.60	.50	.65
Central	....	....	....	.20	....	....	....	....
Dudley	.30	....	....	....	....	.20	.20	.30
East B. & B	....	....	....	....	....	....	.35	....
Eureka Con	1.15	....	1.10	1.20	1.30	2.50	2.00	3.00
Exchequer	.60	.70	.60	.75	.70	1.10	.70	.80
Grand Prize	.70	.75	.70	1.00	.80	1.00	.75	.80
Gould & Curry	2.30	2.50	2.20	2.60	2.60	3.80	2.55	2.90
Hale & Norcross	4.15	4.50	4.10	4.40	4.30	5.25	4.45	4.90
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	.35	....	.25	.35	.30	.45	....	....
Justice	1.20	1.25	1.10	1.25	1.20	1.60	1.35	1.40
Kentuck	....	....	....	....	1.90	2.35	1.65	1.75
Lady Wash	.35	....	....	.35	....	.40	....	.40
Locomotive	....	....	....	....	....	.10	....	....
Martin White	....	....	....	....	....	....	....	....
Mono	1.25	1.30	.20	1.25	1 40	1.55	1.50	1.75
Mexican	3.35	4 45	3.85	5⅛	5.25	8⅜	4.70	5⅜
Mt. Diablo	....	....	....	....	....	....	....	....
Navajo	....	....	.35	.90	.80	.95	.80	.90
North Belle Isle	2.90	3.00	2.60	2.65	2.25	2 50	1.75	2.15
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	2.95	3.00	2.55	2.65	1.95	2.55	1.70	2.15
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.00	1.20	1.00	1 10	1.10	1.50	1.10	1.35
Ophir	5⅛	5⅜	5⅛	5⅞	5.25	7⅛	5⅛	5.75
Overman	1 20	1.30	1.20	1.35	1.35	1.70	....	1.35
Potosi	1.80	2.75	1.60	1.85	1.80	2.75	2.05	2.10
Peerless	.40	.50	.40	.45	.40	.55	.65	.75
Peer	.30	.35	.25	.35	.30	.35	....	.35
P. Sheridan	....	....	....	....	....	.05	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.60	2.80	2.55	2.90	2.75	4 00	2.90	3.10
S. B. & M	2.70	2.90	2.45	2.65	2.60	3.60	2.70	3.00
Sierra Nevada	2.95	3.30	2.90	3.90	3.80	5.00	3.70	4.00
Silver Hill	.50	....	.45	.50	.50	.65	.45	.55
Silver King	....	....	....	....	.55	.70	1.05	1.10
Scorpion	.50	.55	.50	.65	.60	.85	60	.65
St. Louis	....	....	....	....	.30	.50	....	....
Syndicate	....	....	....	....	....	....	....	....
Union Con	3.30	4.05	3.55	5⅜	5.00	7.75	4.50	5⅝
Utah	1 15	1.30	1.15	1.45	1.35	1.90	1.30	1.50
Yellow Jacket	3.25	3.40	3.10	3.40	3.10	4.20	3.30	4.15

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200	Alta	1.95	
50	Andes	.80c	
450	Alpha	1.95	
100	Baltimore	.25c	
200	Belcher	3.80	
135	B. & Belcher	3.75	
100	Bodie	1 80	
100	Bullion	.90c	
100	Caledonia	.35c	
220	Challenge	3.55	
200	Choliar	2.45	
350	Commonwealth	5.50	
200	Crocker	.55c	
100	Crown Point	3.80	
320	Con Va & Cal	8.12½	
400	Con. Imperial	.60c	
250	Dudley	.25c	
275	Exchequer	.65c	
400	Gould & Curry	2.40	
100	Hale & Nor	4.50	
100	Iowa	.50c	
50	Julia	.25	
250	Mexican	4.25	
400	Mono	1.75	
100	Navajo	.85	
50	N. Belle Is	1.75	
50	Nev. Queen	1.70	
30	N. Commonwealth	1.00	
675	Overman	1.35	
350	Ophir	5.00	
200	Peer	.25c	
400	Potosi	1.85	
100	Peerless	.60c	
450	Savage	2.70	
200	S. B. & M	2.90	
170	Sierra Nevada	3.45	
200	Silver Hill	.45c	
100	Silver King	1.05	
250	Utah	1.40	
950	Union	4.20	
150	W Comstock	.45c	
500	Yellow Jacket	4.00	

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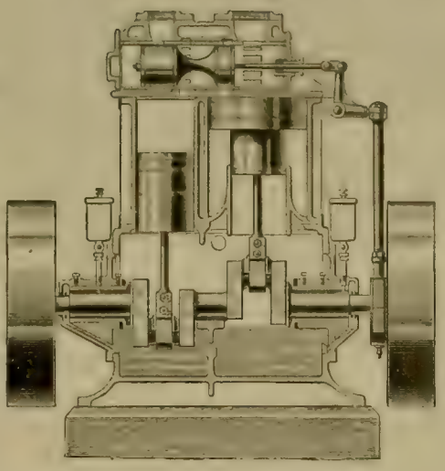

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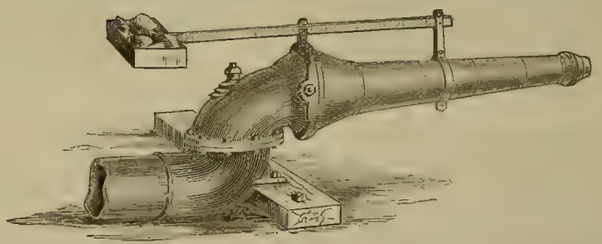

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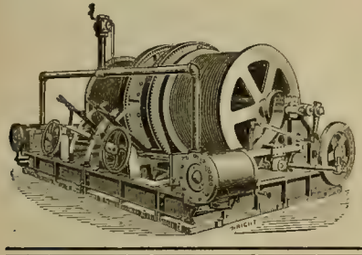

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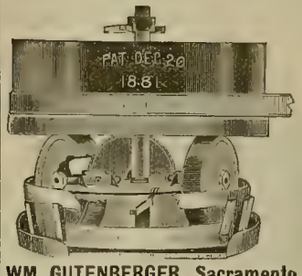

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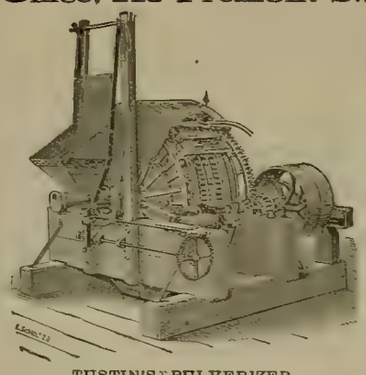
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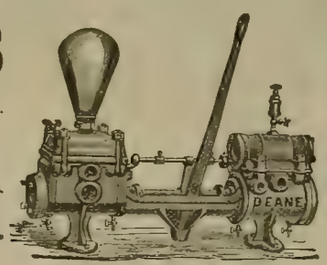

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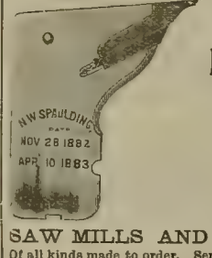

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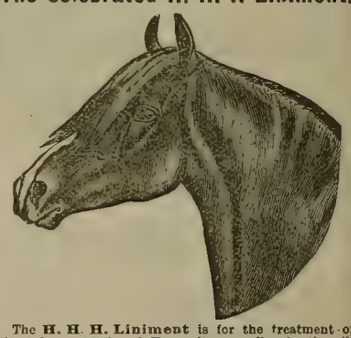
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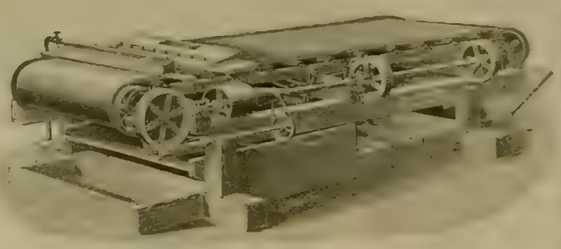
Experimental machinery and all kinds of models. Tin and brasswork. All communications *strictly confidential.*

IMPROVED BELT FRUE ORE CONCENTRATOR,

The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, $900, f. o. b.
Price of Plain Belt Frue Vanner, $575, f. o. b.

For Pamphlets, Testimonials and further information, apply at office.



Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

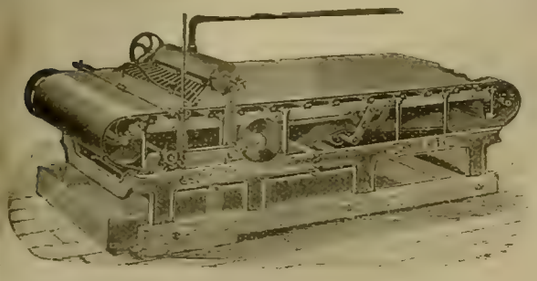
THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIRS: Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., Room 15, No. 132 Market Street, San Francisco, Cal.

$1,000 CHALLENGE ACCEPTED,

PRICE, FIVE HUNDRED AND FIFTY DOLLARS ($550.00).



THE "TRIUMPH" ORE CONCENTRATOR.

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

JOSHUA HENDY MACHINE WORKS,
Nos. 39 to 51 Fremont St., San Francisco, Cal.

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We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

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Is beyond all question the most important improvement that has ever been made in this class of mining machinery. It will do more than twice the work with a given amount of wear than any other Crusher made, besides crushing so much finer that for mining uses, the capacity of the mill is greatly increased. It has the same relative superiority for macadamizing purposes, affording the cheapest and most reliable machine for this use.

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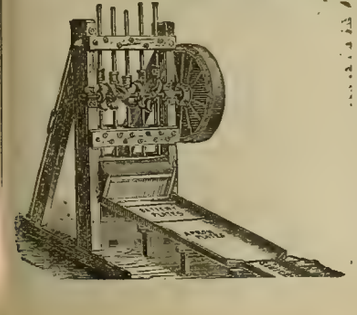

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PRICES GREATLY REDUCED.

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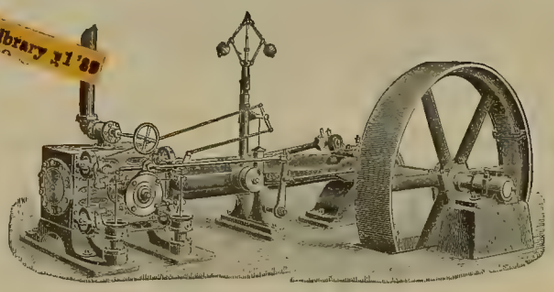
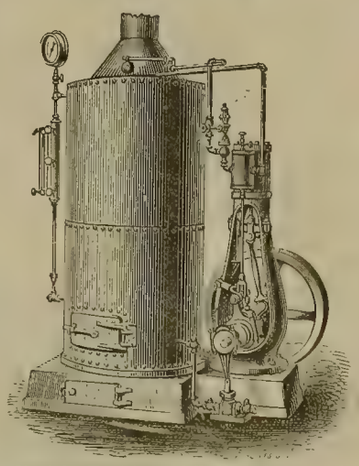
Hydraulic Mining, Quartz, and Saw-Mill Machinery, Hydraulic Gravel Elevators, Hydraulic Giants, "Triumph" Ore Concentrators, Automatic Ore Feeders.



"ECLIPSE" CORLISS ENGINE.



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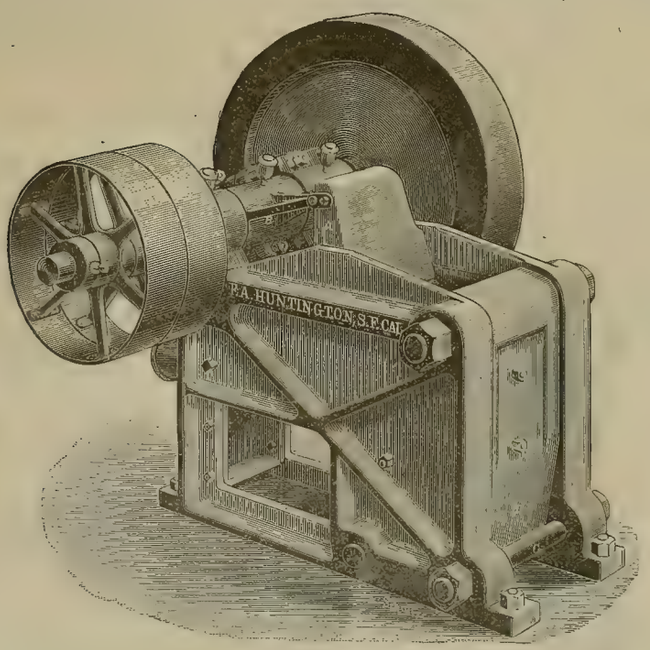
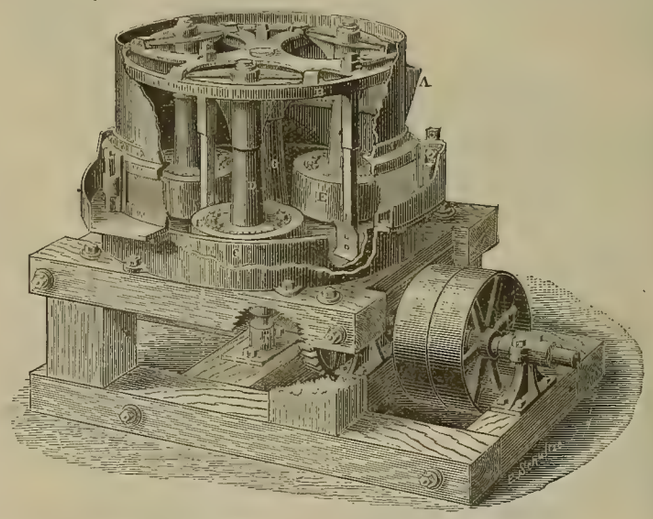


Huntington's Improved Rock-Breaker.

The main features of this machine are strength, ease of adjustment and simplicity of construction.

The movable jaw *A* is worked by the eccentric *B* and is pivoted at the bottom. The stationary jaw *D* is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt *C*. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt *C* and the jaw *D*. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



F. A. HUNTINGTON'S Centrifugal Roller Quartz Mill.

The following will explain the above cut:

The ore and water being fed into the mill at the hopper *A*, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet crushing and gold saving it has no equal.

I claim especial merit in that feature of this system *which prevents* ALL FLOURING of gold and quicksilver, and the consequent loss of gold that attends stamp milling.

For the economical working of ore that contains sulphurets, I particularly claim the adaption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.

MINING AND SCIENTIFIC PRESS.

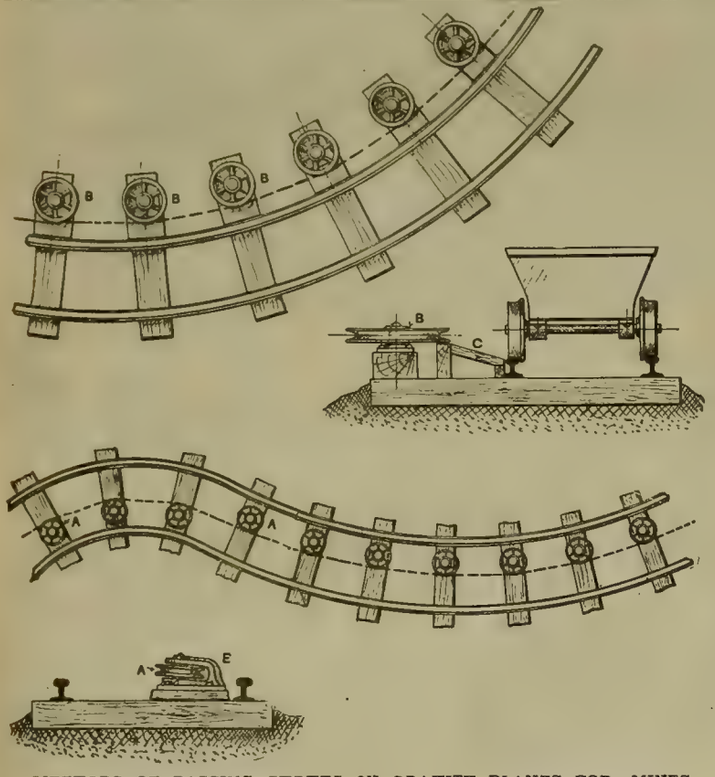
An Illustrated Journal of Mining, Popular Science and General News.

TWENTY-PAGE EDITION.

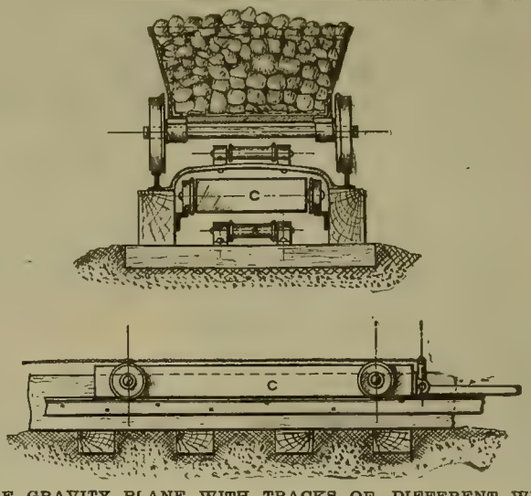
BY DEWEY & CO. Publishers.

SAN FRANCISCO, SATURDAY, MAY 11, 1889.

VOLUME LVIII Number 19.



METHODS OF PASSING CURVES ON GRAVITY PLANES FOR MINES.



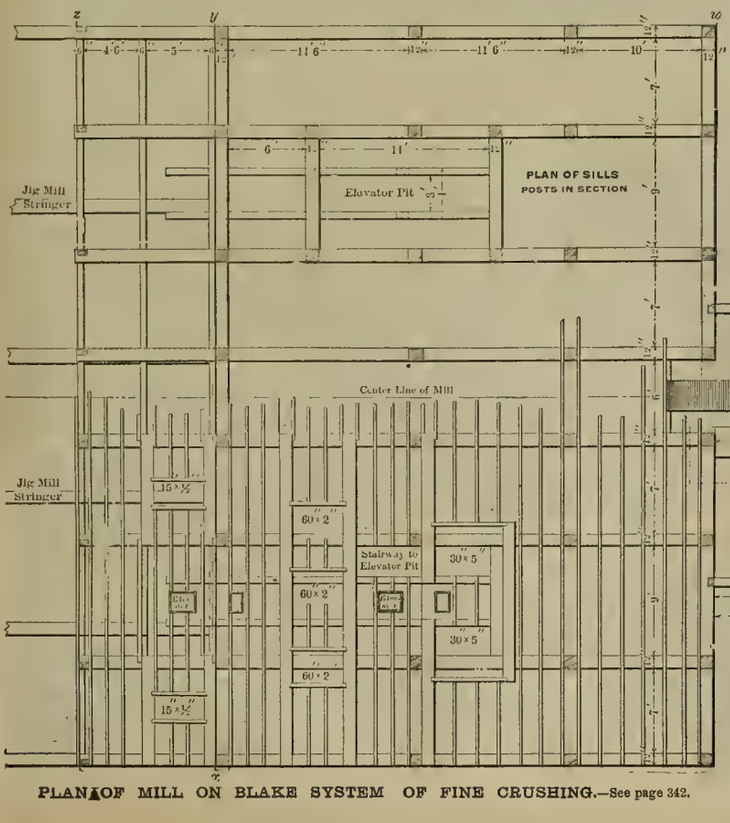
SINGLE GRAVITY PLANE WITH TRACKS OF DIFFERENT WIDTH.

Wire-Rope Haulage in Mining.

On inclined or gravity planes, operated by the gravity of the descending load of ore, when the cars have to go around curves, the difficulty of passing curves is solved by two efficient and simple methods. In one device, shown in the accompanying engravings, the rope is taken around the curve by means of a series of wheels about 24 inches in diameter, placed outside the track. The car, in turning a curve, brings the rope between the rails; but after passing, the rope is guided back into the grooved wheels by the timbers *C*, placed in front of each pulley.

The guide-wheels are sometimes placed between the rails and a few inches to one side of the center line, as shown in one of the cuts. These wheels are, of necessity, smaller than the preceding, and are held in a slightly inclined position to the horizontal by the bearings *E*. The rope is attached to the car at the same level as the grooves of the wheels. In passing a curve, the rope is drawn to the center of the track and falls back into the grooves when the curve has been rounded. Either of these systems may be employed with advantage, the determination of the more efficient being a matter of location.

In the gravity inclines of the valley of the Monongahela, as described by J. M. Silliman before the American Institute of Mining Engineers, the single-track system is modified so as to employ two tracks of different gauge, the narrower being placed within the wider, as shown in the accompanying cuts. The wider track is for the pit cars, while the narrower serves as a roadway for what is termed the balance car *C*. The latter is so proportioned in weight that it is sufficient to raise an empty car, and light enough to be elevated by the descending loaded car. To the balance car is attached a safety-lever *E*, as shown. When the rope breaks, or through any means becomes slackened, the lever *E* drops, and, coming in contact with the ties of the roadbed, prevents rapid and dangerous descent.


PLAN OF SILLS POSTS IN SECTION
Elevator Pit
Jig Mill Stringer
Center Line of Mill
Jig Mill Stringer
Stairway to Elevator Pit
Plan of Engine Room and Foundations
Scale ½ in = 1 ft.

PLAN OF MILL ON BLAKE SYSTEM OF FINE CRUSHING.—See page 342.

Pacific Coast Men-of-War.

The cruiser Charleston, built by the Union Iron Works of this city, is now on her trial trip in the Santa Barbara channel, south of Point Conception, where there is a clear course of very smooth water. She is reported to have behaved very well on the trip down, and the vacuum pumps, concerning which there had been some adverse criticism, worked satisfactorily. In crossing the bar at the entrance of this harbor very rough water was met—the result of the recent storm—but the vessel passed through this all right, proving herself a good sea boat. In a few days the result of the speed trial will be known.

The Union Iron Works have been awarded the contract for the new coast-defense vessel at the price of $1,628,000. The new vessel will be a departure in design from any vessel in the navy, and will be the most formidable vessel for her displacement of any in the world. She approximates the Monitor type, and will be of 5000 tons displacement in cruising trim. She is to have a length of 256 feet, with a breadth of 49 feet. She will be protected by a belt of steel armor 16 inches thick over the engines, boilers and magazines, and eight inches thick forward and aft. The specifications call for 5400-horse power. The specifications provide for two ordinary tubular marine boilers of 1500-horse power. The remainder of the 5400-horse power required is to be supplied by coil boilers.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

The Klamath River.

Its Navigability and Its Mines.

[Written for the PRESS by J. H. CROSSMAN, late assistant in the field of the California State Mining Bureau.]

As it is reported that the members of the U. S. Debris Commission are about visiting the Klamath river and its tributaries in pursuance of instructions from the Department, a description of this region may not be uninteresting to the readers of the PRESS, particularly as the result of their examination will not be made known to the public for some time.

The Klamath river is estimated to measure approximately from source to mouth 362 miles, inclusive of its contour lines. It takes its rise in Oregon, coursing in a southerly direction, passing through Siskiyou county, California, entering Humboldt and forming a portion of the boundary line between Del Norte and Humboldt counties. It is during the flood season a raging torrential stream of considerable magnitude, but late in the summer not much more than a purling brook and fordable in many places. Notwithstanding the immense area of the watershed of the main trunk and its numerous tributaries, of which Shasta, Scott, Salmon and the Trinity are of considerable magnitude,

At Its Mouth

The river expands to a width of three-quarters of a mile, where its flow is retarded by the ocean currents and tides, forming by deposition of the river debris a bar which at a low stage of water is often crossed by horsemen on the "land spit." This bar at times practically closes the river to navigation of vessels either large structions in its bed, would prevent reaching a or small. Even could this obstruction be removed by Government aid, the navigability of the river for more than ten miles up from its mouth would be impracticable without locks, which would be inoperative from the immense quantity of drift timber, trees and trunks brought down the river during the flood season. The rapid current of the river, its unusual grade of a mean of ten feet per mile, its numerous falls, rapids, shallow depths and rocky obhigher point; even a canoe at any season requires frequent portages, canyons alternate with bars; short pools of still and apparently dead water, with powerful under-currents and eddies, engulf the hapless mariner or unsuspecting bather. In some places the rapids approach the dignity of veritable cascades or falls, the water in its descent being precipitated over mammoth rocks, tumbling and tossing in a sea of white glittering foam. The river, as a rule, is rock-bound. Its banks are formed of bare sterile rocks, jagged and forbidding, which reach to a hight of several hundred feet before vegetation is seen on the high bars or terraces of older river channels, of which there is usually a series of three, one above the other, and several hundred feet of vertical hight between them. It is in these channels that

The Auriferous Gravels

Are found, which are peculiarly adapted to work by the hydraulic system, they having all the requisites of dump and head of water from the numerous tributaries of the Klamath. The river in its course passes through extensive canyons with precipitous walls; one above Orleans Bar, 65 miles from the mouth, is three miles in length. In places the soft rocky structure of the walls and banks is from the erosive action of the water has caused extensive slides of large areas. In fact this process is constantly going on, and the river as constantly changing its contour lines. The trails instead of coursing near the river-bed seek the high bars on the mountain slope. No reliable estimates have been made of the mean of the

Flood Rise of the River

From low-water mark. It varies from 5 to 102 feet, owing to the expansion and contraction of the river channel. Fifteen feet, however, may be taken as an approximation. For instance, at a point above Martin's Ferry, 45 miles from the mouth, in a narrow gorge, the river has been known to reach a point 102 feet above the low-water bench mark in 24 hours. Above the mouth of Cotton Wood creek, the rise is not over 2½ feet. Below this point the waters of Cotton Wood creek, Shasta and Humbug swell the stream and bring the average up to 7½ feet. Below the mouth of Scott river this is increased to 12 feet. At Happy Camp is a still greater rise. Below the mouth of the Salmon the rise is 15 feet, thence to Orleans Bar and Martin's Ferry, which we have described.

Its Width

From its source to Lower Klamath lake is from 70 to 75 yards, thence from the mouth of Scott river 75 to 90 yards; from mouth of Scott river to Happy Camp 100 yards. To Martin's Ferry the width varies from 70 to 100 yards, expanding and contracting until its mouth is reached, where, as stated, it is three-fourths of a mile from bank to bank in flood season. Its depth varies from two to eight feet in the upper portion of the river and from three to ten feet in the lower, with deep holes and pools; but the numerous riffles and rapids lower the average.

The Grade is also Variable,

But the mean, from source to mouth, is estimated at ten feet to the mile. The flow or velocity of the stream varies from four to ten miles per hour; the mean, seven miles. This has been approximately ascertained at several points on the river, and may be considered nearly correct. At a point ten miles above the mouth, the velocity is much less.

Agricultural Lands.

From the mouth of Scott river to the ocean there are essentially little or no agricultural lands to speak of unless on the high bars or benches several hundred feet above the river-bed, where an elevated system of terraces have been formed by the erosive action of the water which has repeatedly cut deeper channels through its bed in which the present river runs. The mountain slopes and terraces are heavily timbered, and the tablelands form good pasturage for stock. Perennial streams and springs are of frequent occurrence, and enable the miner to work profitably the old river channels filled with rich auriferous gravel. These streams affording heavy pressure-heads of water and abundance of fall for the debris. The river proper runs through

Narrow Gorges and Canyons

For the greater portion of its length. Hydraulic mining has been prosecuted for quite a number of years. What few isolated spots of agricultural land that occur on low points and river bars have been patented as mineral land, and either worked as agricultural or for its mineral product, as the owner deems best—"no kicking about debris or slickens here."

So far as the agricultural resources of that portion of Siskiyou, Trinity, and Humboldt counties are concerned, through which the Klamath, Trinity, Salmon, and the lower portion of Scott river flows, they are not equal to the support of a respectable tribe of Digger Indians, and were it not for the salmon, which was the principal food of the aborigines previous to the white man's advent, the red man would have had a poor show. The main source of breadstuff and supplies is drawn from Etna (the principal town of Scott Valley, a rich agricultural section, situated on the upper portion of Scott river), Eureka and Arcata of Humboldt county, and packed in on mules over the precipitous ranges of mountains that surround this section. The region is essentially mineral. The product of its mines, if industriously worked and the ban of the anti-debrite removed, so that capital could safely invest, would support a large and thriving population and add to the wealth of our State and nation.

The Klamath river and its four principal tributaries—the Shasta, Scott, Salmon and Trinity rivers—drain in California approximately 10,500 square miles, and in Oregon 10,000 miles, or about 20,500 miles in all.

The rain-gauge shows a mean of annual precipitation for the past five years of 46 2-5 inches, the maximum 52¾.

The Trinity River

I am largely indebted to Mr. W. S. Lowden for the following facts: The entire length of this river, from source to mouth, is about 165 miles. The upper forty is of no importance as a mining section. From Trinity center to its mouth (distant 125 miles) the river has an average grade of 15 feet to the mile; average width, 150 feet at low water and 600 feet at high water. At low water the river is two feet deep and at high water 25 feet. The rain-gauge shows an annual fall of 40 inches. The area of land drained by the Trinity river in Trinity county is 2637 square miles. The amount of agricultural land in Trinity county that could by any possibility be damaged by the debris of the mines does not exceed 150 acres and is not worth over $3000.

There is a section of the Trinity river in length about 20 miles in the vicinity of Weaverville (above and below) that has a grade of 12 feet to the mile, but as it passes through the canyon below the North Fork, the river attains a grade of 20 feet to the mile.

From the foregoing facts may be seen the absurdity of the Act passed by our Legislature in 1872, declaring the Klamath river a navigable stream from its mouth to Orleans Bar, a distance of 65 miles. This, together with the decision of our courts adverse to hydraulic mining in California, has prevented capitalists from investing in the hydraulic mines of that section through which the Klamath and its tributaries flow, and materially retarded its progress and prosperity. Until the Act declaring the Klamath a navigable stream has been repealed by a future Legislature, and the class of mining referred to is recognized by our courts as a legitimate industry, neither hydraulic nor any other class of mining in our State will become favorite investments. Notwithstanding the obstructions thrown in the way of the miner from adverse legislation, there are in operation on the Klamath river, according to the annual report of our State Mineralogist for 1888, some 47 hydraulic, 22 wingdams, 23 drift, and 7 sluicing claims, giving employment to nearly 1000 miners directly, and an army of farmers, mechanics, packers, butchers, traders, etc., indirectly.

The law relating to navigable streams in substance is as follows:

"The State of California in the enabling Act admitting her into the Union, stipulated that the title to all navigable waters should vest and remain in the United States. The Legislature of California by an Act declared the Klamath river a navigable stream from its mouth to Orleans Bar, a distance of 65 miles, hence the title vests in the United States."

The Debris Commission recently appointed by the Secretary of War to investigate this subject in order to, if possible, devise ways and means whereby our mines could be worked without detriment to any other industry, are now in session, and purpose visiting the Klamath river at an early date. A favorable report from this body of engineers would go far toward remedying the evil and remove the cloud that now hangs over this great industry.

A Point in Leaching Ores.

On the Withdrawal of Silver from Argentic Solutions Through the Action of Insoluble Sulphurets.

EDITORS PRESS:—Being engaged in making a chlorination test with sodium thiosulphate on raw silver ores (assaying 320 ounces silver per ton) in preparation for raw chloridizing (and in which I had found on the previous day 65 per cent soluble in hypo, filtering after 15 minutes' contact), I happened to be called away just after subjecting the test to the action of a solution of hypo, thus letting it stand over night. After 16 hours' contact, on filtering off the solvent and assaying the washed and dried residue, to my great surprise I found that a chlorination of only 12 per cent was indicated. On repeating as usual, the test (after 15 minutes' contact) assay of the residue showed a chlorination of 70 per cent.

Surmising that the presence of undecomposed sulphurets in the ore treated was the cause of the *drawback* of the silver from a soluble to an insoluble form, I forthwith instituted an experiment, with the view of ascertaining whether such a reaction would actually take place under such conditions. Eight hundred milligrams fine silver were dissolved in nitric acid, evaporated to siccity, the argentic nitrate dissolved in water and precipitated by sodium chloride, and after decanting off the supernatant fluid the precipitated argentic chloride was dissolved in an excess of a solution of pure sodium thiosulphate (about 100 cubic centimeters), and after filtering said solution more, one per cent hypo solution was added, making up 250 cubic centimeters. This last addition was made in order to preclude the possibility of any insoluble compound being deposited. I then added four grams of elutriated sulphurets (concentrates) containing only three millograms of silver and consisting mainly of galena, blende and pyrite, leaving the same in contact with the argentiferous solution during 16 hours, under repeated shaking of the bottle in which they were contained.

The sulphurets were then collected on a filter and washed with weak hypo and with cold and hot water, dried and scorified, and on cupelling the resulting lead a button of silver 282 millograms in weight was obtained!

I am unaware that any such "drawback" has yet been noticed in the practice of leaching ores with hypo. Some of the anomalies in the practical working of the leaching process might be due to analogous reaction.

It might be suggested that the main utility of cuprous hypo be the prevention of the same; also that the silver separated in this case would have been easily soluble in cuprous hypo.

ALEX. H. DUBOIS.

Mining at Volcano.

EDITORS PRESS:—The mining season is about closed and the water season will be gone before the cleanup. The Volcano gold-gravel mining will soon have to stop for want of water. For the chances they have had, the results are good. The Jones mine is being worked under a bond, and out of it several thousands have been taken. It is turning out a valuable claim. The cement and gravel is very rich.

What is wanted here is capital to open our claims. As I need, for instance, to "bottom up" a rich hole, a small donkey engine to handle the water and gravel, I will give a working share to any one furnishing such power, or I will agree to pay for the same when the money is taken out of the claim. The dry season will be favorable for working the claim. I have had this property of mine for 25 years and have invested $7000 in it, believing it to be a No. 1 claim. I would be very glad to be able to obtain one of the horse-power hoists such as you recently illustrated as made by the Risdon Iron Works. Parties who last worked this rich "hole" say it went $10 a carload. I have the gold in the claim, and will take it out as soon as a favorable water season permits. I own my own water ditches and flumes and can easily put the property in good shape with slight financial assistance.

P. W. PECK.

Volcano, Amador Co., Cal.

GOATS IN A MINING SHAFT.—A correspondent writes us as follows from Amador City: A band of goats grazing near the main shaft of the New London mine became scared, and in attempting to escape two of the animals fell into the mine, which is 1200 feet in depth. One of the miners happened to be coming up on the "skip" and had reached the 500-foot level when he was struck by one of the falling goats and had his arm broken. By good luck the man retained his grip on the cable and thereby saved himself from a horrible death. Had he fallen from the "cage" he would have been precipitated to the bottom of the shaft, 700 feet.

The Mining Bureau Appropriation.

We have previously mentioned the fact that State Controller Dunn has said he would refuse to draw his warrant for $100,000 for the benefit of the State Mining Bureau and $350,000 for the erection and maintenance of the Southern California Insane Asylum, on the ground that the Acts making the appropriations failed to specify the fund from which the money was to be drawn. He also said that before he would draw his warrants a decision of the Supreme Court to that effect must be rendered.

Since then the Attorney-General has rendered the following opinion, which is directly the opposite to the one given by Mr. Dunn, and which will result in the appropriation for the Southern California Insane Asylum also being made available:

S. Heydenfeldt, Esq., Trustee State Mining Bureau, San Francisco—MY DEAR SIR: I have examined the Act making an appropriation for the support and maintenance of the State Mining Bureau for the forty-first and forty-second fiscal years, approved March 14, 1889, and have arrived at the following conclusions:

First—It is not necessary that the Act should contain a direction to the Controller to draw his warrant in express terms; but an implied authorization is sufficient, such as is contained in the words: "That at least 70 per cent of the appropriation shall be used for geological work in the field, and not more than one-half of the said sum appropriated under this Act shall be expended during the forty-first fiscal year." This all necessarily implies that the Controller must draw his warrant.

Second—It is not necessary that the Act should say that the money named as appropriated is appropriated out of the General Fund, or out of moneys not otherwise specifically appropriated. The appropriation of $100,000 is a specific appropriation, and the object is stated. Although no fund is expressly stated in the Act, from the necessity of the case the appropriation must come from the General Fund. It cannot be any specific fund, for there is no authorization of the Legislature to divert it, and to divert money from a specific fund would require an Act of the Legislature. The General Fund consists of money received into the Treasury and not specifically appropriated to any other fund. The appropriation is made by the Act; what is necessarily implied is the same as expressed, and the money must, therefore, come from the General Fund. The case of Redding *vs.* Bell (4 Cal. 333) does not apply for the reason that in that case there was no specific appropriation as in this case, and besides, that was a case of mandamus, where, of course, it was necessary to allege in the complaint that there was money not otherwise appropriated by law out of which the amount in question was directed to be paid.

Third—The appropriation is available.

Very truly yours,

G. A. JOHNSON,
Attorney-General.

Make no Mistakes in Concentrators.

There is a popular move all over the mining field to want concentrators. Miners who never had or knew anything about concentration, have come to the conclusion all of a sudden that in order to make their low-grade ore profitable they must have concentrators. We are glad to see miners coming to a right understanding of their business, but at the same time it is a very easy matter to overdo the thing and bring reproach on yourself and the mining business. It is not every concentrator that is a success, in fact there are more failures than successes. Irwin had two signal failures, losing thousands of dollars, before a success. And in all kinds of milling machinery, Gunnison county, like the older counties, has her share of monumental folly. We were counting up the other day and a low estimate is that one million of dollars has been ruthlessly wasted in one process and another, as the old wrecks of mills in every camp will testify. Had that million been spent in actual development of mines before any effort was made to make home treatment of ores a success, it would have been a great deal better.

If you have got concentrator on the brain and must have one, the first thing you want to do is to secure the services of a first class man, who understands the business, and they are few and far between. Then find out if you have a mine or mines that will produce enough ore to run continually whatever capacity you decide to build. Do not depend on other people to mine and ship you the ore, but do a little custom work when it comes along. Next find out what particular process or table is adapted to save the most of your mineral. A good idea is to send a ton or more ore to concentrators already in operation, and experiment with it. By all means do not build your concentrator before you find your ore.

Concentrators are all right and is the proper method for the dressing of ores, making them profitable to ship where mines are a long distance from the ore market, but it is a very easy matter to get in a lot of worthless machinery, expend several thousand dollars making experiments, and then give the whole thing up in disgust. We propose to frown down any such enterprises that may be attempted in this vicinity.—*Elk Mountain Pilot.*

OLD WORKS.—In cleaning out the old works of the Senator mine and extending the drift south, a body of very high-grade gold ore was encountered yesterday. It was struck at a depth of 250 feet, and assays give a value of over $400 per ton. The ore has been gradually increasing in value as the work has progressed southward from the new double-compartment working shaft.—*Prescott Courier.*

The Wrecks in Samoa.

We reproduce by our photo-plate system a series of views by Taber, the eminent photographer, of the late disaster to the German and American war-ships in the harbor of Apia, Samoan Islands. The first view shows the remnant of the battered bow of the Eber, all that held together of a once noble vessel. The wreck of this ship was so sudden and complete that out of a crew of 78 officers and men, only five were enabled to save themselves. To the right is the stern of the Trenton, the flag-ship of Amiral Kimberly and the American squadron. After heroic attempts to save her she was driven aground by the fury of the hurricane. In her loss of life she was extremely fortunate, only one man being reported lost. In the middle distance the hull of the Adler is seen, and in the background the shore of the harbor.

Our second view is of a portion of the harbor of Apia, showing a part of the town on one side and the debris and wreckage left by the hurricane on the beach on the other.

The third picture shows the German corvette Adler as she was left high and dry on her beam ends on the beach. While she fared better than her consort, the Eber, she is nevertheless represented as a total wreck. Her casualties were 20 men killed and drowned.

DIED FROM EATING WILD PARSNIPS.—Sebastian Merdam, a farmer of St. Joseph, Minn., was recently engaged in plowing. Four of his children were playing in the field and found the roots of wild parsnips which were plowed up, and all ate of them. They soon became violently sick and three died in terrible agony. Medical aid was summoned, but arrived too late. Another girl, three years old, who also ate the poisonous roots, it is thought may recover. The three children were buried in one grave at St. Joseph.

THE Grass Valley *Tidings* says the famous Idaho mine there has paid $650 a day for the past 20 years.

Getting Rich by Small Inventions.

The New Jersey man who hit upon the idea of attaching a rubber-erasing tip to the end of a lead pencil is worth $200,000.

The miner who invented a metal rivet or eyelet at each end of the mouth of coat and trousers pockets, to resist the strain caused by the carriage of pieces of ore and heavy tools, has made more money from his letters patent than he would have made had he struck a good vein of gold-bearing quartz.

Every one has seen the metal plates that are used to protect the heels and soles of rough shoes; but every one doesn't know that within ten years the man who hit upon the idea has made $250,000.

As large a sum as was ever obtained for any invention was enjoyed by the Yankee who invented the inverted glass bell to hang over gas jets to protect ceilings from being blackened by smoke.

The inventor of the roller skate has made $1,000,000, notwithstanding the fact that his patent had nearly expired before the value of it was ascertained in the craze for roller-skating that spread over the country a few years ago.

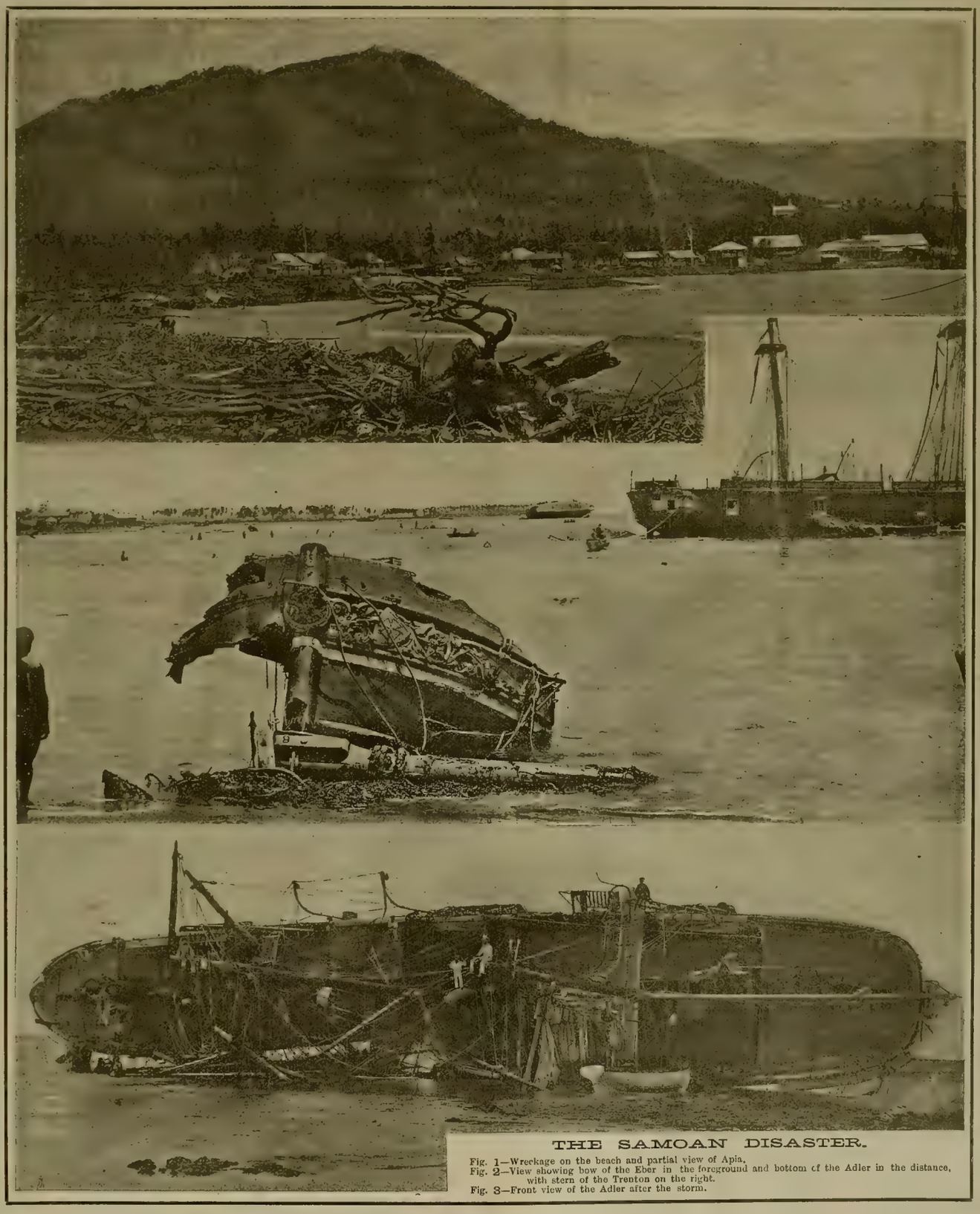
The gimlet-pointed screw has produced more wealth than most silver mines, and the Connecticut man who first thought of putting copper tips on the toes of children's shoes is as well off as if he had inherited $1,000,000, for that's the amount his idea has realized for him in cold, clammy coin.

The common needle-threader, which every one has seen for sale, and which every woman owns, was a boon to needle-users. The man who invented it has an income of $10,000 a year.

A minister in England made $50,000 by inventing an odd toy that danced by winding it with a string.

The man who invented the return ball, an ordinary wooden ball with a rubber string attached to pull it back, made $1,000,000 from it.

The person who invented the most recent popular toy, "Pigs in Clover," will be rich before the leaves turn this autumn. He was poor last November.—*Pittsburg Press.*



THE SAMOAN DISASTER.

Fig. 1—Wreckage on the beach and partial view of Apia.
Fig. 2—View showing bow of the Eber in the foreground and bottom of the Adler in the distance, with stern of the Trenton on the right.
Fig. 3—Front view of the Adler after the storm.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

QUARTZ.—Amador *Dispatch*, May 4: About a quarter of a mile east of Jackson, on J. McMann's ranch, is a ledge of quartz which runs nearly north and south. Years ago a shaft had been sunk 10 or 12 feet deep on the claim, and abandoned. Lately a young man named Purdy, while prospecting there, discovered a pocket of rich ore about 10 feet below the surface. From this place he took out a tub of decomposed quartz, which he values at about $200. He now has a shaft 30 feet deep on the west side of the ledge and occasionally breaks into and prospects the ore, which so far continues flattering.

GOVER.—The Gover has more, and a better quality of ore, than they have had for years. They were working by the side of a wall supposed to be the hanging-wall, but when they broke through into it found 10 feet of high-grade ore.

Calaveras.

AN OLD MINE TAKEN HOLD OF.—*Prospect*, May 3: An Oakland company has taken hold of the Hoozier mine, above Jesus Maria, and several men are now at work. There is a 10-stamp mill on the premises and machinery to prospect the mine thoroughly. A tunnel will be run about 300 feet to tap the vein at a depth of 200 feet. This mine has been worked at different times for 20 years.

THE CASSINELLI CLAIM BONDED.—Tom Goodwin has bonded the Cassinelli gravel claim on Central Hill to a San Francisco Co. and work has been commenced already. Several other claims will be opened in a short time, and we predict that the bullion product of the county will be increased considerable the coming year by the opening of the Central Hill gravel deposits.

PUMPED OUT.—The Mitchell gravel mine at Vallecito is being worked now in a manner that will insure success. Last week the mine was drained of water, and now the proprietors can run their drifts and take out the rich deposits of gravel and not be bothered with water. Pumps have been running for about three months to clean out the mine.

Colusa.

SULPHUR CREEK.—Cor. Williams *Farmer*, May 1: Our little village, Sulphur creek, once enjoyed the busy life of a thriving mining camp, when the Buckeye quicksilver mine was in full blast, but is now resting in quiet repose awaiting the return of business activity and enterprise. The boom is fast approaching, but mining interests in these parts have taken a fresh impetus. The Manzanita gold mine that has been worked for quite a number of years by different companies is now about making preparations for extensive work; although the ore is somewhat refractory it is now handled very successfully under the able management of Mr. Northey, the present superintendent. We understand the above-named gentleman has been called East by his company to consider the practicability of adding 20 or 30 more stamps to the ten already in place, when the hundreds of tons of ore on the dumps of the old Cherry mine are proposed to be worked; this ore, being free milling, can then be worked very profitably. The Clyde and Keely mines, about five and one-half miles northwest of Sulphur creek, are making hurried preparations for early work. The Clyde is a well-known mine in this locality, and contains some very valuable deposits of rich ore. H. M. Cooper, Esq., of your city, the present proprietor of this mine, we understand intends moving his mill lower down the creek, where the ore can be worked to a better advantage by taking it through a tunnel that will tap the shaft in about 100 feet from the mouth and about 70 feet down from the surface. The Keely mine, immediately adjoining the Clyde, is now the property of J. W. Brim, who recently bought it and has already commenced excavating for his milling machinery, and as soon as his five-foot Huntington mill arrives operations will begin and continue night and day as long as water lasts.

El Dorado.

GRAVEL AND QUARTZ INDUSTRY.—Georgetown *Gazette*, May 2: The cheering reports of developments all along the line of the ancient gravel deposits in the vicinity of Volcanoville, which are being made by miners of little capital, and under trying difficulties, are slowly but surely establishing undoubted evidence of the belief that there exists beneath the great depth and width of volcanic ash and cement in that region channels of gravel as rich in gold as are the gravel beds just over the river on the other divide. The perseverance and pluck of our prospectors on the El Dorado side will yet break through the rim at the bottom of the main channel which holds the wealth sought for; then will capital look this way for investment. The same we may truthfully say of our quartz mines. The zone or belt containing the rich mines in Amador and southern El Dorado traverses northward the vicinity of Kelsey, Garden Valley, Georgetown and Volcanoville, on through Placer, Nevada and Plumas counties. Slowly and steadily the work of deep development is creeping up this way, gaining a hold here and there, with just enough encouragement to inspire now and then a capitalist to venture the development of a prospect. Our prospects are good, prospects which, if they were located farther south on the lode line, would, to say the least, be thoroughly developed. Let us encourage capital to come and develop our prospects. If you have faith in your mine, give the capitalist ample time to test it. If it is a good mine, he will be willing to pay a reasonable price; if it proves worthless, he has done all that in reason can be asked or expected of him.

Fresno.

HILDRETH.—Cor. Fresno *Expositor*, May 1: The 600-foot level of the Abbey mine is driven ahead to cut an extensive ore body, which is being developed on the fourth level. The 700-foot level is producing considerable good ore. The winze from this level is going down rapidly and the ore continues to improve. The upper stopes are still producing large quantities of high-grade ore. No. 1 tunnel, through which the mine was originally worked, will be driven ahead to facilitate the workings of the surface ground, which contains large bodies of rich rock. The mill is running day and night at present. The Morrow mine continues to improve as depth is attained. The shaft is still going down, disclosing a fine regular ledge of fair ore. The shaft is down about 150 feet. Considerable water was encountered last week, which seems to come from the ledge, which is a very good sign of a continuous vein. The mill is running steadily on ore from the mine. The intention is to build a mill at the mine as soon as there is sufficient water to run it. At present the ore has to be hauled to the Frances & James mill, a distance of two miles.

MILL CREEK.—Cor. Fresno *Expositor*, May 1: Your correspondent visited the 99 mine a few days ago. The mine was discovered some years previous by Mr. Rider and others, who sold it to the present owners, a company of gentlemen from Visalia and this vicinity. They have a tunnel some 800 feet, and are now sinking a shaft which is 70 feet below the surface to connect with the tunnel. While blasting the other day the side of the shaft was jarred so as to cave off, leaving a ledge visible, which Mr. Stiles informed me he had tested and found to be rich with gold and some silver. There are two more mines located near by which will soon be opened up.

Inyo.

THE CASEY MINES.—Inyo *Index*, May 1: H. A. Mullins of Paris, Ill., is a principal stockholder in the Casey mines near Laws, and came from the East a few months ago. He confirms the good report of the tapping of the lode with the prospecting tunnel and reports later developments as exceedingly encouraging. Should present prospects continue as favorable as promised, the owners, the Inyo Gold Mining Co., will early arrange for mining and milling on an extensive scale.

NEW MINING CO.—Inyo *Independent*, May 4: A new mining company has been incorporated to be known as the Butte Valley M. Co. The mines of the company are in Butte Valley, in the southeastern portion of Inyo county. The principal place of business of the company is Santa Ana, Los Angeles county. The capital stock is $300,000 and is divided into 300,000 shares of a par value of $1 each. The directors of the company are John G. Kimball, D. M. Tomblin, George L. Morgan, O. R. Scholl and Milo Page.

Mariposa.

HORNITOS.—Mariposa *News*, May 4: Mr. Stone, a mining man from Calaveras, has bonded the Moore Hill mine from its owner, J. Craighn, and gone to work on it with a small force of men. The ledge is from 6 to 8 feet of good milling rock with a steady streak running uniformly 16 inches and paying $13.50 per ton.

Napa.

QUICKSILVER SHIPMENTS.—*Calistogian*, May 1: During April, quicksilver was taken from the mines and shipped from Calistoga, as follows: Napa Consolidated mine, 481 flasks; Sulphur Bank mine, 180; Bradford mine, 99; Gt. Western, 30; total, 790 flasks. The continued large shipments from the Napa Con. are beyond the expectations of all who knew anything about the property years ago. Four hundred and eighty-one flasks make a fine month's work for the mine.

Nevada.

PARTIALLY FLOODED.—*Tidings*, May 1: Monday night, Edwin Abram drilled three "holes" in the "raise" he was running to connect the Lone Jack and the Omaha shafts. At 10:20 P. M. Abram blasted, when a considerable volume of water rushed in. The blast had rent the rocky barrier between the "raise" and the Lone Jack shaft. There was another "raise" close by and Abram rushed into it with an alacrity not even equaled by the rushing water, shouting an alarm as he ran. The other men in that part of the mine were at supper and quickly placed themselves in safety. A Mr. Harris and son, less alarmed or more dignified than the others, were slow in moving and were caught by the water, which rose around their persons to a hight of three or four feet. The raise which tapped the Lone Jack is about 100 feet above the bottom of the mine. The lowest levels were flooded and the water rose to a hight of 25 feet in the shaft.

RICH ORE AT THE CHAMPION.—*Transcript*, May 2: For several years the owners of the Champion mine of this district have been expending money and labor in the development of the property, and now they have bright prospects for realizing largely from the investment. The drift on the 500-foot level is in 60 feet and shows a four-foot ledge, the most of which old miners say will mill $100 per ton. This ledge is improving in size and quality with each day's work on it. The Champion bids fair to soon become one of the leading producers of the county.

MACHINERY FOR THE KENTUCK. — *Transcript*, May 5: During the past week there has passed through this city a quantity of machinery from San Francisco consigned to the Kentuck mine across the river from Goodyear's Bar. The machinery, including the boiler, is made in sections. The mine is up on the mountain-side a mile and a half from the wagon-road and everything has to be carried on mule-back and over a rough and narrow trail. B. F. Rouse is superintendent of the Kentuck.

DRIFT MINE.—Nevada *Transcript*, May 4: The work of reopening the Manzanita drift mine by sinking a shaft and a bedrock tunnel will be commenced without further delay, now that the negotiations for a transfer of the control of the property to S. Wheeler and Geo. G. Allan have been consummated by Messrs. Gowell, Heath and the other stockholders selling their interest to these two gentlemen.

GOLD TUNNEL.—The men who have been prospecting for some time past at the old Gold Tunnel mine, which was many years ago regarded as one of the richest claims of this district, have made important developments. A new and large ledge of high-grade ore has been found, and it is made apparent that the pioneer owners worked only on a smaller and less valuable body of ore. It is confidently anticipated that before the summer is over the Gold Tunnel will be giving employment to a large force of miners. A gentleman from the neighborhood of the California quartz mine near Graniteville says it is currently reported there that Messrs. Foley & Co. have sold the property for something like half a million of dollars. There is a conflict of statements as to whether the mine has really changed hands or not.

Shasta.

GRIZZLY GULCH MINES.—Cor. Shasta *Democrat*, May 1: Your correspondent lately visited the rich strikes in the Grizzly Gulch mining district. Excitement is running high, and prospectors are flocking to the front. The Iron Mask mine, owned by a San Francisco company, is yielding rich ore. G. H. Knox's mine, adjoining the Iron Mask, presents, already developed, a chute of ore 150 feet in length and three in width that will average $30 to the ton. Last Monday the Pluto mine, owned by Messrs. Purdin, Weser & Watson, passed into the hands of a San Francisco company for a handsome sum, and at present negotiations are being made for the Hoodoo and Mascot mines, owned by J. P. Bowder and E. Flanagan. The Red Bluff and the Mammoth mines, owned by C. A. Weser & Co., are also a center of attraction, the Red Bluff prospecting as high as 25 cents to the pan in the ledge. Six years ago there was but one mine on Grizzly gulch, and good prospectors who frequented there thought that no other good mines could be found. To-day there are not less than 20 located and prospected quartz claims in that locality, and most of them promise, by surface prospects, to turn out well.

Sierra.

THE BUFFALO.—*Tribune*, May 3: The mine looks better every day and the owners are confident of a big cleanup. The company have about decided not to clean up until the water falls short, as they would have to lose two days at least if they should, and water is too precious to them to let that much go to waste. There will be an engine to run the mill by July. Frank Cook and a gentleman from San Francisco went up to the mine Tuesday and brought down some rock with them. It was most all decomposed. The reporter was shown it and without any exaggeration whatever, we could see gold all through the dirt with our naked eye. A handful of this decomposed matter was horned out and a perfect string of precious metal was obtained. The principal stockholders of the Buffalo are residents of Sierra City.

NORTHERN BELLE.—The Northern Belle mine, a short distance back of the Marguerite mine, is looking well. The four-stamp mill has been completed and was started up Monday. Free gold can be seen in nearly all the rock and a good cleanup after a few weeks' run can be depended upon.

San Diego.

JULIAN.—Cor. San Diego *Sun*, May 4: The approaching season will be the most favorable in every respect relative to mining and mines in this section of any preceding year in the history of Julian. A gratifying assurance is the number of prospectors daily arriving, the larger number evidently intending to remain, as they are much pleased with the future prospects of the camp. Prospecting in the vicinity of Banner will receive an impetus heretofore unknown, and the fact will be fully demonstrated that Banner and its surroundings will compare favorably with any gold camp on the Pacific Slope. The prospective point at present appears to be in the vicinity of the Chariot mine.

THE OWENS MINE is in the immediate vicinity of Julian, and formerly was quite a paying institution, the old shaft being some 300 feet in depth, and while under the supervision of I. James, since deceased, unearthed some of the richest gold quartz ever before produced at Julian. The old shaft has been abandoned and a new one started on the same vein. The mines are down something over 100 feet with flattering prospects. In this district several other mines are being worked, the miners say with some degree of success.

THE CINCINNATI BELLE.—This property, owned by W. Fredericks, is at Banner, and is the best paying mine for its size in this district. The main shaft is down some 68 feet, but at present is full of water, unless very recently pumped out. Parties must not draw the inference that this is a wet mine; on the contrary, it is too dry if anything. The heavy rains caused the filling of the shaft. It is evident that negotiations have been going on between Eastern capitalists to perfect a sale, if the parties can agree on the price.

THE FRACTION MINE is the extension of the above, and is nearly as rich. It is owned by McGhear & Rolland, and at the present good ore for milling is being taken out. At the Ready Relief mill, which will shortly have a good-sized crusher, Mr. Rolland informed me that he usually pounded out his richest metal in a hand mortar.

Tulare.

BARTON MINE.—Tulare *Times*, May 3: Joseph H. Thomas of this city spent several days of last week visiting the Barton quartz mine on Rattlesnake creek, 25 miles east of town. He says the mining ground can easily be traced for 1¾ miles by the country rock that crops out for that distance, but that is the beginning and the end of all indications of gold. Several shafts have been sunk along this line, and everywhere traces of gold can be found, though the peculiar formation containing the gold is not discovered until a shaft has been sunk on the lead 10 or 12 feet. The rock containing the gold is not quartz, but is of a sandstone formation, which will dissolve in a short time after being placed in water, and can then be run through sluice-boxes, and the gold saved. Mr. Thomas does not believe the rock or sandstone to be very rich, but is of the opinion that if water was handy it would pay $2.50 per day to the man. Water is scarce, and can only be obtained for working the "rock" during the rainy season; yet there is water that can be utilized if the ore were transported a distance of a mile and a quarter.

NEVADA.

Washoe District.

UTAH.—Virginia *Chronicle*, May 4: On the 600 level, the double compartment incline upraise from the end of the main south drift is up 120 feet. Formation, vein porphyry and quartz.

CON. CALIFORNIA AND VIRGINIA. — During the week 1182 tons and 1850 pounds of ore were shipped to the Morgan mill, 1846 tons and 1760 pounds to the Eureka. The average assay value of all the ore worked at these mills during the week, according to battery samples, was $27.60. Bullion valued at $72,600 on hand in the assay office. Shipped to San Francisco during the week bullion valued at $90,247.39.

OCCIDENTAL.—On the 300 level in the north lateral drift, 35 feet north of the south winze, an incline upraise is up 253 feet. Formation, clay and porphyry. On the 450 level the north drift is extended 160 feet from the north incline winze. Formation, ore and porphyry. Will finish excavating for battery foundation for new mill next week.

NORTH OCCIDENTAL. — On the 300 level, west crosscut No. 2, 100 feet north of the south line, is advanced 44 feet in quartz and porphyry. On the 400 level the north lateral drift is extended 183 feet; formation, quartz and porphyry.

BEST AND BELCHER.—During the week there has been crushed at the Thompson mill 17 tons 1600 pounds of ore, the average battery assay of which is $24.20 per ton. Have shipped to the office in San Francisco bullion valued at $7569.

CONFIDENCE.—Shipped 160 tons of ore during the week. Pulp assays show an average value of $27.87 per ton. The raise above the 300 level is in ore. Ore shipments from this mine and Challenge were suspended April 30th.

UNION CON.—On the 1465 level at a point in the north lateral drift 220 feet north from the south line of the mine, west crosscut No. 1 is advanced 83 feet in a formation of porphyry and clay showing some water.

CROWN POINT.—Shipped during the week 833 tons of ore, battery sample assays showing a value of $21.07 per ton. The hanging-wall in the stopes above the 400 level flattens and the ore is much narrower.

BELCHER.—The 1100 level west crosscut entered ore May 1st, which shows an average value of $100 per ton. The ore does not extend to the top of the crosscut and is evidently the apex of a body.

OPHIR.—On the 1465 level, from the south drift from the east crosscut, 90 feet in from the main south drift, a west crosscut is advanced 70 feet and is now in quartz which shows value.

HALE AND NORCROSS.—During the week shipped 1018 tons of ore showing a value of $31.42 by battery sample assays. Bullion valued at $88,000 shipped so far on April account.

MEXICAN.—On the 1465 level the north drift from west crosscut No. 1, 61 feet east of the upraise, is extended 30 feet in a quartz and porphyry formation of low value.

ALTA.—Sinking a winze in ore below the 925 level. The ore in the bottom is above the average grade. Crushing and concentrating the usual amount of ore.

SIERRA NEVADA.—On the 520 level from the shaft station, an east drift is advanced 210 feet and is in porphyry showing some water.

SAVAGE.—Shipped during the week 474 tons of ore showing a value of $19.79 a ton from battery sample assays.

GOULD AND CURRY.—On the 450 level the northeast drift is extended 125 feet. Formation, porphyry and quartz.

BULLION.—On the 760 level advancing a south drift from the bottom of the winze sunk below the 640 level.

CHALLENGE.—During the last week shipped 89 tons of ore showing an average assay value of $27.87 per ton.

JUSTICE.—The mill is running steadily on ore. The new hoist plant will be completed next week.

CHOLLAR AND POTOSI.—Shipping daily to the Nevada mill 70 tons of ore from the joint stopes.

SCORPION.—Still advancing an east drift from the 520 level of the Sierra Nevada shaft.

SEG. BELCHER.—The 1100 west crosscut is in 325 feet. The face is in soft porphyry.

ALPHA.—The joint 500 level east crosscut at the Imperial line is in vein matter.

EXCHEQUER.—Advancing a north drift and west crosscut on the 500 level.

ANDES.—The upraise above the 350 level will soon connect with the 175.

IMPERIAL.—Advancing the joint Alpha line crosscut on the 500 level.

BALTIMORE.—No change in explorations in progress on the 225 level.

NEW YORK CON.—Crosscutting west from the 800 level lateral drift.

SILVER HILL.—Drifting northeast and southwest on the 200 level.

OVERMAN.—Shipped 242 tons of ore during the week.

YELLOW JACKET.—Resumed shipping ore May 1.

Bristol District.

LEACHING TAILINGS.—Pioche *Record*, April 27: Chas. L. Roe was in from Bristol yesterday. He says he will be ready in about two weeks to begin steady work in leaching the tailings there. A test of 35 tons worked last week shows that by proper roasting the tailings and ore of the same class can be worked to a high percentage. There is no question but that the work will prove profitable.

Eureka District.

NOTES.—Eureka *Sentinel*, May 4: Charley Broy has been hauling ore from the Eureka tunnel during the week. We learn that there are about 100 tons of ore to come from there. The tunnel in the Diamond mine will be completed in about a week. The Tributers in the Phœnix mine have about 30 tons of ore ready for shipment. The Hugenot mine on Prospect mountain, under lease, is yielding some good ore. A number of men are now employed at the Eureka Con. furnaces in making repairs, and it is thought they will commence smelting about the first of June.

Jefferson District.

DEVELOPING.—Belmont *Courier*, May 4: The mine-owners in Jefferson district are busy developing their properties and some good ore is being encountered. The Harrison mill is running and producing silver bullion.

Tuscarora District.

BELLE ISLE.—*Times-Review*, May 4: North drift from west crosscut, 250-foot level, extended seven feet, showing a good width of vein; ore, low grade. Have started a drift south from the same point.

COMMONWEALTH. — 225-foot level: Upraise to connect with No. 3 winze made seven feet, exposing fine ore. Intermediate drift from No. 1 winze extended 11 feet, still in ore. South drift from No. 2 west crosscut advanced 17 feet, showing good ore. No. 1 winze sunk nine feet, developing very fine ore. 300-foot level: South drift advanced 17 feet in the vein; north drift extended 14 feet, showing low-grade

ore. A few miners have been put to work stoping in the different openings of each level. The mill is now running 20 stamps on ore from the mine, everything going nicely.

DEL MONTE.—North drift, 225-foot level, extended 19 feet. The face shows seams of spar carrying iron and giving low assays. North drift, 100-foot level, extended 17 feet, showing some high-grade ore. At this point a crosscut has been started to determine the width of the vein and has been extended four feet, showing better ore than was found in the main drift.

NEVADA QUEEN.—The stopes are yielding good concentrating ore. Two hundred and seventy-five tons of concentrating ore have been shipped. The concentrator is working well. The mill has been turned over to the Commonwealth. Shipped bullion to the value of $18,340.98. Another shipment of the cleanup is yet to be made.

NORTH COMMONWEALTH.—A joint crosscut has been started east from the 225-foot level station, in favorable looking ground. South drift, 100-foot level, extended 25 feet; the face shows some high-grade ore; neither wall has yet been cut by the drift.

NAVAJO.—South drift, 250-foot level extended 15 feet. A drift has been run south 10 feet on the vein, from the top of No. 7 upraise, 350-foot level, showing fair ore. The usual quantity of ore has been sent to the mill.

NORTH BELLE ISLE.—The stopes above the 300-foot level are almost exhausted of high-grade ore.

ARIZONA.

COPPER BASIN.—*Journal-Miner*, May 1: Thirty-five tons of copper has been shipped from Copper Basin. A rich ledge of copper is reported to have been struck recently near Lee's Ferry. Ore is commencing to arrive again in large quantities at the sampling works. J. M. W. Moore has nearly a carload of $300-ore ready for shipment from his Amulet mine. J. N. Rodenburg left for the Bradshaws yesterday, to work some claims owned by him there. James Akers and Harvey Helm came in from the Trap Rock mine yesterday, with a lot of ore for the sampling works. Frank Alters has sold his one-fifth interest in the Catoctin mine to Wm. Ronald for $2000, the deed for which has been recorded. The Lynx Creek Hydraulic Works have closed down for the season for want of water, after a very successful run of three months. J. R. Liston, who owns a good mine in the Bradshaw country, is in town purchasing supplies, and says that they are having a genuine mining boom out there. N. L. Griffin of Lynx creek says that Dixie Mining Co. is pushing work rapidly on its property in the above district, and have very flattering prospects for success. James O'Hara, who owns some good mines in Martinez district and in other places in the county, is in Prescott. He says he will soon commence taking out ore from a claim near Copper Basin. J. J. Williams made an experimental run of his little water jacket furnace to-day, at the sampling works. It worked to perfection. The furnace is a portable one, and has a capacity of from three to five tons per day. The engine used to work the blower is of two-horse power capacity.

BRITISH COLUMBIA.

ON THE FRASER.—Kamloops *Sentinel*, May 1: An English company has applied for 45 miles of the Fraser river to dredge for gold. The limits applied for extend from Boston Bar to the foot of Cornish Bar, five miles below Hope. In these limits there are 20 miles of canyon which cannot be worked. It is to be hoped the application will be granted, as the work will incur a large outlay of capital. It is the intention of the company to build a steamer, dredges, scows, and other necessary plant at North Bend, and mine down stream. Should the company be successful—and there is no reason to doubt that they will—it will give an impetus to this system of mining that will be the means of employing a large number of men, and will bring the rivers of the province into prominence both at home and abroad. Other companies have tried pumping, dredging, coffer-dams and diving years past without success, and it is to be hoped the proposed scheme will, if undertaken, be more fortunate in reaping a rich harvest for its promoters.

YIELDING $20,000 A YEAR.—Donald *Truth*, May 1: The Perry Creek Gold Mining Co.'s ground is now producing dust at a monthly rate that will aggregate about $20,000 a year. The company has labored and overcome many difficulties, but are now reaping a small reward for their perseverance. A letter from Foreman Dow to Secretary Jacoby states that the tunnel is still in the old river-bed canyon, which is very narrow in places. The bedrock and rimrock are quite smooth. The quality of the gold taken out is coarse. The yield for April is expected to average fully as large as that of the three previous months, as good-looking ground is being worked. The total yield for January, February and March was $4797.

COLORADO.

GOLD BELT.—*Ouray Plaindealer*, May 4: All along the gold belt, both in the upper and lower quartzite, nothing but the most flattering reports are daily received. A great many prospectors are busy with pick, shovel and gold-pan on both sides of the river along the contact for miles. As the snow decreases the field of operation is extended. The extent of the field is as yet undetermined, but with the development and prospecting now in progress the treasure troves in this singular formation will be speedily brought to light. There is no telling how much of the precious metal these immense cavities in the quartzite contain. Suffice it to say, that enough work has been performed and ore extracted to satisfy the most skeptical that rich ore in paying quantities exists. Work all along the line on all the most extensively developed properties demonstrates that the quartzite can only be compared to a honeycomb, the cells being filled with soft, decomposed ore, rich in gold. Report of a rich find in the Puzzle was circulated Wednesday by disinterested parties, who were at the mine when a number of blasts were fired into the breast of the drift, which opened up a larger and richer cave than any heretofore found. American and Nettie working as large a force of miners as is practicable, and producing about four tons per diem. The Jonathan is making a good record as a producer, and is conceded to be one of the most promising properties on Gold hill. For the amount expended in development, the quantity of ore exposed and ready to be shoveled up and marketed at the pleasure of the owners, the gold belt surpasses any district in the State, and is well worth the trip to go up and examine.

IDAHO.

THE MINING OUTLOOK.—Boise City *Statesman*, May 4: The mining outlook does not appear to be as bad as many have supposed. The placer mining in Boise Basin will amount to but little this season. It is one of the poorest seasons ever known for placer mining in Boise county, but on Snake river, where there is now a good deal of mining, it is better for the low water. The bars where the gold is are more exposed and they have a larger surface of pay dirt which is easy to get at and will make the season on Snake river longer than usual. The Gold Hill mill is turning out $15,000 a month and the mine continues improving. The Washington mine shipped a good deal of ore last season, but will have a mill erected at their mine in less than 90 days, and the product of the mine will be twice or three times as much as last year. Jo Voshay, the superintendent, is on the ground and he will push the work with all necessary labor. John Brown, the superintendent of the Banner mine in Banner district, has been on the ground all winter and has done considerable deadwork and uncovered a good deal of rich ore. This mine and the other mines in the group are narrow and require heavy working, but the ore is very rich. It is quite probable that this mine will produce $100,000 this season. K. P. Plowman is building his mill over on Robies' creek, ten miles north of here, and will work the Thurman lead and ore from several new mines this side of Shaws' mountain, eight miles from this city. The outlook for the mines around Silver City, Bellevue, Hailey, and Ketchum is better than it was last year.

BUNKER HILL AND SULLIVAN.—Wardner *News*, April 29: The *News* is informed by Superintendent V. M. Clement that all work in the Bunker Hill & Sullivan mines will be suspended this evening and on Tuesday next all operations in the mill and other departments of that works will cease. This suspension will continue until a reasonable freight rate is offered by the Cœur d'Alene Railway Co., or until the W. & I. road, now in course of construction, is completed to Kellogg. Superintendent Geo. B. McAulay is anxious to have work proceed in the mines under his charge, but he positively states that if a reduction in freight rates is not made immediately he will be forced to stop all work in the Sierra Nevada, Stemwinder and Granite mines and concentrators.

HUNTER DISTRICT.—Since the first of last February, the date on which operations were resumed on the Hunter mine, a great deal of development work has been done, confirming the opinions already expressed concerning the vast resources of this most valuable property. The vein proper is between 30 and 40 feet in width, but the ore streaks vary from one to eight feet, several of which are found thereon, and there is every indication of encountering kidneys that will extend the full width of the vein. The mine is opened by four tunnels. The concentrator is located at the mouth of Hunter gulch. The main building is 65x100 feet and 60 feet in hight, with an ore-house attached 25x40 feet, and a sacking-house 40x57 feet. The machinery is run by water-power aided by a 20-inch Leffel water-wheel. The mill is from the works of Fraser & Chalmers, of Chicago, and contains the latest improvements in the methods of concentrating. The plant consists of 2 ore-crushers, 4 sets of Cornish rolls, 2 Heberly grinders, 12 jigs (which number will be increased immediately to 16) and 4 Frue vanners. One hundred tons of ore are being treated daily. An air compressor with a capacity to run 10 Sergeant power drills has been ordered and is now en route from the Norwalk works, South Norwalk, Conn. The mine and mill are under the able superintendence of C. C. Perkins, a gentleman of large experience in his business,

MORNING.—Chloride Hill is one of the loftiest and grandest elevations found in the Cœur d'Alenes, and looks proudly over the town of Mullan. Foremost among the developed properties stands the Morning, which is now conceded to take its rank among the best mines of the South Fork. Work has been commenced on the concentrator; everything for the works, including the building, will be erected by the Utah & Montana Machinery Co. The site for the mill is conveniently located near the railroad track south of the town. Martin Curran, one of the best practical miners in the country, is superintendent of the mine.

GEM.—The Gem mine, owned by Campbell, Finch and others, is at present a scene of busy operations, and as work progresses most encouraging developments are made apparent. In the upper tunnel three shifts are employed in sinking an incline on the ledge, which shows to the full width of this working. Wednesday, May 1st, work will be commenced on the concentrating mill, which will be built under the direction of R. K. Neill, who has acquired a reputation for the erection of such works second to no one in the West.

BLACK DIAMOND.—A very promising claim called the Black Diamond, owned by W. J. and Geo. E. Hughes and Tim Maher, is located about six miles from Mullan. They have a tunnel in 150 feet, with a crosscut from its face run in a northerly direction 47 feet. Assays run 84¼ ounces silver and 59½ per cent lead.

SILVER CLIFF.—An extension of the Black Diamond on the east, called the Silver Cliff, is owned by J. D. Young. He has a tunnel in 170 feet showing two chutes of ore.

THE SILVER WING.—Challis *Messenger*, May 3: A one-half interest in the Silver Wing mine, a one-half interest in the Queen of the Hills, a four-ninths interest in the Shamrock, a four-ninths interest in the Herschel, on Ramshorn hill, and the Greyhound mine, formerly called the Keystone, on Keystone hill, all in Bayhorse mining district, together with all ores on the dump, have been sold by Owen Long and George Clark to A. J. Crook & Co., and the deed was placed on record on the 26th ult. Consideration $25,000. The Silver Wing mine adjoins the Skylark on the east, is one of the best little mines in the county, and has been a constant producer of a reasonable amount of high-grade ores ever since its discovery, which dates back some eight or ten years. The other properties all have good showings, and with sufficient development work, will, from every indication, prove to be mines and a valuable investment to the purchasers.

MONTANA.

THE MOUNTAIN LION.—*New Northwest*, May 4: The Mountain Lion working shaft was still in vein matter Tuesday, not yet having struck the footwall. The vein is so far demonstrated to be 13 feet wide at this point. There is considerable stratified ore in it, aggregating about two feet, some of very good quality. There is now over 800 feet of development on the Lion, and over 500 feet of shafting and tunneling yet to be done by the Syndicate. The work is being expeditiously, durably and economically pushed by Mr. Gable.

THE CHAMPION.—"Everything is looking first-rate" is Supt. Ed. Mills' report of the Champion yesterday. The 350-foot level is in 30 feet, with 4 feet of ore. A carload a day could be sent up readily if there was ore-house capacity to hold and teams to handle it. As it is, ten carloads will be shipped this month. The ore so far shipped has netted over $1200 per car at Butte and Helena.

NOTES.—Mr. Alex. Sloan is now shipping 20 tons of iron ore per day to the Helena smelter, from Avon, which he hauls from his mines about nine miles from Avon. He has a contract to deliver 2000 tons, and the smelter will take all he can furnish, it making a very desirable flux. There seems to be an illimitable deposit of it, and it is procured so far by plowing it up and filling it into wagons.

THE RUBY-AMERICAN PROPERTIES.—Dr. H. L. Hoyer obtained, a few days ago, the final signature that completed the titles to the Ruby and American locations, and has commenced operations. These locations are on Gospel Mountain, between the Champion and Lion properties. They prospect very well in the representation shafts sunk on them.

THE FRANKLIN.—Supt. Benjamin Franklin, who is running the Jumbo tunnel for the Franklin Co., reports the tunnel in 650 feet, with 260 feet vertical depth at the head. He has 13 feet of a vein filled with quartz and porphyry, with 40 inches of ore in place in the head of the tunnel, and all quartz to the right.

GRANITE MOUNTAIN.—Phillipsburg *Mail*, May 4: The output for the week ending May 2d was 40 bars of bullion, containing 62,522.81 ounces silver and 91.77 ounces gold.

BI-METALLIC.—The company commenced grading this week, and the foundation is already started for an addition to the cooling-room. The force of men which has been at work constructing the tramway have been released, having completed that useful piece of work. It is thought the cable will be started this week. The mill is treating an average of about 60 tons of ore per day now, and the Granite road is constantly lined with teams hauling the ore from the mine to the mill. The engine for the tramway arrived this week, and is now being placed in position.

ORO FINO DISTRICT.—J. M. Siegfried, a well-known prospector and miner in this district, returned Monday from a trip to the Oro Fino district, and reports great progress in mining affairs in that section. There are now in all about 100 men employed in the Champion, Mountain Lion, and on other mines and prospects, and all are satisfied that a long season of prosperity is in store for Gospel mountain.

HATTA.—Another shipment of two carloads of ore will be made from the Hatta this week. They intend sending it direct to Omaha. It was expected that the company would be able at the recent meeting of the stockholders to raise sufficient money on the machinery to continue developments, but it was found impossible to do so.

NONPAREIL.—Work has been resumed on the Nonpareil, on Boulder creek. A shift of men is now sinking the shaft, and the property will be opened up as rapidly as possible. The indications are very flattering, and there seems but little doubt that it will develop into a valuable property.

OREGON.

THE WINTER MINE.—Bedrock *Democrat*, May 1: Dr. Marotte came in from the Winter mine near Sparta last Sunday. He says the mine is making a grand showing. In the tunnel at a distance of over 200 feet the ledge averages two feet wide and the ore is rich in gold. He has a force of men employed pushing development work and will continue for some months to come.

THE MINES OF POCAHONTAS.—The Nelson M. Co. are working their immense hydraulic claims with a large force of laborers employed, and the present indications are more favorable for a good run than the outlook a few weeks since. The Auburn canal, the main supply of water for the mines, is carrying a large amount of water and the late rains and snows in the mountains will be of great advantage in keeping up the supply. Messrs. Carpenter & Co., and other mine-owners of the Pocahontas district, are preparing to commence the season's work, but do not expect as long a run as usual.

FROM CRACKER CREEK.—Deputy U. S. Mineral Surveyor Emil Voigt, from Cracker Creek, reports the mining outlook of that section good; also placer mining at Sumpter progressing under favorable circumstances. The claims of Archie Downie, which are probably the best equipped mines in that section, are running under a full head of water and giving most favorable indications for a prosperous season.

NEW MEXICO.

CARLISLE.—Silver City *Enterprise*, May 4: The Carlisle mine is doing as well as usual. Several carloads of high-grade ore are being shipped from various mines of the district. These shipments will bring the mines into notice. Such shipments do more for a camp than expert reports. The Rain-in-the face mill is running steadily.

SHERIDAN.—The old Sheridan mine is producing a sufficient amount of ore to keep the mill running steadily. The ore is of a good grade, and is more than paying expenses. The Beatrice mill started up last Tuesday, and is running well and doing good work under the immediate supervision of Captain Davis, the resident manager. The "Carlisle Mining Co." is the name of the new corporation which is now running the Cooney Silver Creek mine. The mine is under bond, and will probably be sold ere long. It is a fine property. The south extension of the Smith & Ailman lead on the east side, is being worked under a lease by H. J. Hankins. The results obtained thus far are very satisfactory, and "Hank" is to be congratulated on his good luck. The Bell and Stevens' ten stamps are pounding right merrily on ore from the Golden Giant and Skillicorn mines. Sam Green is the presiding genius, and the results from the refractory ores from the district attest his skill as a thorough millman. The Major mine, the property of M. B. Tallant, is opened by a shaft 38 feet in depth. The crevice at the bottom is from five to eight inches in width, and offers a fine milling proposition. In this, as in every mine or prospect in the district, there is increased value in both quality and quantity as depth is gained.

ZINC ORES.—Buyers of zinc ores hitherto have demanded that ores of that character to be made available, should not carry silver. This difficulty has been obviated, and now there is not a pound of zinc ores in Hanover district but can be placed on the market with a profit to the seller and smelter. The St. Louis sampling and testing works are in the field, and are purchasing zincs carrying silver and testing them successfully.

UTAH.

PARK NOTES.—*Record*, May 4: Ore shipments are increasing in magnitude. Negotiations are being made to incorporate the Glencoe group and push developments on this promising property. The Little Mac group, between the Ontario and Massachusetts, is being cleaned up preparatory to being worked by leasers. Jas. McCune will start up work on his leased property, the Wasatch, in about a week, and he expects to be shipping ore from it before long. Dividend No. 155 on Ontario stock, being $75,000 for April or 50 cents a share, has been paid. This makes the total of Ontario dividends to date, $10,125,000. The Jupiter leaser sare pushing work with favorable results. It is understood that negotiations are going ahead looking to the resumption of work on the Massachusetts property. The Anchor tunnel has reached a point under the shaft and crosscutting for the ledge has been started. Several Heber and Midway persons have lately returned from a prospecting trip to Uintah county and they report finding a ledge some 50 miles from Ashley which can be traced for miles. Assays from the new find show 50 ounces silver and 39 per cent copper—peacock copper—to the ton. There is strong talk among these men of going back there again to organize a district and develop the mines. Undoubtedly this is a rich strike, particularly as regards the copper, and local mining men are becoming interested in it.

ORE AND BULLION SHIPMENTS.—The Ontario bullion product for the week was 31 bars, containing 17,791.02 fine ounces of silver. During the week the Crescent shipped 137,910 pounds of first-class ore and 151,000 pounds of concentrates. For the week just ended the Mackintosh sampler received 526,600 pounds of Ontario ore, 458,680 of Woodside leasers, and 174,510 of Daly ore; total, 1,159,790 pounds. The first of the week, 22 bars of Daly bullion, 20,460 fine ounces of silver, were shipped from the Marsac mill. Besides this, several large lots of silver sulphides, the result of treating the ore by the Russell lixiviation process, have been shipped from the Marsac to eastern refineries.

THE MAMMOTH MINE.—Cor. Salt Lake *Tribune*, May 3: The Mammoth mine in Tintic mining district has, under the able supervision of Major Reno, become one of the largest ore-producing mines in the Territory. When he took charge, nearly two years since, the mine was in a poor condition. Under the management of Major Reno the mine has paid in dividends the sum of $70,000, besides for improvement the large amount of $65,000, while for a considerable time previous it paid but $10,000. Superintendent Reno has tendered his resignation, to take effect on May 1st. He will be missed by his employers, in the management of whose valuable property he has been eminently successful, and by the employes under him, for whose safety in the mine he was ever watchful.

THE COKE A SUCCESS.—Salt Lake *Tribune*, May 3: An experimental run of practical proportions has been made at the Germania smelter with native coke from the Castle Gate mines. The test was made during a 30-hour run, nothing short of which could be considered an effective settlement of the question as to whether we were able to supply coke from Utah mines that would bear the heavy work of the smelters. The question is settled beyond all controversy and the quality of the coke has been pronounced equal to that of Crested Butte or any other place. Thirty coke ovens are now in course of construction at the mines, and the owners propose to carry on the business on the large scale that this important article justifies.

WASHINGTON TERRITORY.

CONCONULLY MINES.—Okanogan *Outlook*, May 2: Latest reports from the Lone Star are that it is improving all the time. Jas. F. DePue has a claim in the lime belt, called the Manhattan, which has several tons of rich ore in sight. It is astonishing to all who visit this country to see the variety of mineral specimens found here in paying quantities. The owners of the War Eagle on Ruby hill are expected in, and it is understood they will resume operations on that noted mine at once. Jas. DePue has bonded the Manhattan mine in the lime belt to Dick Chilson for $4000. The Lone Star, three miles south of Ruby and about six miles from Conconully, has made a rapid jump to the front. An assay recently made shows $74 in gold and $60.74 in silver. The New Hope, Madge and Powderly claims, located near Golden in the Wanicut country, have been incorporated in Chicago under the name and style of the Consolidated Mining Co. R. H. Bliven of Ruby exhibited to us some samples from the Catelpha, Washington Belle and American Belle, situated about three miles below Ruby on Arlington hill, which are creating quite a stir among mining men here. The samples were in limestone between perfect walls. These ledges have always been thought barren, but from several test assays gold is found in paying quantities.

MECHANICAL PROGRESS.

Indian Crucible Steel—Miniature Steel Works.

The *East Indian Engineer* furnishes the following very interesting account of the primitive mode in which crucible steel is made in India:

The industry is still carried on to some extent. The works are conducted in some location favorable for obtaining charcoal. In the village here referred to the business affords employment for about 16 families of smiths, and is altogether in the hands of a Mussulman named Mahomed Routhen, who holds a monopoly of the right to collect charcoal for the purpose in the jungles of the estate, for which he pays 1000 rupees per annum. Beyond the convenience of its situation as regards jungles and the existence of tolerably fine red earth in the vicinity, the site possesses no special advantages. The modus operandi is described as follows:

"The process employed is very simple. Small quantities of iron are inclosed in a small earthen crucible with a few pieces of the wood of the avaram plant and two or three green leaves. A top is luted on, and when dry the whole is exposed to the heat of a small charcoal furnace till the iron is melted, a fact which the operator ascertains by picking up the crucibles in a long pincer and shaking them. The vessels are allowed to cool and then broken open, when a knob of steel is found at the bottom. Two sizes of ingots are made, weighing about 8 ounces and 10⅝ ounces respectively. The crucibles are made of a mixture of red earth and charcoal made of paddy husks kneaded together. They are shaped on a wooden plug about five inches long and two inches in diameter for the smaller size of ingot, and slightly larger for the other size, having a conical end which forms the bottom of the cavity in which the steel collects while fluid. The lid is of the same material and put on wet. It appears hardly to contract at all in drying, and a fairly air-tight vessel is consequently produced. The clay is not nearly refractory enough for the heat it is exposed to, as the crucibles are completely vitrified and spoiled at the end of a single operation

"The iron used is brought from the Namakal Taluk of Salem, and appears to be a rough description of wrought iron. For the smaller size of ingot it is cut into pieces weighing as nearly as possible ten ounces (a small piece is added to make up the weight, if necessary), and this quantity is placed in each crucible with ¾-ounce weight of pieces of the dry wood of the avaram plant. Two or three green leaves (the kind is a matter of no consequence) are placed on top and the charge closed up with a lump of clay carefully plastered all around. Great care is taken in putting in the correct proportions of iron and avaram wood, and the operators assert that, if less is used, the iron is not melted, and if more, it will not stand being worked afterward. The green leaves probably serve in some way toward retarding the drying of the lid and preventing it from cracking. The furnace consists of an inverted cone of earthwork about two feet in diameter, and the same in depth, the apex opening into an ash-pit below. At one side, and protected from the heat by a mud wall, is a small shed in which two bellows-men sit and work a pair of skin bellows most vigorously. The air is admitted into the furnace through a hole near the bottom. In preparing a furnace, some straw is first placed at the bottom below the air-hole, and charcoal is then thrown in to a suitable hight. On this, 25 of these conical crucibles are placed with the point downward, and when all are in position they appear to form a sort of circle and to be independent of the layer of charcoal below. More charcoal is placed above, and the furnace is then lighted through the air-hole. Fresh fuel is thrown on above from time to time, and one or two of the crucibles are occasionally lifted with long-handled pincers to allow the burning charcoal to fall through and replenish the supply below. The straw remains untouched by the fire throughout the process. The crucibles are given a sharp shake on these occasions, which is said to assist the process, and, toward its conclusion, allows of the operator's ascertaining whether the iron is melted or not.

"As the mouth of the furnace is open, the waste of fuel is enormous, and I do not believe that one-fourth of the charcoal used exercises any effect on crucibles. In the absence of good fine clay this fault seems irremediable, as there is no sufficiently refractory metal available from which a separate opening for the supply of charcoal to the furnace below could be constructed. After about an hour or an hour and a half, the feel of a crucible when lifted shows its contents to be liquid. The process is then considered to be completed, and the crucibles allowed to cool, after which they are broken open, and a knob of steel is found at the bottom of each. The ingots are reheated and hammered into oblong pieces, in which shape they are sold. All the crucibles do not remain absolutely air-tight during the process, the lids becoming cracked without affecting the result. I had the contents of one of these poured out through a crack, and was surprised to find the steel in a state of extreme fluidity, a thing which the heat produced hardly led me to expect."

The estimated cost of making 200 pounds of steel is about 31 rupees, and the value realized for the production about 36 rupees, the manufacturer netting a profit of 5 rupees, or about 16 per cent. The annual outturn of the manufactures in the village is about 14 tons.

The silver rupee is worth about 50 cents of English money; the gold rupee about $7.

Machinery and Hardware in Russia.

Mr. Mitchell, English Consul at St. Petersburg, says that, with the exception of a very marked increase in the importation of machinery for manufacturing textile goods, and in that of steam engines, a decline in machinery of every other description was perceptible in 1887. This was also noticeable in the case of cutlery, scythes and sickles, tools and other descriptions of hardware. The importations from Germany and Austria likewise showed a diminution under these heads, owing to the higher duties, though, perhaps, not in the same degree in some classes of machinery and tools. For instance, fewer portable engines were imported from Great Britain, but an increase in those obtained from Germany. It is the comparative cheapness of German hardware that drives our own nearly out of the Russian market. Thus, German crosscut saws are considerably cheaper, and therefore command a much larger sale than our own, which are, however, held in much higher esteem. Equally cheaper than our own in the Russian market are German edge tools and plain iron hammers, though English are often preferred, the difference in price alone making the latter inaccessible to the Russian purchaser at large. Works have been recently established in Russia for the manufacture of these articles.

Large quantities of locks, padlocks and other metal goods, as also tinned wire, are imported from Germany, and are sold at lower prices than those of English make. Manufactories for these articles are also being started in Russia, and, owing to the high duties which will protect them, they will be able to compete with similar German products. In order to mislead, the German manufacturer, we are told, while not generally pirating English trade-marks, has printed in English on his comparatively inferior goods, "best quality," "warranted best cast steel," packed up in the same style as the English wares. These find greater favor than they otherwise would. It must be observed, however, that Russian wholesale dealers in German cutlery, tools, etc., require them to be made up as English goods in paper, and with labels closely resembling those used by our own manufacturers. Some classes of American hardware, such as locks, saws, axes, tools, spades, pitchforks, etc., also compete successfully in Russia with our own products of a similar kind, as they are in most cases cheaper and more novel and varied in make.

JUDGING IRON BY FRACTURE.—Much is sometimes made of the appearance of a fracture on a piece of iron, as indicating its quality; and a practiced eye may, indeed, discriminate between coarse and fine metal by examining the broken ends of a bar. But, nevertheless, little dependence is to be placed upon the supposed difference between iron showing a "fibrous" and that which exhibits a "crystalline" fracture. The same break will not infrequently show patches of each appearance, and that in instances where it is perfectly certain that the texture is uniform. Probably in such cases the difference does not lie so much in the iron itself as in the manner in which it is broken. Where, for example, the fracture is of the nature of a crossbreak, the place will have a crystalline appearance; but when it runs along the grain, like a tear, it will look fibrous. In other words, the so-called "crystals" appear to be merely the ends of fibers, which, when drawn into points, would have presented a "fibrous" fracture. And, in general, the causes producing one sort of break or the other seem to be external rather than structural. For instance, when a piece of iron is broken suddenly, as by a blow, or is nicked and then bent cold, the resulting fracture is almost always crystalline; but when it is pulled steadily until rupture takes place, or is bent without nicking, the break generally presents a fibrous appearance. In this respect, indeed, iron behaves much like pitch and other ductile substances, which, when drawn out slowly, will run to a point or break like a bunch of fibers; but if struck or jerked suddenly will crack with a smooth conchoidal fracture, corresponding to one of the crystalline surfaces or faces of the broken metal.—*Builders' Reporter.*

SHEET METAL HOUSES.—The "Societe Centrale d'Architecture" of Paris has just received a very curious communication. A system of building houses entirely of sheet iron has been discovered. The walls, partitions, roofs and wainscoting are composed of double metallic sheets, separated by an air mattress, which is surrounded by different substances non-conductive of heat. The great merit of this discovery is the non-combustibility of this building. The metal employed allows of the most varied forms of ornamentation, so that the general aspect may be made as pleasing as that produced by any materials hitherto in use.

"ARDENBRITE" is a new invisible lacquer recently introduced into London. It is so strong as to withstand weather, steam, smoke, sea-air or sea-water; and gold, silver, copper, steel, brass or iron does not tarnish when coated with it. As it is so fine as to be unseen on the most delicate instruments, the new lacquer has an extensive field of application.

SCIENTIFIC PROGRESS.

Perceptive Faculties.

We condense the following from the correspondence of the Germantown *Telegraph:*

All animated natures, as far as we can understand, have perceptive faculties, and reasoning from their vital necessity to the preservation of life alone, it seems to be a foregone conclusion that that portion of living beings too small, too remote, or too inaccessible for our powers of observation to give us ocular proof, must still have these perceptive faculties, modified to suit their several organizations. Hearing in man is of a certain compass. Our tympanum, though a very delicate membrane, is yet able to withstand extremely loud sounds without destructive impairment, and still to distinguish tones extremely soft and delicate. It is not probable, however, that the lower orders of nature can distinguish those sounds which we denominate "ear-splitting."

In our own cases we know that the sound of a 16-foot organ pipe is loud, low, but clearly distinct; its sound vibrations are sufficiently numerous, *i. e.*, close together, to affect our tympanum musically. We also know that a 32-foot pipe, which gives us the octave below the 16-foot, is absolutely inaudible to us, just because its vibrations are too few in a given time to make any musical effect upon our hearing. But as the vibrations of the two pipes are proportionally thus, as 32 : 16 : : 1 : 2, so when both pipes are sounded together we can distinguish the otherwise inaudible 32-foot, because the 16-foot comes in as both a coincident and an intermediate sound.

This example reveals the extent downward in the scale of sounds which is the limit of the human ear in perception. We can hear no lower tone. As sounds run up in the scale higher and higher, we find another point at which our tympanum ceases to act, because its construction and the material it is composed of cannot respond (vibrate) quickly enough to convey the tone to our perceptive faculties. This is the extent upward in the scale of sounds to which the human ear is capable. It varies in different individuals in proportion to the delicateness of the tympanum, which may be inherent, or may be created by musical education of the ear.

Having thus stated the facts bearing upon the effect of *sound* upon the *human ear*, it remains to draw conclusions upon the same effects upon the hearing of all animated creatures below us in the scale of beings. If our ears would probably be destroyed by sounds lower than a 32 foot pipe can produce, it seems rational to believe that insects must have a scale of vibratory nerves similar to our own, but of less perception to the low, and of greater perception to the higher, notes. If so, their faculties may begin just where ours leave off in the upper register, and as the class of insects diminish in size, so the scale or gamut of each must ascend higher and higher, because their more and more increasing delicacy of organization could neither withstand the boisterous low tones nor distinguish the intermediate ones.

Thus we can understand how an omnipotent power has created a world capable of containing a diversity of beings *similar* in perceptive faculties, but dissimilar in the capacity to receive them. It follows in this train of thought that all the other perceptive faculties throughout creation must for similar reasons be gauged to a higher and finer scale, as the individual is more delicately built.

In regard to sound and its perception by insects, the "country hallucination" of beating tin pans and blowing hideous noises to bring down a swarm of bees is exploded when we consider that the *concussion* upon their wings by the terrible sound waves created by the din, leads them to suppose that a thunderstorm with rain is approaching, and instinctively they drop to the nearest shelter. It is evident that their perceptive faculties are those of feeling, not hearing, and their expressive faculties take the form of instinctive action.

The day is fast approaching when the light of science will so shine in upon the intellectual faculties that all mankind shall see the truth in all things, and there will be but one opinion on all subjects by every one. In that day, there being no difference of opinion, contention of every sort will cease, peace will reign, happiness will be perfect, and the millennium will be omnipotent.

GYPSUM AS SAND.—Some 60 miles due north of El Paso, writes a correspondent of the St. Louis *Globe-Democrat*, lies a formation of pure gypsum, forming ranges of low, undulating hills, without a speck of a mixture, and of a dazzling whiteness. The gypsum occurs in the shape of a fine sand, and the district is some 25 miles long by 6 or 7 miles wide. The rays of the sun are so strongly reflected from a brilliant surface, that traveling across the country is almost impossible in summer on account of the blinding glare and the great heat generated. This gypsum range is generally known as the White Sands, and the White Oakes railroad skirts the eastern border. In one locality on the White Sands there is a natural basin-like depression, into which a number of neighboring gullies and valleys lead and concentrate, and this basin has, for the first time within the memory of man, been filled by rains, and over 300 acres have been covered several feet deep and transformed into a lake. As the bottom of this lake consists of the purest gypsum, which has been by the water cemented into a solid snow-white mass, it cannot drain off except by the slow process of evaporation, and when the midday sun shines with its full force upon the landscape, the effect of the reflection is dazzling and magnificent beyond description. There is, probably, no similar deposit anywhere in America.

A DELAYED INVENTION.—Professor Morse in 1832 discovered the first principles of the telegraph, but for want of means he struggled until 1837, a period of five years, before he could get sufficient assistance in money and mechanical skill to put up the first few miles of telegraph wire in a room. In 1837 many of the principles of the telegraph were as perfect as they are to-day, but pecuniary assistance could not be obtained to construct a mile of telegraph wire for commercial use, and Congress was also appealed to in vain, notwithstanding Morse & Vail had put up a wire in a room ten miles long in Washington in 1838, and operated it successfully. In 1842 Morse again applied to Congress for an appropriation, and on March 3, 1843, Congress appropriated $30,000 to build a line of telegraph from Baltimore to Washington, and the first message passed between the two cities on May 24, 1844, some 12 years after the first discovery of the telegraph. The rest is fully known. In this narration it should not be forgotten that Professor Morse did not "discover the first principles of the telegraph." They were communicated to him by Dr. Chas. T. Jackson of Boston, but Professor Morse is entitled to the credit of reducing them to practical use.

THE PROBABLE FUTURE OF PRINTING.—Some years ago it was publicly stated by R. H. Hoe that the newspaper of the future would be printed entirely, reading-matter, illustrations, and all, from photo-engraved plates. What the Hoe firm has since done in its experiments in this direction, of course I do not know, but there is a man in New York now working very nearly on this line who will soon have his invention in shape to patent. The principle upon which he depends is a "photoglyptic stereotype," as he calls it, in which the stereotype sheet is made directly by a camera, very cheaply, and with clearer and better results than any common stereotype can give, as the matter is photographed on to a matrix already curved to the shape of the cylinder by an arrangement of lenses which he has kept secret. You know the common matrix is made flat and then bent into a curve before the metal is poured upon it, thus naturally blurring and crushing the fine edges of the letters and the lines of the illustrations, so we seldom get a satisfactory picture from a rapid press.—*Chicago Press.*

A REMARKABLE METEORITE.—The heaviest purely metallic meteorite as yet known is the "thunderbolt" of the Arab Sheik Kalaph Ben Assab. This chieftain saw it falling in the Valley of Kalede, in Central Arabia, in the year 1863, and presented it to the Persian Governor of Bunder Abbas. The latter sold it, along with a formal attestation of the finder, to the English authorities, and it has since been chemically examined. It consists of 91.04 per cent of iron, 7.40 nickel, 0.66 cobalt, traces of copper, phosphorus and sulphur, and 0.39 of amorphous carbon. It contains no stony matter, and only includes scattered traces of troilite and graphite. Its weight is 120 pounds, and it is consequently the largest purely metallic meteorite or "holosiderits" known. The meteorite of Pallas, now in the St. Petersburg museum, is much heavier, but it contains many cavities filled with olivine, and is consequently a "syssiderite." It is the tenth meteorite which has been seen actually descending. It fell during a thunderstorm, and made a deep hole in the earth.

NO DANGER FROM LIGHTNING.—There is very little danger now of an oil-tank being struck by lightning. Formerly it was the custom to run the pipes along the ground for a considerable distance and then up over the edge of the tank. In nearly every case in the Pennsylvania region, where lightning struck a tank, the electric fluid ran along the pipes and jumped off the end of the conductor, which was always above the oil. The top of the tank being filled with gas, when the electric spark jumped off the end of the pipe it set fire to the gas and caused an explosion. Now all the pipes are run right into the oil instead of the ends being exposed in a vapor.

A SENSITIVE PLANT.—The Paris Academy of Science is just now excited over a plant called colocasia. This plant often exhibits a trembling or vibrating motion without any apparent cause, and as many as 100 or 120 vibrations have been observed in a single minute.

NATURAL GAS AND THE HAIR.—A scientist has promulgated the theory that natural gas will gradually turn blonde hair dark. He says the gas generates an ammoniacal vapor, which combines with the sulphur in the hair chemically and produces the sulphuret of ammonia.

BLACK SNOW.—Snow as black and dirty as if it had been trampled on recently fell at Aitken, Minn. It continued to fall in this condition for several hours before it became white. Lights were required at 4:45 in the evening.

USEFUL INFORMATION.

A NEW METHOD OF PRESERVING MEAT.—Experiments have been recently conducted at the Australasian Wool Stores, Melbourne, with a novel process of meat preservation, introduced into the Colony by Col. House of the United States, where, it is stated, the success of the method has already given rise to a flourishing trade in the exportation of fresh meat from that country. The process, by which flesh of all kinds may be preserved for an almost indefinite period, is exceedingly simple, consisting merely in the steeping of the flesh in a liquid preparation patented as "Beniana," the effect of which is to render the meat entirely unsusceptible of decomposition. By this means meat has been kept in a fresh state for over nine months, exposed to the influences of the atmosphere, and yet at the termination of that time has not shown any effect of the treatment, being in taste hardly distinguishable from the butcher's article. The company were shown samples of pork that had been thus preserved for over eight months, after having been kept in the liquid for less than 60 hours. The samples were declared by all present to be perfectly fresh and devoid of any undesirable effect from their immersion in "Beniana." Although the efficacy of this preparation has been well established in the United States, the patentees have conducted a series of experiments in Victoria, with the object of testing whether the effectiveness of the process was likely to be interfered with by different climatic conditions, but the result of these trials has been perfectly satisfactory. The liquid has been submitted for analysis to the Government analyst, who has certified that it contains no deleterious ingredients likely to prejudice the fitness of the meat for human consumption.

MAKING CELLULOID.—This interesting substance, which masquerades as genuine ivory in the shape of flour-triers, paper-knives, combs, brushes, buttons, etc., as highly finished four-ply linen in "dickies," collars and cuffs, and reaches its most striking form in the powerful explosive known as gun-cotton, is manufactured by the following process, according to a description in the *Inventor:* A roll of paper is slowly unwound, and at the same time saturated with a mixture of five parts of sulphuric acid and two parts of nitric acid, which falls upon the paper in a fine spray. This changes the cellulose of the paper into proxylin gun-cotton. The excess of the acid having been expelled by pressure, the paper is washed with plenty of water until all traces of acid have been removed. It is then reduced to a pulp, and passes on to the bleaching trough. Most of the water having been got rid of by means of a strainer, the pulp is mixed with from 20 to 40 per cent of its weight in camphor, and the mixture thoroughly triturated under millstones. The necessary coloring having been added in the form of a powder, a second mixing and grinding follows. The finely divided pulp is then spread out in thin layers on slabs, and from 20 to 25 of these layers are placed in a hydraulic press, separated from one another by some sheets of thick blotting paper, and are subjected to a pressure of 150 atmospheres until all traces of moisture have been got rid of. The matter is then heated to a temperature between 140 and 150 degrees Fah., after which it issues in the form of elastic sheets of celluloid.

HOW TO MAKE GLACE FRUITS.—From one of Rene Bache's letters to the *Post* we take the following, explaining how fruits are glaced: And, by the way, Boston's greatest confectioner told the writer the other day just how to make glace fruits, than which in the way of candy scarce anything is better, if anything is equally good. The recipe is worth telling, so that you may try it yourself if you like. The whole thing consists simply in dipping fresh fruits—grapes, figs, oranges, nuts, or what you will—into boiling sugar at a high temperature. They must be dipped but once and then laid in a cold place for a little while, after which they are ready to gobble. All depends, however, upon the temperature of the sugar syrup and its consistency. Probably you will have to make an unsuccessful trial or two before hitting it. Take granulated sugar and cold water in about the proportion of a pint of the former to half a pint or less of the latter. Stir up the sugar until as far as possible dissolved in the cold water, and set the mixture on a hot fire to boil. Drop a little of it now and then into a glass of cold water, and when it becomes really brittle the solution is ready. Leave the latter on the fire, and dip into it quickly the fruits, which should, thereupon be laid on plates, covered with greased paper, and put out in the cold. If the candy was at the proper heat, the things so treated will presently be found covered with a delicious crackly sugar coating—morsels fit for the gods. No flavoring is wanted.

A NEW DYE FROM SEAWEED.—Formerly iodine, bromine, magnesia and potash salts were the chief products of seaweed, which was also used, when more or less decomposed, as manure on land adjoining the seacoast (it yields upward of two per cent of ammonia). Some varieties were collected as articles of food in Scotland, Ireland and Norway, etc. (the species of the genus Ulva), and the large species of Laminaria, especially *L. saccharina*, can be made to yield mannite. Of late years, says the *Scientific American*, seaweed has been made into charcoal, and into a material for whip handles, and still more recently the curious substance algin has been produced from it, and is already in use as a stratum for photographic films, and for other purposes. From the substance algin, just mentioned, an acid called alginic acid has been produced, and by acting upon the latter with nitric acid a new light-colored dye, which is insoluble in water, but dissolves in alkalies, yielding a brown solution, has quite recently been discovered. The ammoniacal solution of this new product dyes cotton a fine Bismark brown, which is not removed by soap, and is said to be not only equal to aniline dyes of the same description, but to excel many of them. A curious feature of this new product is that, contrary to what is observed with aniline dyes, it will dye cotton but not wool, and that its acid solutions will not act as dyes at all.

INTERESTING EXPERIMENT IN AN IRISH FOUNDRY.—A new system has been discovered, it is stated, of coating iron with copper. At the commencement of the present year experiments were made at Fulton's Iron Works in Kilkenny, for the purpose of testing the efficacy of the method. A piece of iron, after being raised to almost a white heat, was then thoroughly sprinkled with a white-colored powder. It was next resubmitted to heat until the powder in its original form had entirely disappeared from the surface, when the iron was plunged into a quantity of melted copper and allowed to remain there for not longer than a second. It was then removed and allowed to cool. After cooling, it was observed to be completely covered with copper.

A NEW IDEA.—Now, the only way that I see that we practical horseshoers can protect ourselves is to let every one that is interested in the welfare of the horse endeavor to induce the congressmen of his district to interest themselves in drafting a law by which all mechanics shall be examined by a committee selected from the very best mechanics in the State. This committee should examine every applicant in his particular branch of business, and, if he is found to be well grounded in it, give him a certificate signed by them and stamped with the State seal. This is our opinion on this subject, but we would like to have the views of others.—*Ex.*

BEING TOO HONEST A FAULT.—A Yorkshire coal-dealer has hit upon one of the most novel as well as most effective schemes for advertising of the present century. He has a weighing machine which gives over instead of under weight; and, although warned by the authorities that it was as illegal as the one that does the other thing, he persisted in its use until a fine of 5s. and costs resulted, the bench expressing the opinion that it looked a little hard to punish a man for cheating himself to benefit his customers. He paid the fine, and has the bulk of the coal business in his parts.—*Grocers and Canners' Gazette.*

GOOD HEALTH.

THE TRUTH ABOUT THE MIND-CURE.—Now, in view of what has been done in curing disease by the aid of mental influence, the public has a right to demand that our physicians shall give us the benefit of this healing agency. Mental influence is a pleasant and inexpensive medicine; it cures in some cases where drugs fail, and it shortens the term of sickness and lightens its pain in many other cases; furthermore, it has no injurious incidental effects. But the mind-cure should be taken out of the hands of the untrained and irresponsible visionaries and the impostors who now practice it, or it will add a terrible amount of suffering and death to what it has already caused. These enthusiasts, carried away by their seeming successes in a few cases, insist that the mind-cure is the only treatment that is worth anything in all diseases and for all persons. They know too little about the nature of disease to recognize symptoms which indicate the fitness of this agency, too little of science in general to realize that a means suitable to remove one condition may be entirely inadequate or unsuitable to counteract another.—*Popular Science Monthly.*

DANGER FROM BITING THE FINGER-NAILS.—"A novel incident resulting from a habit of very common prevalence among nervous people was brought to my notice recently," said a leading physician of Philadelphia to a reporter the other day. "A young lady presented herself at my office and complained of a constant irritation in her throat. Two weeks previously she had been taken with a very severe attack of sore throat, which was treated by the family physician. Under his care, she said, the inflammation quickly subsided, but there still remained a sensation of irritation. Examination revealed a small, fleshy-looking object about the size of a kernel of wheat adherent to the tissues posterior to the left tonsil by the one end. The other parts of the throat were normal. The little mass could not be detached by a cotton-covered probe, but by the use of forceps it was easily removed and on examination proved to be a piece of finger-nail which had become imbedded in a cheesy deposit. A broken piece of the nail was also removed from under the mucous membrane at the same spot by a sharp-pointed probe. The lady then confessed to the habit of biting her finger-nails, and moreover could remember that a day or two previous to her throat trouble a piece of nail she had bitten off had become lost in her mouth, but after it had caused a fit of coughing she had forgotten all about it until reminded by the discovery."

WRINKLES.—The following paragraph would seem to do away with the old theory that wrinkles are produced by worrying: "It is customary to say that wrinkles come from worrying, but the truth is that most of them come from laughing," says a well-known physician. "To know how to laugh is just as important as to know when to do it. If you laugh with the sides of your face the skin will work loose in time, and wrinkles will form in exact accordance with the kind of a laugh you have. The man who always wears a smirk will have a series of semi-circular wrinkles covering his cheeks. When a gambler who has been accustomed to suppressing his feelings laughs, a deep line forms on each side of his nose and runs to the upper corner of his mouth. In time this line extends to the chin and assumes the shape of a half-moon. A cadaverous person, with a wax-like skin, is very apt to have two broadly marked wrinkles, one running up from the jaw and the other under the eye. These meet at right angles at the cheek-bones and look as though they formed a knot at the apex. The scholar's wrinkles form on his brow, while the scheming politician's come round his eyes, where they look for all the world like the spokes of a wheel."—*Mail and Express.*

A DANGER PECULIAR TO RESIDENCE IN FLATS.—The *Lancet* (London) raises its voice of warning to apartment-house occupants, which is worth considering. An ordinary householder has access to every portion of the building in which he lives, and should he suspect a defect, he can ascertain how far his suspicion is correct and remedy it. But in the case of flats, while the actual apartments rented may be free from all risk of evil, the tenant is, in point of health, almost entirely at the mercy of his landlord and of the occupiers of the basement, in so far as the drainage of the premises is concerned. If this latter be wrong, the whole mansion is apt to be filled with foul air from below upward. A number of cases have come under our notice in which tenants have only been too glad to pay what was demanded of them in order to get out of the premises with the least possible delay. While no one should take a residence without skilled advice as to its sanitary state, this precaution is more than ever necessary in the case of flats, where the entire premises, including, above all things, the basement, should be thoroughly overhauled.

LENGTHENING LIFE.—An English newspaper has been making collective investigation regarding the questions given below: "1. Does your experience suggest to you that the race of Englishmen is degenerating physically? 2. Do you think that the great advance in the healing art is responsible for keeping alive much weak life that will in time affect the whole race injuriously? 3. Do you think that the increased indulgence in physical sports has, on the whole, a good influence on health? 4. Has it ever struck you that probably the great attention paid to health in these days may be producing an anxiety about bodily ailments which is a disease in itself?" Answers have been received from a long array of practitioners, among whom are the names of eminent London physicians. The general view taken, according to the *Medical Record*, is that Englishmen are not degenerating, but that, on the whole, the race is improving in vigor.

A LETTER-CARRIER'S PRESCRIPTION.—A St. Louis letter carrier says there is no reason why a man should remain thin or have cold feet and corns. "I was that way myself once, but as a cure our old negro cook told me to wear a flannel or woolen waistband, that is to say, cover my body from chest to hip with flannel or woolen next to the skin, besides the regular winter or summer clothing, and keep the band on all the year round. I tried it some years ago, and at first I saw no change in my size or waist measurement, but suddenly I noticed I could not button the waistband and I moved the buttons. Before three months passed I moved the buttons four times." The extra covering causes great internal heat, which is carried over the body by the blood and aids digestion. The remedy for cold feet is to scrub them in cold water every night before going to bed for 60 days. There will be no further trouble.

THE HERB THAT HYPNOTIZES.—The deputy of Oaxaca, Mr. Perfect Carrera, has taken to the City of Mexico a plant that grows in Mixteca, which the natives call the "herb of prophecy." It is taken in various doses, and in a few moments a sleep is produced similar in all respects to, and we might say identical with, the hypnotic state—for the patient answers, with closed eyes, questions that are put to him, and is completely insensible. The pathologic state induced on whomsoever partakes of the herb, brings with it a kind of prophetic gift and double sight. Furthermore, he loses his will, is completely under the control of another to such a degree that the sleeping person would leap from a balcony, shoot, or stab himself with a dagger, at any moment, if ordered to do so. On returning to himself he remembers nothing of what he has done.—*Translated from La Luz.*

ENGINEERING NOTES.

PROPOSED SHIP CANAL ACROSS SCOTLAND.—The agitation in favor of canals and waterways, which has been waged in England for some time back, has at last extended to Scotland. The proposal is to improve the present existing canal between the Clyde and Forth, so that ships might be able to pass through. The canal was constructed a century ago, and is 35 miles long, extending from Bowling on the Clyde to Grangemouth on the Forth, and there is a branch of 2¾ miles to Port Dundas in the north of Glasgow. It rises 156 feet and has 39 locks. At the present time only very small craft can be passed through, not only because of the short locks, but also owing to the depth of water being but about 9 feet. It is proposed that it should be made suitable for deep seagoing ships. There are no great engineering difficulties in the way. The cost is variously estimated between £1,500,000 and £2,000,000 sterling, a sum which, it is thought, might be easily raised by a company. It is contended that being the shortest route between America and the Baltic, the Continent and the east coast of Scotland and England, the through traffic would be considerable. This may be true, but the gain in time would be reduced materially by the fact that vessels in coming off the Atlantic would require to sail up the long firth (Clyde), and would probably require, particularly if deeply laden, to wait on the tide to get to Bowling, which is some distance up the river, or the channel would need to be broadened and deepened, thus adding to the cost. For channel steamers going from Ireland or the west coast of Scotland, England, or Wales to the east coast of the Continent, the canal would be a decided benefit, for not only would their voyage be shortened, but the rocky and dangerous coast of the north of Scotland would be avoided. The canal passes through the coal and oil districts of Scotland—a fact which affords additional argument in favor of the scheme. Another consideration which carries much weight is the facility gained for the rapid passage of battle-ships from one shore to the other, rendering defense in time of war more effective. Looking, therefore, to principal "pros" and "cons," as stated, the question is worthy of serious consideration. The canal is the property of the Caledonian Railway Company, and they are taking no action meantime in the matter.—*Engineering.*

PROJECTED LARGE CANAL IN SWEDEN.—A new canal is at present on the *tapis* in Sweden, having for its object to connect the Kattegat with the large and important Lake of Venern. The canal will connect the towns of Uddevalla and Generaborg, and, if carried out, is sure to prove of very considerable importance for a large portion of Middle Sweden, where a number of iron-works are located. The total length of the projected canal is about 12 miles, of which some four miles are lakes. It has been proposed to raise the level of the canal by three sluices above that of the Lake Venern. This would make the canal cheaper to build, but is otherwise attended by several drawbacks, and it may be preferable to incur the additional expense by not making it any higher than the Venern. The depth of water in the Uddevalla harbor and in the Venersborgvik limits the depth of the canal to 21 feet, which would admit of vessels of about 3000 tons passing the canal. The sluices would have to be about 350 feet long and 45 feet broad. From Vermland, Dalsland and upper provinces, an export of about 200,000 standards of timber is reckoned upon to pass through the new canal, which would also be the best route for about 100,000 tons of Swedish iron export, and would lower the rate of freight from several wood-pulp manufactories, etc. It is now the intention to collect the necessary funds to have the matter thoroughly sifted, financially, commercially, and from a technical point of view. It is considered necessary that the State should build and own the canal.—*Engineering.*

AN UNDERGROUND RAILROAD PROJECT just brought out in Philadelphia causes much excitement. The scheme involves the expenditure of at least $25,000,000. The corporation has been organized as the Broad & Market Streets Underground Railway Company. P. P. Bowles, manager of the Fairbanks Scale Co., is the president. Ex-Gas Trustee James E. Salter is the secretary and treasurer. The plans are for the construction of a four-track road. Two tracks are to be set aside for fast trains and the other two for trains that will stop at stations to be erected about half a mile apart.

THE FORTH BRIDGE.—At the Forth bridge works over half a million has been spent on machinery, staging, railways, steamers, buildings and lighting; £400,000 was spent on granite piers, and £1,300,000 in steelworks. Up to the present time 42,000 tons of steel have been used in construction, and a good deal more is ready for erection. As many as 4300 men have been employed on the works, but the average for five years has been 2300. The Forth bridge is at present the chief structure of its kind in the world, but its principle is being applied to still greater bridges.

THERE is a good deal of activity displayed in mining work from one end of the Comstock lode to the other, and all at important points.

MINING AND SCIENTIFIC PRESS.

A. T. DEWEY. W. B. EWER.

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W. B. EWER.....SENIOR EDITOR

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Entered at S. F. Post Office as second-class mail matter

Our latest forms go to press on Thursday evening.

SAN FRANCISCO
Saturday Morning May 11, 1889.

TABLE OF CONTENTS.

EDITORIALS.—Wire-Rope Haulage in Mining; Pacific Coast Men of War, 333. Passing Events; Latest Phase of the Copper Situation; Shipping Concentrates; Mines and Districts in Mexico, 340.
ILLUSTRATIONS.—Methods of Passing Curves on Gravity Planes for Mines; Single Gravity Plane with Tracks of Different Width; Plan of Ground Floor, 333.
CORRESPONDENCE. — The Klamath River; A Point in Leaching Ores; Mining at Volcano, 334.
MISCELLANEOUS.—The Mining Bureau Appropriation; Make No Mistakes in Concentrators, 334. The Wrecks in Somoa; Getting Rich by Small Inventions, 335. Coast Industrial Notes; Fine Crushing of Ores, 342.
MECHANICAL PROGRESS.—Indian Crucible Steel—Miniature Steel Works; Machinery and Hardware in Russia; Judging Iron by Fracture; Sheet Metal Houses, 338.
SCIENTIFIC PROGRESS.—Perceptive Faculties; Gypsum as Sand; A Delayed Invention; The Probable Future of Printing; A Remarkable Meteorite; No Danger from Lightning; A Sensitive Plant, 338.
USEFUL INFORMATION.—A New Method of Preserving Meat; Making Celluloid; How to Make Glace Fruits; A New Dye from Seaweed; Interesting Experiment in an Irish Foundry; A New Idea; Being Too Honest a Fault, 339.
GOOD HEALTH.—The Truth About the Mind Cure; Danger from Biting the Finger-Nails; Wrinkles; A Danger Peculiar to Residence in Flats; Lengthening Life; A Letter-Carrier's Prescription; The Herb that Hypnotizes 339.
ENGINEERING NOTES.—Proposed Ship Canal Across Scotland; Projected Large Canal in Sweden; The Forth Bridge, 339.
WHEAT AND FLOUR.—A New Flour-Mill for Stockton; The Deficiency in the Australian Wheat Crop; The Wheat-Growing Problem of the World, 343.
MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 336-7.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 343.

Business Announcements.

[NEW THIS ISSUE.]

Electric Power, etc.—Keith Electric Co.
Rock Drills—Rand Drill Co., New York.
Situation Wanted—"J. A."

See Advertising Columns.

Passing Events.

The cruiser Charleston, the first steel vessel ever built for the Government on this coast, is now off on her trial trip. At last accounts she was behaving very satisfactorily. The speed trial is taking place in the Santa Barbara channel.

The contract for building the powerful coast-defense ironclad has been awarded by the Secretary of the Navy to the Union Iron Works of this city at the price of $1,628,000. She will be about 5000 tons displacement. This will be the third large contract these works have obtained from the Government for warships.

An English company has applied for 45 miles of the Fraser river, in British Columbia, to dredge for gold. There is a canyon 20 miles long which cannot be worked in any other way. They will use steamers, dredgers and scows. The plan has been successful in Australia, but not in this country, thus far.

The heavy storms of Saturday and Sunday set the water-courses running again. Over four feet of snow fell in the Sierras, and the snow-plows were brought out for the first time in the month of May.

Shipping Concentrates.

Low-Grade Ores in Fresno County.

The Star Mining & Reduction Co., Mount Raymond district, Fresno county, made their first shipments of concentrates this week to the Selby Lead & Smelting Co. of this city.

The work being done at this mine is different from any in California. They have a hundred-ton concentrator, with rollers, jigs, and slime tables, all of which came from Denver. A Pelton-wheel utilizes the water-power for the plant.

The material is divided into eight grades by the machinery. The ore itself is a low grade, averaging 23 ounces of silver and 10 per cent lead. After concentrating it runs 60 per cent lead, 60 ounces of silver and from $3 to $4 per ton in gold. The ore is delivered at the concentrator, 7800 feet from the mine, by a Hallidie tramway for ten cents a ton. It is concentrated for about $1.25 per ton, and it costs about $12 per ton to team the concentrates to the railroad station at Raymond.

The mine is owned by a Montana company, of which Mr. Henry Kline is president, John Shopp vice-president, and Albert Kleinschmidt treasurer. The gentlemen mentioned are in the city at present. The company took hold of this as a concentrating proposition and are well satisfied that they have a valuable property.

In fact, they say if this claim was in Montana it would be considered worth there at least half a million dollars. They have a very complete outfit and have so far expended $110,000.

The ledge or deposit is about 150 feet wide. It has so far been worked by stripping and open cuts. They have a 60-foot face 60 feet deep, but are commencing a tunnel.

The facilities for working are excellent, there being plenty of water-power, an abundance of timber, etc. They have had to build shops, houses, roads, etc., but are now in good condition to work steadily. The concentrates have to be hauled about 35 miles to the railroad; but as soon as the railroad company are assured of steady freight they will build a branch road. They now ship one carload a day, but will soon put on night shifts, when they can ship two carloads of concentrates daily. Adolf Heberlein, an old Montana "concentrating-man," is superintendent and Mr. Wagner the business manager. Most of the company are from Helena, Montana.

In conversation with some of the officers this week, a representative of the PRESS was told that this is a much better proposition than the famous Bunker Hill and Sullivan mines, at Cœur d'Alene, Idaho, where they are making money on lower-grade ore. They have to wagon it as far as the Star Co. do, but have a mine with a shaft from which they have to pump water. It cost them $200,000 for development work alone.

In the Star mine some very large pieces of galena ore are found. The deposit is so large that it is easily worked. There are other properties in the vicinity, the owners of which have been waiting to see how the Star Co. is coming out. These claims will now doubtless be worked. No doubt there are many other places in this State where similar concentrating works could be located with profit. This company has expended its money without any fuss or noise, the stockholders having seen how profitable similar enterprises are in Montana and Idaho.

MINING BUREAU TRUSTEES.—The Governor has appointed the following trustees of the State Mining Bureau: W. S. Keyes of San Francisco, vice self; J. Z. Davis of San Francisco, vice self; S. Heydenfeldt Jr. of San Francisco, vice self; W. T. Garratt of San Francisco, vice G. W. Grayson; Geo. C. Perkins of Alameda, vice Geo. Hearst.

THE Mechanics' Institute has been appointed by the Secretary of the Interior a depository of public documents, and consequently the library will now receive copies of all publications of the Government issued for public distribution, without special application, as heretofore.

A THOROUGH test has been made here of black sand from the new find on the east fork of the Carson, in Douglas county, Nev. Although a color can generally be found, the results were unsatisfactory, proving beyond a doubt that it would not pay to work.

Latest Phase of the Copper Situation.

Col. R. H. Ranlett confirms the press telegrams that American copper-mine owners and the French copper syndicate were unable to arrive at an understanding by which the price of the metal would be sustained. So far as we are able to learn, the syndicate and American mine-owners had agreed upon a basis for mutual action, and the papers were all drawn ready for signing, but one person, said to be an Englishman, refused to abide by the agreement, which was to allow the French holders of copper to work off their holdings as fast as the market could absorb it without breaking values. So as to better facilitate them in selling, mine-owners were to restrict the output, and also not send to Europe more than 20 per cent of their production. With this agreement, which really was in the interest of the French, falling through, the Americans left for this country, it is claimed, in disgust, and vowing that any further movement or overture for an agreement to control the copper markets must come from European holders of copper and controllers of foreign mines. As it now stands, the situation warrants the assertion that low prices will obtain for copper both in this country and abroad. While not absolutely knowing, Col. Ranlett is under the impression that the price of copper in this country will range from between 10 and 11 cents a pound, against from 8 to 9 cents a pound in Europe. The difference in the price will be due to the duty of 2½ cents a pound on all copper imported into this country. American mine-owners, while keeping values up in the United States, can send enough to Europe to unsettle values there and keep them from going above nine cents a pound. At this low price heavy losses will not only be entailed on foreign holders of copper, but they will make it so unprofitable to work foreign mines as to compel them to shut down. Even at ten cents a pound in this country it is quite certain that few mines will cover expenses, while none will be able to pay much, if any, dividend owing to the increasing expenses as depth is made in mining. Copper mines, like silver mines, pay best near the top, while gold mines pay best deeper down.

RICH MINES AT MORENCI.—We have received from Morenci, Arizona, some remarkably rich specimens of the ores of the Black Dyke and Refugio mines. The ledge does not carry such ore as this all the way across, but it is well-defined, six feet wide, and assays rich for its full width. The owners, Messrs. Campbell, Muir and Jenkins, have five claims on the same ledge and three shafts from 75 to 200 feet apart, all showing the same character of ore. There is considerable activity shown at Morenci at present. We are informed that the specimens sent us are fair samples of the richer deposits in the ledge. The mines ought to be good paying propositions with ore half as rich as this.

THE steamship City of Paris of the Inman line has beaten the transatlantic record by making the trip from Queenstown to Sandy Hook in 5 days, 23 hours and 7 minutes. This is the first time it has been brought below six days and two hours. The vessel not only broke the record for the run, but for one day, making 511 miles. The longest run previously made in a single day was 505 miles, by the Umbria of the Cunard line.

THE TECHNICAL SOCIETY of the Pacific Coast is anxious to have arrangements made by which it can organize under the charter of the Mechanics' Institute and work in harmony with it. Sixty per cent of the Technical Society's members belong to the institute.

JULIUS LESZYNSKY asks the Superior Court of Los Angeles county for an order to restrain the San Jacinto syndicate from selling its tin mine for $1,500,000 to a London syndicate, on the ground that he has a contract to sell it for $1,000,000 and receive $100,000 commission.

A CONTRACT has been let to the Union Iron Works by the Portland Cable Railroad Company for engines, boilers and all the machinery necessary for their road for $58,000. The outfit is to be a duplicate of that of the Geary-street road.

A COMPANY has been organized to prospect for natural gas near Bakersfield, Kern county.

Mines and Districts in Mexico.

In continuing the interview with Mr. A. H. Dubois, further information is given by him concerning other Mexican mines. His description of localities will be clearer, now that we are able to present a map of various mines and districts on two of the Mexican States, which he has courteously drawn for the PRESS. Mr. Dubois says:

The San Nicolas Property.

Some 20 miles north of San Fernando, an easy day's journey, is the San Nicolas property, partially owned by Americans. This, we understand, is on the market. Having lately had occasion to examine said property, I am enabled to furnish the following information respecting it: The outcrops only of the deposit seem to have been worked under Spanish rule, and the property lay abandoned until 1882. This property consists of two adjacent claims 5333 feet in length on the San Nicolas lode. This lode courses N. N. E. (22° 30′ magn.) dipping 65° to W. W. N. The developments consist in an ample shaft down 334 feet, following the dip of the San Nicolas lode, reaching down 302 feet perpendicularly. A tunnel or level on the same lode is in 460 feet.

In 1882 MM. Lozaya and others located two adjoining claims on the site of the old Spanish workings and in the four subsequent years took out from superficial workings ores which, worked by Patio process, produced some $80,000 to $90,000 in gold and silver bullion. Then the two properties were sold to the parties who now own them on the strength of the worked-out bunch of ore, Lozaya retaining a part ownership in the property and the direction of the working. Mr. Lozaya is an energetic miner and skilful amalgamator from Guanacevi and made a mine out of the property, making it pay the expenses of development out of the ores which he derived from the same development work. When I visited the mine I found a gang of men breaking ores 68 feet above the bottom of the shaft. On sampling and assaying the output, consisting of some 15 or 20 tons, I found that (after hand-picking and rejecting one-fourth of the output) it assayed 121 troy ounces silver and 1 ounce gold per ton. This undoubtedly is considerable above the average ores furnished by the mine. The part rejected showed by assay 16 ounces silver and ⅜ ounce gold per ton. Little or no lateral development has been done on the lode through the shaft, as it is not yet connected with the level, and carrying up on men's backs the stuff broken from the lode is expensive, as good peons are scarce here, although drillers are plentiful.

The developments show that from 4 to 10 feet in thickness have been taken out as ores of the footwall of the deposit, the hanging-wall being nowhere touched. My impression is that the whole output, without sorting, taking from surface to the bottom of shaft, would not run under 30 ounces silver and $5 gold per ton, and that the dump or haban will assay 20 to 25 ounces silver and $4 to $5 gold per ton. The country rock is composed of porphyry and metamorphic rocks.

About 1½ miles below the mine is a location with water enough for a large steam mill should developments call for the erection of one. Fuel is abundant ($2 to $2 50 per cord), pine, oak and madrone on land controlled by the owners of the mine. The outcrops are traceable almost throughout the whole length of the claim, and some 400 feet north of the mouth of the San Nicolas shaft, I broke free-milling ores from the outcrops assaying 40 ounces silver per ton. Two more veins, the Conchas and Tacotal veins, course at a small angle to San Nicolas lode, one on each side, and seem to join it north of the shaft. Superficial workings on several places of the Tacotal vein show silver ores with free gold similar to those obtained from the San Nicolas, and a specimen which I broke from an open cut (near to San Nicolas shaft), in which the vein was exposed, assayed 51 ounces silver and 2½ ounces gold per ton.

The ores from the San Nicolas deposit consist of hard flinty quartz stained with brown hematite and greenish chlorite and carry coarse free gold, argentite, polybasite and oxidized lead ores, wulfenite, cerusite, etc., all stained with copper, besides red clay (a gouge of red clay lies on the footwall). The ores are reduced by Patio process at San Dario, some six miles distant from San Nicolas.

A Primitive Mill Moved by Water-Power.

The establishment at San Dario is located in an iron-bound canyon, through which flows a large creek, which is utilized as motive-power for four arastras moved by water-power.

It may not be out of the way here to describe these primitive mills used by the Spaniards. They consist of a horizontal turbine-wheel formed by a wooden ring 20 or 25 feet in diameter, carrying on its circumference wooden buckets, or rather spoons, inserted in mortises in said ring, the whole suspended from eight arms which traverse the vertical shaft of the arastra, a circular pit 10 or 12 feet in diameter paved with hard stones, which is built in the middle of the ring, and the grinding-stones or metapiles are attached to the two lower arms by means of chains or rawhide thongs lashed to wooden plugs driven into holes drilled in the metapiles. The water is led through wooden troughs inclined some 20° from the horizontal

and strikes the buckets, affording by its impact the motive power. This primitive grinder is very wasteful as to power, only some 15 per cent of the motive-power of the head of water being made available, a head of 10 to 15 feet being required. The arastras are charged with 1500 to 2000 pounds of ore broken by hand to about one-half inch and water is furnished gradually as the ore is being reduced to pulp. Each charge requires 24 to 30 hours to reduce it to the desired degree of fineness.

Here the gold is extracted during the grinding by means of silver amalgam, of which 20 pounds is added to the arastra, and when sufficiently enriched in gold, is collected, washed out and retorted. Quicksilver is sparingly added as may be required to keep the amalgam pasty. In many cases copper amalgam is used instead, and seems to be preferable to silver amalgam, especially if the character of the ores be such that the copper in the amalgam be dislodged by silver from the ores. This is usually the case when the ores carry argentite, silver chlorides or bromides, obtaining thus as final product, gold and silver amalgam free from copper.

When the ores are sufficiently ground, the resulting pulp is thinned by dilution with water, and tapped out into tanks, care being taken not to carry off the amalgam which is previously allowed to subside along with the coarser sand and sulphurets.

After allowing the pulp to subside in the tanks and drawing off the excess of supernatant water, this pulp is transferred to the patio, a yard provided with a tight-fitting wooden flooring, 3 to 5 per cent salt mixed into same, and after a couple of days standing, quicksilver and the amount of cupric sulphate required by the ore (here from three-fourths pound to two pounds per ton) is trodden into the pulp by oxen.

I found in the buddled tailings from ores carrying originally 60 ounces silver and one ounce gold per ton an assay value of 5½ ounces silver and 1 20 ounce gold per ton. I will here notice that although these ores carry a considerable amount of lead, the amalgam obtained by the Patio process carried none whatever.

These ores might be profitably worked by stamping the ores, concentrating on Frue vanners and subsequently passing the tailings from the vanners over a classifier in order to eliminate the then worthless sands, and collect the slimes in order to beneficiate these mixed with some little sand by the Washoe pan process, refraining, however, from attempting any grinding in the pan in order to obviate the amalgamation of lead from the ores and using cupric sulphate, and, if possible, no salt, or as little as would prove admissible.

At a distance of say ten miles up the same creek we find the San Ignacio mines, a valuable property owned by a wealthy Mexican, D. Remedios Rocha. This mine is opened out on a lode six feet and more in width, carrying quartz much stained with chlorite and steatite, and much gold, argentite and other silver minerals proper and free from base ores, excepting some little pyrites. The ores derived from this mine are ground in arastras moved by water-power similar to those described and the pulp beneficiated by Patio process. This mine has produced very considerable quantities of gold and silver bullion. From this, one day's journey brings us to the mining camp Copalquin, which is in a deep canyon.

INFRINGEMENT SUIT COMPROMISED.—At the instance of the parties litigant, Judge Sawyer in the United States Circuit Court has dismissed the suit of Richard F. Knox and Joseph Osborn against Tiburcio Parrott. The suit was brought to recover $150,000 damages for the infringement of a patent for the construction of quicksilver furnaces with draft openings on the opposite sides so as to draw the heat through the passing ore. Mr. Parrott compromised with the plaintiffs and paid the costs of the suit.

NEVADA NITER COMPANY.—The Nevada Niter Company, a San Francisco corporation, has purchased 380 acres of niter mines, or deposits, on the east side of Humboldt lake, about 14 miles below Lovelocks, Nev.

Rosenthal's Calculating Machine.

Eugene M. Rosenthal of San Jose has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency a simple and effective machine for making calculations of all kinds, and especially for the calculation of interest. Engravings on this page show the general appearance of the machine and some of its details. Through the front wall or face of the case passes a sleeve which carries on its inner end a dial plate connected with it by an arm. On its outer end it has a thumb-wheel. Two more of these dial plates with thumb-wheels are arranged so that the three thumb-wheels lie one behind the other on the front of the case, and the dials are in corresponding relative position inside. The effect of the whole construction is such as to render each dial plate separately rotatable by means of the thumb-wheels on the front. It is also such as to provide for the arrangement of the various figures upon the dials so as not to interfere with the exhibition of each set through the sight aperture.

In the face of the case is made a sight aperture through which the faces of the dials may be seen. The outer dial plate has openings out in its outer portion at stated distances apart, and so has the middle dial plate, whereby the result is effected of being able to see through portions of the outer dial plates and see the figures on the inner one through the sight aperture.

By turning any one of the thumb-wheels the figures of the proper dial plate may be brought into view through the sight opening, and by manipulating each of the thumb-wheels any combination of figures on the several dial plates may be brought into position together and be exhibited through the aperture.

Secured to the front of the case directly under the sight aperture is a slotted guide plate (shown also in the smaller cut) in which is mounted a series of independent slides, each of which is operated by a projecting knob. These slides have a width sufficient and are adapted to conceal separate numbers of the rows of numbers on the faces of the dial plates, and as these slides are separately movable, but one need be moved down at a time, thereby exhibiting only a single vertical row of figures on the three dial plates, and thus avoid any mistake likely to follow from the confusion of so many numbers as would otherwise be exhibited through the sight aperture.

Each of the thumb-wheels is provided on its rim with notches, and these notches engage pawls mounted in a guide above and are operated by projecting knobs.

In the present machine, which is particularly designed for an interest calculator, the smallest or outer thumb-wheel is the year-wheel, and is provided with notches numbered consecutively, as shown. The next largest wheel is the month-wheel, and is provided with 12 notches numbered consecutively. The largest wheel is the day-wheel, and is provided with 31 notches consecutively numbered.

As an interest calculator the numbers on the dial plates are previously figured out—say, for example, on a basis of $100. The numbers are arranged on the dial plates in concentric rows. The outermost number of each row of the dial plate connected with the year-wheel represents the interest on $100 for a given number of years at a given per cent—say at five per cent. The next number of each row represents the interest for a given number of years on $100 at six per cent, and so on throughout the rows of the plate. In like manner the figures on the dial plate connected with the month-wheel represent the interest on $100 at given percentages for a given number of months; and the figures upon the dial plate connected with the day-wheel represent the interest on $100 at different percentages for a given number of days. The slides are suitably numbered, as shown, and represent the rates per cent, and these slides conceal the figures on each dial plate representing the percentages of these several rates respectively.

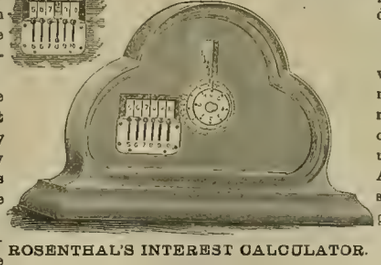
The operation of the device will be best understood by the following example: What is the interest on $155.15 for 2 years, 7 months and 13 days at 5 per cent per annum? First, raise the outer pawl, then turn the outer or year thumb-wheel around to bring its No. 2 notch under the pawl, whereupon drop the pawl into the notch, thereby holding the wheel. This represents the two years. Now raise the center pawl and turn the center or month thumb-wheel around to the 7 notch, and drop the pawl into it, thereby holding the wheel, and this represents the seven months. Then raise the inner pawl and turn the inner or day thumb-wheel around to the 13 notch, and drop the pawl into it, thereby holding the wheel, and this represents the 13 days.

Thereupon push down that slide of the series which is numbered 5, and which represents five per cent, thereby exposing a vertical row of figures on the three dial plates. The figures on the dial plates added together sum up 1310. Now multiply 155.15 by 1310, which gives a result, after pointing off the proper decimal, of $20.32, which is the answer. It will thus be seen that by turning the proper thumb-wheels to the proper notches representing the given time for which interest is to be computed, and then dropping the proper slide representing the given rates per cent, the dial numbers will be exhibited, which, when added, give a multiplier for the principal, thus giving the proper interest.

As many rows of numbers as may be desirable may be made upon the dial plates, and as many slides corresponding to these numbers may be made representing the different rates of interest. The machine is also applicable to the calculation of matters other than interest, but which need no detailed description.

The simplicity of construction of this machine is such that it is impossible for it to get out of order. There is nothing complicated at all about the manipulation and there is no possibility of error, as only the actual figures to be used in the calculation are in sight. Once set the figures and unerring mechanism does the rest. This little machine is quite ornamental in appearance and takes up very little room on a desk.

MAP OF MINES AND MINING DISTRICTS IN SINALOA AND DURANGO, MEXICO.



ROSENTHAL'S INTEREST CALCULATOR.

JAMES BRODIE, a well-known millwright, who has been for some years past engaged in mining in Sinaloa and Durango, Mexico, has returned to San Francisco for a time. He received an injury by some machinery falling upon him, and is here for medical attendance. At the same time he is perfecting an improved settler and quicksilver trap for which he is applying for a patent.

THE Ensenada *Lower Californian* says the picnickers are returning from the Santa Clara mines in droves, and other testimony is to same effect. Only capitalists who are able buy costly machinery and employ large forces of men can make anything out of the mines there. Five stamp-mills are going up.

Coast Industrial Notes.

THE Vacaville *Enterprise* declares that lumber is cheaper in that town than in San Francisco.

THE Santa Rosa planing-mill burned up April 16th. The sawmill adjoining was saved.

THE Santa Clara Land & Lumber Co. has been formed at San Jose with a capital stock of $60,000.

THE Fresno people require another $100,000 before they can commence actual work on their "mountain railroad."

A SHINGLE MILL at Chehalis, Wash., is kept busy night and day filling orders. The regular output is 35,000 a day.

THE managers of the several lumber and shingle-mills, near Sissons, are making extensive preparations for the summer's work.

A SEWER-PIPE factory at Butte will make pipes of cement imported in bulk from Chicago, and will be at work in a very short time.

THE new Deseret woolen-mills at Salt Lake City are ready to begin business. The manager says he expects to turn out 20,000 yards of cloth a month.

THE Oregon Railway and Navigation Company's new iron drawbridge over the Snake river, at Riparia, is nearly finished. It will cost $250,000.

NEVADA CITY has a new business establishment, the "Miners' Foundry," of which Messrs. Robert Martin, Wm. H. Martin and David Muir are proprietors.

THE Sissons Mill & Lumber Co. are pushing their railroad some seven or eight miles into the timber, and expect to do a rushing business after the tenth of May.

THE California Sewer pipe Company at Los Angeles, which uses the Elsinore clay, has a series of buildings 280 feet long, with three wings 140 feet long and 40 feet wide.

THE property of the San Francisco Cordage Company having been transferred to the Tubbs Cordage Company, the business hereafter will be conducted in the name of the latter company.

ACTUAL tests of the white kaolin deposits of the Daggett beds in San Bernardino county have been made lately, and the result is said to show that true porcelain may be made from them.

A COMPANY is being organized in San Diego for the manufacture and introduction of a new honey section paper box and other late improvements for saving and handling the honey crop of the Pacific Coast.

A QUARRY of brown sandstone has been found in Ventura Co., on land covered by the lease of the Ventura Asphalt and Bitumen Co. Its formation and position are such that it can be readily quarried and worked.

THE *Astorian* says: Timbermen from Deep river tell of trees there 180 feet to the first branch that will scale 12 M to a tree. There are thousands of acres of just such timber both sides of the river, and it is being snapped up.

THE company at Haywards which has the contract for cutting the trees from the 100-acre gum-tree ranch northeast of town, has nearly finished the work. It has some 4000 cords of wood left, which will be converted into charcoal.

ANOTHER planing-mill is being outfitted at Redding. The old foundry building on California street was recently purchased from Wm. Banks by Clover & Dean, who intend putting in an extensive plant for a sash and door factory.

JUDGE GRANT furnished the Mariposa Mining & Commercial Company with 15,000 feet of lumber recently, and has orders for 1,000,000 more. The company intend putting up a few stamps for prospecting the rock taken from the Josephine mine.

A VERY successful launch of a new schooner —the Bender Brothers—took place April 15th from Alexander Hayes' shipyard, at the foot of Sixth street. She is 84 feet long, 23 feet beam and has 7 feet depth of hold. She can carry 120,000 feet of lumber.

THE Colton Soap Company is putting up a natural soap made from a clay taken from a mountain near San Jacinto. The clay is first ground into a fine powder and then mixed with other ingredients and formed into cakes the shape and size desired.

PRELIMINARY steps have been taken to establish a cannery in Sonoma by the citizens of that place. A meeting was held and the following committee was appointed to take the matter in hand: Robert Howe, Robert Poppe, H. Weyl, S. H. Shaw and A. D. Lowell.

THE Oroville *Mercury* says: A good many buildings are to go up in town; the Golden Gate mine will employ about 300 men this summer; the Lumpkin Mill Company will build a flume or railroad from Lumpkin to Oroville, and numerous other enterprises are talked of.

THE Watsonville people are arranging to build a creamery. In connection with the creamery is a cold storage for eggs and fruit. The evenly low temperature necessary for the processes of the creamery can be made available without further cost for the storage of eggs and fruit.

AT Astoria, Oregon, the fishing boats report a small catch—six and eight to the boat. The traps are doing better. There never before was so much gear in the water at this time of year as at present. Every shoal place has seines on it, and there are traps everywhere. All the canneries but three have 60 boats apiece and upward.

THE sawmill of the Truckee Lumber Co. started up Monday and the mill of Lewison & Smith started April 9th. All the mills will soon be running on full time. There is a good demand for lumber and but little dry material on hand. The outlook for trade is flattering and the season is likely to be a prosperous one for everybody.

SAN FRANCISCO now makes nearly everything in the way of electrical supplies, from a wooden call button to a 20-horse motor. There are half a dozen manufactories of this sort here, the largest being devoted to making the general run of telegraph and telephone machinery, fire-alarm apparatus, electric bells and electro-medical apparatus.

THE Pipe Works at South Riverside have had some bad luck with their pottery kilns. They have a large amount of pipe stored away to cure, and cannot make much more until they complete the kilns and fire a lot of that already on their hands. They have a large force of men employed. Quite a village has sprung up around the factory.

THE Oakland Iron Works has just completed a three-ton locomotive for Remillard & Co., to be used at their brickyard near Pleasanton. It is the first locomotive ever built in Oakland. It is about 15-horse power, and its peculiarity lies in the fact that the cylinders are vertical and are set directly over the front wheels. It will run on a three-foot gauge road.

SOUTHERN CALIFORNIA experts in the manufacture of porcelain, stone, granite, earthenware, delf and similar articles have been making some rare and beautiful designs in that class of ware from raw material recently discovered in San Diego and San Bernardino counties. The discovery of the deposits is believed by local potterymen to be of great importance.

ABOUT 1000 tons of a new sandstone recently discovered at Ione will be used in the construction of the new building of the California State bank at Sacramento. The stone is described as being of different colors—red, white and brown—according to the depth at which it is quarried. It is soft enough to be easily worked when first taken from the quarry, and it readily hardens upon exposure.

THE influence of electrical science upon the industries of this city has been felt in a marked way during the past few years. It is estimated by those in the business that no less than 500 persons now gain a livelihood by employment in the different electrical branches in San Francisco. In the line of electrical supply work the compensation ranges from $3 to $5 a day, while an expert electrician can command from $300 to $500 a month.

THE Elsinore vitrified, salt-glazed pipe is a pipe made of clay of sufficient strength and quality to stand the fearful test of 3000 degrees Fahrenheit for weeks, in the kilns, until it is thoroughly vitrified, or in other words burned into what is practically glass. The glaze is a result of the soda in the salt combining with the silica in the clay and forming what is known as a soda-salt glass, which is a glaze and a part of the body of the pipe.

THE fruit-canners say that unless they have lower freight rates by rail, some of them will have to go out of business. The present Eastward rates make competition with Eastern packers almost impossible, and the uncertainty as to their maintenance makes the situation still worse. Eastern jobbing-houses are purchasing very little from California, and the market here is glutted with goods that should have been moved six months ago.

SALMON canning on the Sacramento river has been an industry filled with disappointments during the past few years, and from all reports there are no great things to be expected this season. The run has been small thus far, and the pack to date is estimated at less than 7000 cases, which is considerably behind the record of last year. The quality of the fish is very good, however, and owing to its being ready for market early, the pack is in active demand.

KNIGHT & Co. of Sutter Creek, Amador Co., have a contract to build a 30 stamp mill on the Cosmopolitan mine, near Drytown; also to build 10 additional stamps to the Wildman mill. They have also orders for a 6-foot water-wheel to go to Alaska, and two 4½ foot wheels for the Marguerite mine. Owing to their increasing business they are putting up a new blacksmith shop, 50x20 feet, with two forges, and a storehouse adjoining.

WE are informed by the general agents of the Giant Powder Company—Bandmann, Nielson & Co.—that their company has purchased an eligible site of land with unlimited facilities of water at Clipper Gap, near Auburn, in this State, where black powder works are now in course of erection with the latest improved machinery. In a short time the Giant Powder Company will be in the market with a superior common blasting powder and offer the same at reasonable rates.

A LUMBER-PILE made of boards, each 100 feet long and 6 feet in width, would be an unprecedented sight in the East, but a gentleman recently returned from a visit to the coast of the North Pacific ocean says that piles of lumber such as that are common at the mills on Puget Sound. "Boards 100 feet long and 6 feet wide, without a knot in them," he says, "are common cuts from the gigantic fir trees of the Puget Sound forest. These trees grow to the enormous hight of 250 feet."

THE steamer Pacheco brought from San Quintin, Lower California, to San Diego, on a recent trip, about 10 tons of abalone shells and meat, which were gathered at Santo Tomas. They were transferred to the steamer Newbern which sailed the same day for San Francisco. This constitutes the first shipment by the firm of Salorio Bros., who have recently begun the business under a concession granted by the Mexican Government. The shells are used in the manufacture of buttons, handles and jewelry, and the meat is shipped to China.

THE boiler works of Langford Bros., Eureka, Humboldt county, Cal., are quite busy. At present they are engaged in building a new boiler for the powerful ocean steam tug Mary Ann. This boiler is eight feet in diameter and 15 feet long, the largest boiler ever made in the county, and the only one of similar proportions and material ever made in California outside of San Francisco. Besides the building of the boiler for the Mary Ann, they have just retbottomed four boilers for Carson's mill. They have recently put in a new boiler to furnish steam for their own works.

THE Porphyry Paving Co., South Riverside San Bernardino Co., which had made all arrangements to commence work on a 10,000-ton contract in San Diego, and had secured satisfactory freight rates, has been compelled to shut down, owing to a clause in the contract providing that the material shall be obtained in San Diego county. About 30 men are thrown out of employment. The company have several contracts pending in Los Angeles, however, and one may be closed before long enabling the works to start up again.

A LARGE business in the shipping of bituminous rock from San Luis Obispo to Los Angeles is in prospect. Steamers running down the coast take many tons of the rock for street-paving purposes. A number of obstacles have arisen against the business which may severely cripple it. One of these is a claim of a royalty of $1 a ton on the patented process of heating the rock and another royalty of 50 cents a ton on the tanks or boilers in which it is heated. A suit is pending in the United States courts to test the validity of the patents.

VALUABLE deposits of bituminous rock are known to exist in the hills about Chino. Recent experiments prove that it is of the best quality. It contains a large proportion of sand. When subjected to fire it readily disintegrates and is easily molded into tough bricks of great elasticity. There is no residuum. Persons familiar with the San Luis Obispo and Santa Cruz rock regard the Chino deposit as fully equal, if not superior in quality. Los Angeles paving contractors are much interested in this rock. The deposit has not been developed to any great extent.

ONE of the growing industries of San Diego county is the manufacture of asbestos goods. At Pacific Beach are located works that cost several thousand dollars, where cement and roof and house paints are made. More machinery is being put in to facilitate the manufacture of these, and a kiln will at once be erected for the making of asbestos brick. The works will soon use a carload of raw asbestos each week. There are two large mines in the county, one near Elsinore, which was opened up some time ago; the other back in the mountains. The first is short fibered, the second very long, from which wire and cloth can be easily made.

THE report of the beet-sugar factory at Watsonville for last year is encouraging. The factory was in operation 61 days, consumed 14,077 tons of beets, and produced 1640 tons of sugar. One hundred and thirty-five men were employed; the average price paid for beets was $5.04 per ton; the cost of manufacturing the 1640 tons of sugar was $148 247; the sale of the product brought $172,817; the net profit was $24,570, which was five per cent on the capital invested. The capacity of the factory has been doubled, and as this doubling will not correspondingly increase the cost of operation, the profits ought in future to be much greater. The best of all the report, however, is that the farmers who raised the beets and sold them for $5.04 per ton cleared from $40 to $65 per acre. There are several million of acres in California that can be bought for half of $40 per acre, that will raise beets as luxuriantly as at Pajaro valley.

WITH each year's development, consumption of redwood lumber increases, and as the only belt of redwood timber in the world is found in seven California coast counties, and out of the seven only three remain with redwood lands for sale—Mendocino, Humboldt and Del Norte—in the other four the timber has all been cut and marketed, save a few private holdings to supply the local trade, the time cannot be far distant when the supply must necessarily cease. The amount of lumber in the redwood forests has been estimated by the Board of Forestry at 33,155,020,000 feet, board measure. It is calculated that 12,000,000,000 feet have been cut.

TOWLES' pulp-mill, at Towles' station, on the C. P. R. R., is now running to its utmost capacity and is turning out about seven tons of wood pulp daily, which requires the consumption of about ten cords of wood. Tamarack wood only is used. The wood is deprived of its roots and bark and is then fed into five large grinding machines which reduce the wood to a pulp. The pulp is ground in water, and after the water is screened of the particles of wood, it is run on to a felt blanket which passes around a number of cylinders. The wood fiber sticks to the blanket and is finally collected on a cylinder, from which it is stripped in sheets six feet long and three feet wide. It is then folded up and taken to the storehouse. It is shipped to the Stockton paper-mill, where it is pounded up, and about 15 per cent of rags is added to it. It is bleached and rolled into newspaper. The San Francisco *Chronicle* uses paper made from this pulp. About 20 men are employed in the mill. The deposit is of vast extent.

Fine Crushing of Ores.

In last week's PRESS we gave illustrations showing elevations of a Blake fine-crushing plant for the Chateaugay Ore and Iron Co., promising to show a plan of the mill and give an account of the results accomplished this week. The plan is shown on page 333. It is a half plan of sills and half plan of ground floor, with plan of engine-room and foundations; *x*, *y* show the inside line of old building sill. Total length; *x*, *y*, 60 feet; *z*, *y*, 11 feet; *y*, *w*, 40 feet. The scale is one-half inch to a foot. In connection with the engravings in the PRESS of May 4th, the details will be clearly understood.

The normal capacity of the mill on ore reasonably dry has been shown to be 30 long tons per hour. Grizzlies put in at the 20 by 15 crushers, the idea being to take out the fine wet ore and send it to the wet screens below. This was fairly successful, but soon, owing to the rigorous climate of that latitude, bringing heavy snows and severe cold, the fine wet ore would freeze in solid mass on the dumps or in the cars bringing it to the mill, and would fail to pass the grizzlies, but go to the crushers. It would pass the first two crushers well enough, giving no trouble, but by the time it reached the 60 by 2 multiple crushers the heat evolved in the crushing would thaw out the cementing ice, giving damp product which would not screen readily. In this way, or by imperfect screening, the actual product of the mill was greatly reduced, and notwithstanding the impossibility of sending the ore to the mill dry, or the absence of a sufficient supply of water to run the mill wet, and in that way obviate the difficulties of screening fine or wet and frozen ore, the mill has, since then (November, 1866), been running uninterruptedly night and day.

The actual amount crushed from September 26, 1886, to Jan. 1, 1888, was 122,814 long tons, or 137 551 short tons, at a cost of crushing and concentration of $42,200.55, or 34 36 cents per long ton or 30.67 cents per short ton, distributed as follows:

2018 tons of coal	$ 8,612 37
Labor	21 008 72
Oil waste, etc	2,374 30
Mill supplies, renewals and repairs	10,205 16
Total	$42,200 55

DISTRIBUTION PER TON OF ORE.

	2240 lbs. cents.	2200 lbs. cents.
Fuel	7	6¾
Labor	17	15½
Oil waste, etc	2	1.7
Mill supplies, renewals and repairs	8	7½
Totals	34	30.7

This economy is remarkable, and still more so when we consider the prevailing unfavorable conditions as regards successful screening of the ore. Had the ore been reasonably dry, instead of being generally wet, and during the winter months frozen, or if the crushing after the passage of the 30 by 5 crushers had been "wet" instead of "dry," and the screening in that way made perfect as it can be, the actual average daily product could have been increased, even doubled, and the cost of crushing and concentrating per ton of crude ore reduced to less than 25 cents.

WHEAT AND FLOUR.

A New Flour-Mill for Stockton.

The Stockton *Independent* of March 29th says that parties were at that time working up a project for a new flour mill in that city. It was remarked by an informant that when the Crown mills were established a well-known millionaire of San Francisco begged for an interest of $50,000 in the business, and that man is ready to-day to take $50,000 worth of stock in a new mill here. He is engaged in the foreign shipping business and knows something of the profits of flour-making in a grain center like Stockton. I am very sure that another big mill will be built here before many months have passed.

A man who has had many years' experience in the milling business in the West and knows what he is talking about, says a mill can be erected here and made ready to turn out 2000 barrels of flour daily, at a cost not to exceed $115,000. You see the price of roller machinery has fallen since these big mills were supplied with the new-process machines, and money will go farther in purchasing mill furnishings to-day than it would a few years ago. But, in addition to the cost of a fully equipped plant, the corporation would need a working capital of several hundred thousand dollars to be expended in timely purchases of stock and to carry the work along until returns could be had from sales of their products. It would be necessary, perhaps, to start with a capital of not less than half a million dollars.

"Is there a safe market for the product of three big Stockton mills?" was asked.

"Undoubtedly there is, for the Stockton mills have the world for a market. Stockton flour is to-day crowding into the best markets of the world, for the reason that it is the best quality manufactured. And the reason for that lies in the fact that we have the best grain in the world. A man employed in one of the local mills said the other day that these mills make more revolutions in a year than any other such establishments in the United States. To supply the demand for Stockton flour it has been found necessary to run these mills to their full capacity night and day during seasons when it was almost necessary to shut down for repairs. In a life of many years in flour mills this man said he had never been in a place where there was such a rush in the manufacture of flour. And it is well known that these mills are unable to keep up with the call for their flour, and often buy the product of other manufacturers. So it would seem that there is room here for at least one more big mill, and there need be no competition in the sale of its products, for there is a market for more flour than half a dozen Stockton mills could manufacture."

"People know but little about the profits of flour-making," continued the interviewed. "I have handled the products of local mills for many years, and know something of the business of manufacture. It was not many years ago when flour was made by grinding the wheat on stones. That was an expensive process, and necessitated the employment of many more men than are used in roller process mills. You may remember that the price of flour made by the stone grinding process was not much above the present figures. Bran then sold at $7 50 a ton, but now it is held at $15. Then bran had considerable flour in it, but there is no waste to-day and one can handle the stuff without getting much flour dust on his hands or clothing. While the roller process of manufacture has worked a revolution in flour-making, and wheat is always lower than in former years, labor remaining at reasonable figures, the price of flour is yet stiff, showing increased profit in manufacturing. It is a good business that will pay four managers $400 a month each and also pay handsome dividends on the stock, and I understand one of the Stockton mills pays such salaries."

From what a reporter could gather here and there it is believed that among the moneyed men who may be interested in the new mill are Messrs. Gillis, Garrett and Davis of the Steam Navigation Company; ex-Governor Perkins and one or more of the Spreckels family of sugar kings.

The Deficiency in the Australian Wheat Crop.

Mr. Brett, one of the best-known and most successful of colonial journalists, who has been commissioned by the New Zealand Government to represent Maori land at the Paris Exposition, recently arrived in this city on his way to Paris. During his stay here he visited a number of our best fruit and wheat growing localities, and contrasted the same most favorably with similar localities in Australia.

To a reporter of the *Call* he alluded to the present drought in New South Wales as something which presaged most disastrous results, particularly to the wheat crop of that country. He says the Government statistician there estimates the shortage as not less than 6,143,000 bushels on the average of crops for the last 20 years, incurring a loss to the farmers of fully $4,500,000.

This shortage will call for a large increase of imports over those of previous years. New Zealand can supply only a portion of this demand. In regard to the California supply, Mr. Brett said: "Your flour is popular there, but we in New Zealand have the advantage of proximity, and so long as the present rates are maintained here your shippers will be unable to land wheat in Australia for less than $1 39.

"The moment the English market falls, however, say to 39s, and provided New Zealand wheat should be selling at above 5s, say 5s 6d, then Californian growers could successfully compete with New Zealand growers; otherwise we have not much to fear.

"But the falling off is not confined to wheat alone. Oats have decreased to the extent of 7 bushels per acre, potatoes 3 09 tons and hay 75 tons per acre. There is opportunity for exhaust in these articles also."

The Wheat-Growing Problem of the World.

The British *Quarterly Review*, in a recent article on the future prospects of the British farmer, said that after so many years of unremunerative prices, many are disposed to regard their struggle with foreign and colonial competitors as hopeless, and it has been asserted that even if they had not to pay any rent, they could not grow wheat with profit. In 1883 the average price of wheat in England was considered very low at $1.31 per bushel, but the next year it fell to $1 11 and in 1886 to 96 cents, and in 1888 to the lowest figure yet recorded, 94 cents. At such beggarly returns no wonder the unfortunate husbandmen of Great Britain have at last almost decided to throw up the sponge, and are looking after other means of making a living. From the reports of 85 wheat-growers in 11 counties it appears that the average expense of cultivation is $42 68 per acre, and the receipts $42 per acre, or a loss of 68 cents, presuming wheat to be worth $1.12 per bushel; so that the loss during the past two years must have been very serious indeed.

In the Western States the expense is estimated at about $10 or $11 per acre, and in some parts even less, so that when the vast productive area of the United States is taken into consideration, the statement that North America produces one-fourth of all the wheat grown throughout the universe may not be so wide of the mark, although it need not be inferred that the American farmers make more than a bare living at such prices; in fact, one has only to casually glance over the newspaper to become aware that there is a vast amount of grumbling among them on account of the low prices obtained, and that the greater number of the farms are heavily mortgaged. The increase in the wheat yields of the United States will be readily seen from the following:

	Bushels.
1850	100,485,944
1860	173,104,924
1870	235,884,700
1880	445,000,000

At the present time only 15 per cent of the wheat is grown in the Eastern States, the New Englander finding it cheaper to import it than to raise it. The possibilities of the future may be faintly gauged from the fact that the present acreage in wheat is about equal to the State of Alabama, so that for many years Great Britain's breadstuff supply will be exported from this country, unless it can be purchased at a cheaper rate elsewhere. Concerning the long threatened competition from India, where labor is so cheap, it has not yet reached the proportion expected, the dirty condition of the grain affecting its sale somewhat, and its lower value by a few cents per bushel is made up by the extra freight charge over that on American grain. The first export of Indian wheat was 20 years ago, when the quantity was 559 000 bushels, which had increased in 1876 to 4,687,000 bushels, in 1881 to 13,896,167 bushels, and for the last six years the average export has been 35 530,000 bushels.

The average yield of wheat in India has been placed at 14 bushels, which, after allowing for the home consumption, means a surplus for export of 66 000,000 bushels. The relative condition of the two countries stands thus:

	United States.	India.
Population	60,000,000	260,000,000
Area, square miles	3,000 000	1,400,000
Miles of railroad	138,000	13 30,000
Wheat acreage	34,000 000	26,000,000
Average crop 1883-86. bushels	437,000 000	260,000,000
Export of wheat, 1887, bushels	432,000 000	39 012,000
Total exports, 1881-86, bushels	800,000,000	175,000,000

From this it will be noticed that the United States raises 7 bushels per head of its population, and India only 1 bushel; India has only 1 mile of railroad to 20,000 inhabitants, while this country has 1 mile to 435 people. What with the expense of irrigation, the terrible droughts that often devastate India, the crude method of conducting farming operations, etc., it may safely be asserted that in the immediate future, if indeed at any time, India will not prove a formidable factor in the European wheat markets. From the mighty and vast Empire of Russia will come the keenest rivalry in furnishing Britons with their daily bread. In 1886 Russia's foreign exports of breadstuffs were 86 150,000 bushels, which increased to 123,800 000 the next year, and in 1888 to 172,870,000 bushels, and it must be borne in mind that this industry can be almost indefinitely augmented without difficulty, while the Argentine Republic in a few years will export grain on a very extensive scale.

If the production of cereals is hopeless in Great Britain, their conversion into flour will be performed by British millers, since they have recently adopted the latest improvements in the requisite machinery, and they have the world's wheat supply offered to them. Their profits are not large, but sufficiently good to induce them to continue the business, and to employ labor. Even when the English market is glutted with American flour, the odds are on the side of the English miller. Cargoes off the coast are generally to be purchased on better terms than from the farmer or merchant, and the sovereigns fetch four times as much as they do here, and this disadvantage the American miller has so far failed to overcome. Not long ago a flour trust was planned in England, when several of the leading mills were inclined to join the combination, being stimulated by the success of the salt trust, but the serious drawbacks have so far prevented its being carried into effect.

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As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. P.) from week to week and year to year.

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DELINQUENT SALE NOTICE.

Gray Eagle Mining Company—Location and principal place of business, San Francisco, California. Location of Works, Placer County, Cal.

NOTICE—There are delinquent upon the following described Stock, on account of Assessment (No. 12) levied on the 19th day of March, 1889 the several amounts set opposite the names of the respective shareholders, as follows:

NAME.	No. Certificate.	No. Shares.	Amt.
Blaney, W E	284	20	$ 1 00
Bogart, O H, Trustee	420	10,000	500 00
Chase, Q A, Trustee	419	3,814	190 70
Gray, H W, Trustee	181	500	25 00
Horton, Thos R, Trustee	51	5 000	250 00
Horton, Thos R, Trustee	315	5,000	250 00
Hall, H E, Trustee	372	1,000	50 00
Rosekrans, H M	34	600	30 00
Taylor, J N	102	1,000	50 00
Taylor, J N	330	40	2 00
Waller, L P F, Trustee	276	300	15 00
Waller, L P F, Trustee	367	3,000	150 00
Winter, T P, Trustee	396	500	25 00
Winter, T P, Trustee	397	500	25 00

And in accordance with law, and an order of the Board of Directors, made on the 19th day of March, 1889, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, 327 Fine Street, Room 9, San Francisco, California, on Tuesday, the 16th day of May, 1889, at the hour of 1 o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of the sale.

O. H. BOGART, Secretary.

Office, 327 Pine Street, Room 9, San Francisco, California.

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THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Leffer, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide. Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 800,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No 1, 32 ft; No. 2, 9½ ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

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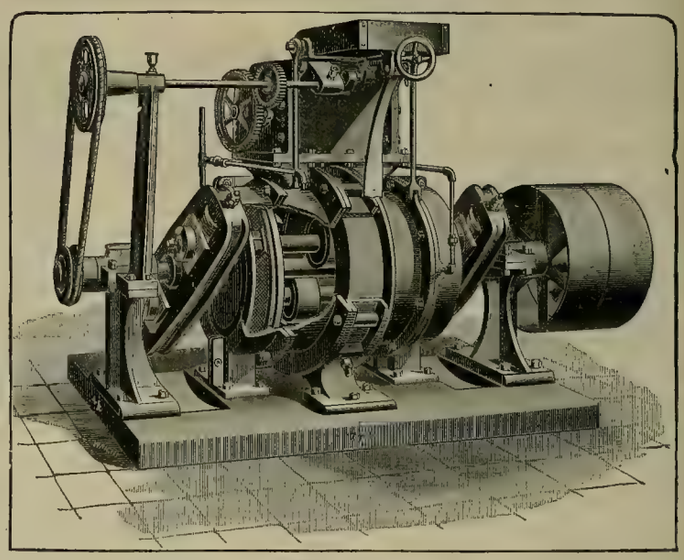

IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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ILEX GOLD MINING CO., Limited.
R. W. Petre, Agent.

Rich Gulch, April 27, 1889.

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Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

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West American Oaks.

We have received, through the courtesy of Prof. Geo. Davidson, a copy of a monograph on "West American Oaks," the history of the preparation of which is as follows: Dr. Albert Kellogg, a distinguished pioneer botanist of this State, confided to some of his friends, before his death, all his papers on botany. They were incomplete and there was apparently no hope of their being finished or published. J. P. Moore and W. G. W. Harford consulted with Prof. Davidson, who addressed a letter to Jas. M. McDonald explaining the matter to him. The result was that Mr. McDonald cordially undertook to bear the expense of publication and gave his check for the required amount. He also asked for an estimate of the cost of publication of a similar monograph of the Coniferæ. Prof. Edward Lee Greene of the University of California wrote the text and the drawings were made from the originals by Dr. Kellogg.

Dr. Kellogg was one of the original seven founders of the California Academy of Sciences, and one of those mainly instrumental in giving it a reputable standing in the scientific world. He was an enthusiastic botanist, ardently devoted to research in the new field of the Pacific, and a singularly unselfish man, assisting with his knowledge and experience all who sought his advice.

In the sketch of the life and work of Dr. Kellogg, which Prof. Davidson has written for the monograph, occurs the following paragraph: "He was the embodiment of modesty in manhood. His heart was as gentle, as sweet and as innocent as a woman's. His speech was clean and refined; always for the right, the needy and the struggling. He was startled at an attack on religious purity, and then his words rose swiftly in force and directness. His soul revolted against chicanery, intrigue and petty meannesses of the trickster, the backbiter and the prevaricator, and his condemnation was unhesitating and piercing. He shrank from the charlatan and the sham; to him they were an unnatural growth in morals or science. His sense of justice and purity was so inborn that he instinctively knew the presence of the offender. His moral life charmed the young and innocent and was an example to the best."

The term "West American Oaks" is used for the work because all the oaks east of the Rocky Mountains have been published as East American oaks. There are now known to botanists at least 300 kinds of oak, of which 50 are indigenous to North America, north of Mexico. The 50 North American species are about equally divided between the eastern and western sides of the continent; and there is no oak common to Atlantic and Pacific America. The greater part of the species belonging to the Pacific States and Territories were more or less fully illustrated by Dr. Kellogg's pencil. The 24 different drawings of his in the monograph represent all the more important species of the extensive commonwealth of California particularly, as well as several others; and the editing of these plates has resulted in a virtual monograph of the Pacific North American oaks; so the volume may be found to contain about all which, up to this date, is known of our West American oaks. The plates are of lasting value. The engraver has been scrupulously faithful to the drawings; and no artist was ever more strictly and conscientiously true to nature than Dr. Kellogg.

The bibliography of the oaks is specially complete. The text is intelligently and plainly written and scientifically correct. Botanists everywhere owe a debt of gratitude to Capt. McDonald for his generosity in publishing this work. The work is a credit in every way.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

A. F. JEWETT—Tulare Co.
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CHAS. DUGAN—Stanislaus Co.
R. G. BAILEY—San Francisco.

SAN PEDRO district, New Mexico, is excited over rich carbonate discoveries in the Lucky mine.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & CO.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING APRIL 30, 1889.

402,382.—FLY-CATCHER—Albert Arents, Alameda, Cal.

402,400.—WRENCH FOR SAW TEETH—Frederick W. Cook, S. F.

402,404. — LUBRICATOR — W. H. Cooper, San Jose, Cal.

402,408.—RAILWAY TELEGRAPH—F. J. Crouch, Oakland, Ogn.

402,462. — GRAIN SEPARATOR — M. N. Laufenburg, Stockton, Cal.

402,471.—MOTOR—Hans M. Olsen, Sacramento, Cal.

402,189.—LAWN-MOWER ATTACHMENT—H. Peterson, Berkeley, Cal.

402,194.—STRAP LOOP — A. C. Reeves, Palouse, W. T.

402,479.—VARIABLE ECCENTRIC — D. L. Remington, San Leandro, Cal.

402,279 — PHOTOGRAPHIC PAPER—F. H. Rogers, Los Angeles, Cal.

402 208. — SNATCH BLOCK — A. Uren, Seattle, W. T.

402,496. — TENSIONAL SOUND BOARD — C. S. Weber, San Jose, Cal.

16,541.—TRADE MARK — Nushagak Canning Co., S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

VARIABLE ECCENTRIC.—De La Fayette Remington, San Leandro. No. 402,479. Dated April 30, 1889. This invention relates to the class of variable eccentrics especially applicable to engine-reversing mechanisms, in which the position of the valves is changed by varying the position of the eccentric which operates the valve rod; and the invention consists in the novel connection of the eccentric and the novel means for varying its position.

RAILWAY TELEGRAPH.—Frank J. Crouch, Oakland, Douglas county, Oregon, assignor one-half to C. P. Houston, Junction City, Oregon. No. 402,408. Dated April 30, 1889. This invention relates to a system of railway telegraphy and signals, and it consists of devices whereby communication may be made beween fixed stations along the line of the railway and between trains moving upon the track between the stations. The system also admits of intercommunication between said fixed stations, moving trains, and any points intermediate between the fixed stations by means of portable telegraphic or signaling apparatus. The details of this device are quite ingeniously arranged, varying considerably from anything of the kind so far invented.

GRAIN-SEPARATOR AND CLEANER.—M. N. Laufenburg, Stockton, assignor to Stockton Combined Harvester and Agricultural Works. No. 402,462. Dated April 30, 1889. The improved apparatus is for separating and cleaning grain after it has been thrashed. This cleaner may be used as part of an ordinary thrashing machine or may be employed as a supplemental cleaner attached to and working with the thrasher and separator, or it may be worked entirely independent if desired. When the wheat which is mixed with the barley, oats, cheat or other foul matter, is deposited upon the shaking table or screen in any considerable depth—as one-half inch or more—the wheat and heavier grain will seek the bottom by reason of the shaking motion and the lighter impurities will rise to the top. Upon this action Mr. Laufenburg has based the construction of his cleaner, in which the screens, while being continuous, are so constructed as to deposit the lower stratum of nearly clean grain upon an inclined plate, which returns it beneath the screen and grades and separates it at once from the grain which is only partly cleaned, this operation being repeated as many times as may be necessary; and by thus relieving the screens of a part of the work the inventor is enabled to greatly increase the capacity and perfection of the work of cleaning.

TOOLS FOR MANIPULATING SAW-TEETH.—Frederick W. Cook, assignor of one-half to H. P. Gregory & Co., S. F. No. 402,400. Dated April 30, 1889. The wrench which this patent covers is one of that class which are especially adapted and are used for inserting and releasing the insertible teeth of saws. The invention consists in a stock or bar having pins near one end for engaging the sockets in the saw-plate and bit-holder, and hinged or pivotally jointed on a line between the pins, whereby they may be brought, by the bending of the stock at the joint, closer together to engage the sockets and forced farther apart by the straightening of the stock to prepare the holder for the insertion or removal of the tooth or bit. The invention further consists, in connection with said stock or bar provided with its engaging-pins, and jointed, as mentioned, of a stop secured to the stock and adapted by coming in contact with the edge of the saw-plate to limit the movement of the stock and thus control the bending of its point to prevent too great separation of its pins and injury to the bit-holder. The object of the invention is to temporarily force the spring-limb of the holder into a position to permit the insertion of the saw-tooth or bit, or to release it, to provide for its removal, and the wrench is specially adapted for use in connection with those bits or teeth which are seated in a socket in the holder and held therein by a spring-limb of said holder.

MOTOR.—Hans M. Olsen, Sacramento. No. 402,471. Dated April 30, 1889. This invention relates to the class of motors adapted for the operation of pumps and other light machinery, and especially to that class in which a gear train operated by a weight is employed to actuate a crank-shaft which is connected by intermediate devices with the machine to be operated. The invention consists in a novel mechanism for automatically connecting the operating weight with the chain which actuates the gear train. The object is to provide a simple and effective mechanism for transferring the weights to the operating chain and providing for the automatic attachment of a second weight as soon as the first has about run down, so that the machine may be run for a longer time than with a single weight.

FLY-CATCHER.—Albert Arents, Alameda. No. 402,382. Dated April 30, 1889. Traps of all sorts, as well as sticky or poisonous paper, have been employed to catch flies; but if strings or elongated strips are suspended from the ceiling, the flies, if present in the room, will be attracted by these strings, notwithstanding the presence of eatables. Whether this be on account of the glistening appearance of the coated strings or for some other reason that cannot be explained, the fact remains that such strings will attract and catch the flies in a room in a short time. Mr. Arents' invention consists of one or more strings of suitable length suspended from the ceiling and a means for preparing, packing and suspending the strings. A string of ordinary loosely twisted twine, having a ring on one end by which to attach it to a hook on the ceiling or other elevation in the room, is placed in a small wide-mouthed bottle, with only the ring and a small piece of string left outside. In the bottle is any strongly adhesive compound which saturates that portion of the string in the bottle. When this is to be used, a pull on the ring will draw the cork (by means of a knot on the string), and when the ring is placed on the hook the weight of the bottle will cause it to descend, the coated string being thus withdrawn until the end is reached, and this is secured within the bottle by suitable means. The bottle then serves as a weight to keep the string extended and as a receptacle to catch any surplus material. The whole device is easily packed for shipment and sale.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

EUREKA MANUFACTURING CO., May 3. Object, to manufacture compounds from mineral and vegetable substances. Capital stock, $200,000. Directors—John D. Fry, Frank F. Woods, L. P. Drexler, George Crocker and Louis A. Garnett.

RATTLESNAKE G. M. CO., May 3. Capital stock, $50,000. This is an Oakland Co. Directors—J. C. Hickox, N. B. Smith, H. Molineaux, W. M. Towle, C. E. Wooley, Owen Brady, J. S. Dallas and C. F. Hickox.

CALIFORNIA ST. CABLE R. R. CO., May 3. This is a reincorporation of the old company covering its new routes. It is to be continued down California street to the ferry. Capital stock, $1,000,000. Directors—Chas. Mayne, Robt. Watt, Jerome Lincoln, C. N. Randall and C. Denervand.

HUTCHINSON SUGAR PLANTATION CO., May 6. Object, to cultivate sugar-cane and manufacture sugar in the Hawaiian islands and elsewhere. Capital stock, $2,500,000. Directors—John D. and C. August Spreckels, Louis Sloss, P. N. Lilienthal and Meyer Ehrman.

PACIFIC DEVELOPMENT SYNDICATE, May 8. Object, to do a general business in lands, mines, merchandise, railroads, wharves, sawmills, etc. Capital stock, $100,000. Directors—G. W. Osborn, H. L. Hyland, N. S. Keith, Robert A. Lewis and Irving Lawton.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Peerless, May 3, $4000; Justice, 3, $2785; Confidence, 3, $18,569; Crown Point, 3, $10,631; Best and Belcher, 5, $7300; Cons. California and Virginia, 5, $90,246; Hale and Norcross, 3, $7700; Hanauer, 2, $6400; 4, $2100; Crown Point, 7, $18,795; Confidence (for April), $83,972; Hanauer, 5, $2500; Navajo, 8, $6000; Cons. California and Virginia, 8, $72,207; total for April, $295,832; Justice, 9, $2789; Savage, 9, $8620; Peerless, 9, $12,200; Overman, 9, $10,272; Hale and Norcross (for April), $90,525; Savage (for April), $24,426.

A CHROME deposit is being opened on Jacilites creek, 20 miles west of Huron, Fresno county.

THE Standard Oil Company seems to be about to absorb the white lead industry of the country.

AT Scotia, says the Humboldt *Standard*, is the plant of the Pacific Lumber Co., one of the largest and best in the redwood belt. This company own about 10,000 acres of the best timber in the Coast Range. Their mill on Eel river, when running, will average a cut of about 93,000 feet of clear lumber every day. They estimate a cut of 1000 feet per day to each man employed in the mill. Some important changes have been made recently in the way of handling the logs and lumber as it comes from the saws and is received for shipment. Formerly all classes and sizes of lumber was carried by line rollers and trucks to a general dump, which was in the shape of an incline from both sides of a tramway to the yard below, where men stood ready to sort and pile it. Now it is separated as it comes from the edgers and placed on inclosed rollers and carried to the chutes and automatically dumped on to a rifle or table, just sufficiently high to be handled by the men without stooping. From the rifle the lumber goes on to cars standing on depressed tracks ready for shipment, or is trucked off and piled according to quality and size, or loaded on cars, as ordered, from six platforms. Some changes have been made in the saws that have proved successful. A third saw is now run on the pony instead of a clipper. By this arrangement larger logs can be sawed and the logs are now taken as they come on the train from the woods and handled on both sides of the mill just as they come. By these changes the mill is run with 27 less men, and instead of sawing 78,000 feet of lumber, 93,000 is sawed. In addition to the sawmill power, there is a detached shingle-mill with a capacity of 150,000 shingles per day, and another machine operated in the main mill with a capacity of 30,000 per day; also a shake and picket machine. Besides the above, a large amount of material for boxes is gotten out every day. Not a piece of lumber is allowed to go to waste, but every available particle of timber is turned to some account. Field's Landing is the shipping point at tide-water for the product of the mill.

CLAUS SPRECKELS, speaking of the beet sugar industry in California, says: "I believe that California alone can in a few years produce enough sugar to supply half the demand of the United States, and California, Oregon and Washington together can produce enough to supply the entire country. Then we will be independent in this as in many other things. We do not need to ask anything of any country. We can raise and manufacture everything we need, and then we keep all our money right in our country. This coming season we expect to turn out fully 4000 tons at the Watsonville factory. That was not really an experiment, as some think, for I was sure before I went in of its success. It is our intention to put up ten factories similar to that at Watsonville, and in furtherance of this plan have formed a company, the Occidental Beet-Sugar Co., with $5,000,000 capital. Last season I gave out seed all over California and farmers sent me samples of their beets. I had these all tested, and the result is that I have now a map which shows me exactly where the beets that yield most saccharine matter grow the best. To pay, beets should average about 14 per cent saccharine matter. Some of those about Watsonville last year ran as high as 24 per cent. We expect to get offers of land from different points on which to build our factories. We have not yet decided on any locations, but will take the matter up when I get back from the East. We will try and have one more factory equipped and ready for work next year. The factories will cost about $600,000 each, and each establishment will be able to turn out 800 tons of raw sugar in 24 hours, and in time will make fully 10,000 tons for the season. We will have to employ about 150 men at each factory. Large factories are better than small ones, for about the same labor is required to turn out 50 tons as 800."

THE Truckee *Republican* says: We predict that the season of 1889 will be the liveliest experienced for a number of years. The *Republican* has been told that the following improvements were to be made this year: Large ice works will be constructed by Brickell & Kruger, which will probably cost $40,000. Lewison & Smith talk of building a box factory at Coldstream to cost at least $5000. The new schoolhouse will be built, to cost over $5000. The Tahoe Ice Co. will probably construct a large ice pond and build another large house. There is talk of another ice Co. being formed with large works near Truckee. Another icehouse will probably be built at Boca. It is said that A. M. Wicks will build a sawmill near BRONCO. If these things are done, at least $100,000 will be expended in this vicinity this year.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

THE Yavapai Development Co. proposes to establish an ore reduction plant at Prescott, A. T.

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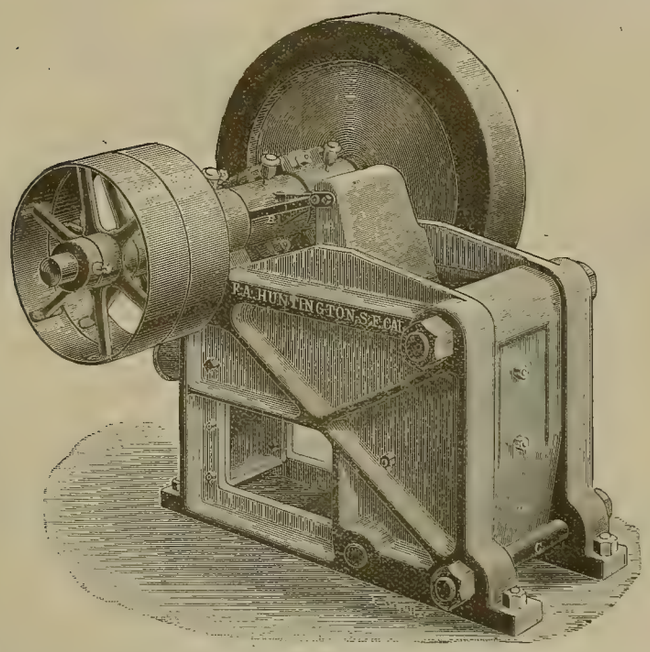
MANUFACTURER AND DEALER IN

STEAM ENGINES AND MINING MACHINERY OF EVERY DESCRIPTION.

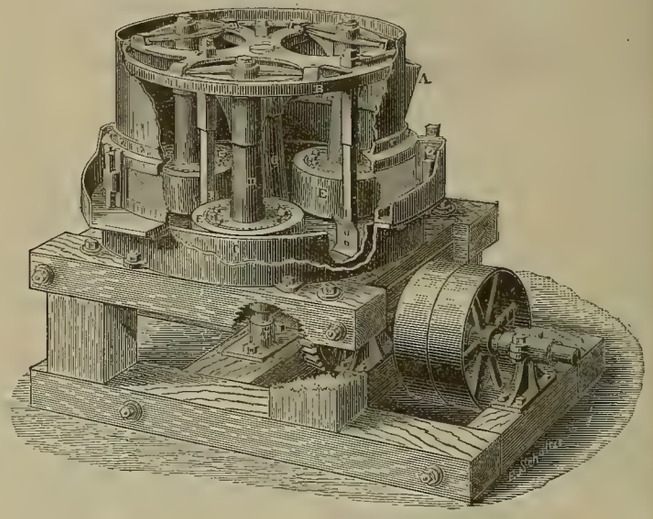
PRINCIPAL OFFICE, 45 FREMONT STREET, SAN FRANCISCO.



Huntington's Improved Rock-Breaker.

The main features of this machine are strength, ease of adjustment and simplicity of construction.

The movable jaw *A* is worked by the eccentric *B* and is pivoted at the bottom. The stationary jaw *D* is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt *C*. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt *C* and the jaw *D*. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



F. A. HUNTINGTON'S
Centrifugal Roller Quartz Mill.

The following will explain the above cut:

The ore and water being fed into the mill at the hopper *A*, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet crushing and gold saving it has no equal.

I claim especial merit in that feature of this system *which prevents* ALL FLOURING of gold and quicksilver, and the consequent loss of gold that attends stamp milling.

For the economical working of ore that contains sulphurets, I particularly claim the adaption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.

FOR WATER WORKS
AND GAS PLANTS,
CONVERSE PATENT LOCK-JOINT PIPE.

Strength, Durability, Economy.

SEND FOR DESCRIPTIVE CATALOGUE.

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ARE YOU GOING TO PUT UP MACHINERY OF ANY KIND?

Are you going to make any change in machinery? Are you freighting by team or packing on mules? Do you want Pulleys on Shafting already up? If so, don't fail to look into the merits of THE DODGE PATENT INDEPENDENCE

WOOD SEPARABLE or SPLIT PULLEYS.

They are the Lightest, Strongest, Best Balanced and most Convenient Pulleys made in the world.

Adapted to any power required. Time, trouble and money saved by using these Pulleys.

☞Price List and Catalogues mailed free.

Also SIMONDS' SAWS furnished to order as follows: Inserted Point (Mill and Edger), Inserted Tooth, (California Pattern,) Solid, Shingle and BAND-SAWS, all sizes, Crescent Ground Cross-Cut, etc. Also Planer Knives.

SIMONDS SAW CO., 513 Mission St., San Francisco.

AMALCAMATING MACHINERY.

Stamp Mills for Wet or Dry Crushing. Huntington Centrifugal Quartz Mill. Drying Cylinders. Amalgamating Pans. Settlers. Agitators and Concentrators. Retorts. Bullion and Ingot Moulds. Conveyors. Elevators. Bruckners and Howell's Improved White's Roasting Furnaces, Etc.

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CONCENTRATING MACHINERY.

Blake, Dodge and Comet Crushers, Cornish Crushing and Finishing Rolls, Hartz Plunger and Collom Jigs. Frue Vanner & Embrey Concentrators. Evans', Calumet, Collom's and Rittenger's Slime Tables. Trommels, Wire Cloth and Punched Plates. Ore Sample Grinders and Heberle Mills.

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IMPROVED STEAM STAMPS

Hoisting Engines, Safety Cages, Safety Hooks,

ORE CARS, WATER & ORE BUCKETS,

Air Compressors, Rock Drills, Etc.

GENERAL MILL AND MINING SUPPLIES, ETC.

Sectional Machinery FOR MULE-BACK TRANSPORTATION.

Pumping Engines and Cornish Pumping Machinery,

IMPROVED WATER JACKET

Blast Furnaces for Galena & Copper Ores,

SLAG CARS AND POTS,

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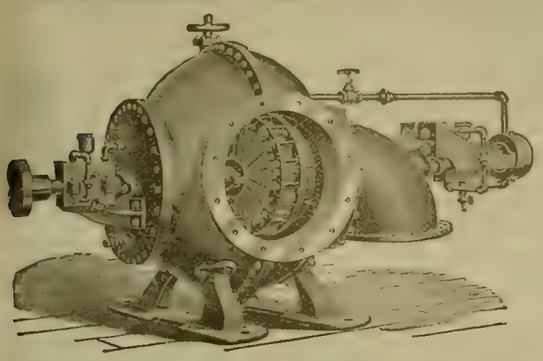

JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted to capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,
Springfield, Ohio, or 110 Liberty St., New York.

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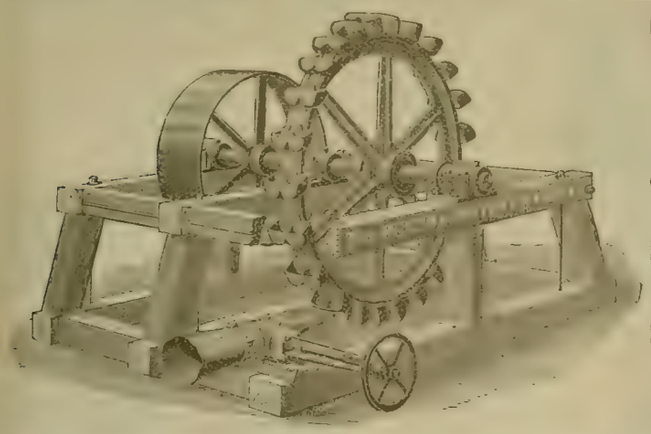
PARKE & LACY, General Agents, San Francisco, Cal.



THE PELTON WATER WHEEL

GIVES THE

Highest Efficiency of any Wheel in the World.

A MARVEL OF ENERGY AND POWER.

Over 600 in use on the Pacific Coast alone, aggregating upwards of 50,000 Horse Power.

It is not only most economical of water, but the most simple and reliable power for Quartz Mills, Compressors, Hoisting, Pumping, or any other purpose where water power can be used.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long distances with small loss, and it is now being extensively used in this way in all parts of the country for producing both light and power.

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Gold Mining Properties Bought, Sold and Developed.

Propositions from principals only entertained.

SAFE DEPOSIT BUILDING, ROOM No. 2

THE RUSSELL PROCESS COMP'Y.

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

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Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

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Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we fee confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

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Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
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Special attention paid to Examinations of Mines; Plans and Reports furnished.

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No imitation, no deception, no planished or rotten iron used. Only genuine Russia iron in Quartz Screens. Planished iron screens at nearly half my former rates.

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For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass Zinc and other metals punched for all uses.

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JOHN W. QUICK, Proprietor.

QUICKSILVER

For Sale in Lots to Suit by
PARROTT & CO.,
306 California St., San Francisco, Cal.

MARKET REPORTS.

Local Market.

SAN FRANCISCO May 9 1889.

General trade continues slow, as does business with iron-workers. The letting of the contract to the Union Iron Works for building one of the vessels for harbor defense, insures in connection with the regular wants the consumption of a large quantity of iron for the next year or two. Money is reported easy, with the banks meeting all legitimate requirements at a fairly low range of interest. The savings banks have a large surplus and offer lower rates of interest. Merchants report collections from the agricultural sections light, but free from mining districts. The imports of treasure by sea the past week are reported as follows: Coin, $32,061; Mexican dollars, 41,500: from Alaska, in bullion, $62,155: from Mazatlan a little over $200,000 in silver bullion. The coast mines are turning out more bullion: the increase is chiefly in gold.

SILVER—The market held up well throughout the week, with free buying for shipment by the steamer to leave to-morrow for China. The bulk of the business is reported to have been executed on the basis of 92¾@92⅝c. At the close, the market is very strong at 92⅜ to 92¼c quoted, with sales at the highest figures. The strength of the market is due to an improvement abroad, and India bids being allotted at an advance.

MEXICAN DOLLARS—The market is poorly supplied, but then the demand is light, owing to fewer Chinamen returning home. Sales made for export by the steamer leaving to-morrow are reported to have been made at from 73¼@73½c, according to quality. Some were placed at a slight advance on the outside quotations.

QUICKSILVER—The market is stronger, with a slight advance reported. Receipts the past week were as follows: Forty-five flasks, A. Abbey; 53, C. S. Neal; 702, Thos. Bell; 40, Haas Bros. Total, 820. The exports by sea were as follows: Three to Victoria, B. C., and 10 to Auckland.

BORAX—The market is quiet, but steady. Receipts the past week, 1707 barrels.

LIME—The market is steady, with a fair home trade reported. The shipments by sea only aggregated the past week 175 barrels. Receipts the past week aggregated 4004 barrels.

TIN—The market for tinplate on spot is very dull and heavy, with more sellers than buyers. For shipment, there is some inquiry, with buyers and sellers apart. Imports the past week were 170 boxes overland.

IRON—The market continues inactive and hard to quote for spot. To sell, lower prices would have to be submitted to, but to buy, full prices would have to be paid. The market abroad is very strong and active. Imports the past week were 300 tons of pig from Irondale, Puget Sound, and 500 tons from Leith.

COAL—Imports the past week were as follows: From Tacoma, 6470 tons: Seattle, 3474: Victoria, 753: Irondale, 200: Coos Bay, 860: Australia, 1358: Leith, 2000; total, 15,115 tons. The market is reported substantially unchanged for shipment since last week's advices, but for spot it is heavy for house, with a weak tone for other kinds. Large buyers are only tempted by concessions.

Eastern Metal Markets.

By Telegraph.

NEW YORK, May 9, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42 1-16	92	$14 25	$3 60	$20 40
Friday	42 1-16	92	13 75	3 75	20 35
Saturday	42 1-16	92	13 70	3 75	20 35
Monday	42½	92½	13 60	3 85	20 25
Tuesday	42⅝	92⅞	13 60	3 87½	20 20
Wednesday	42 9-16	92½	13 60	—	20 20

NEW YORK, May 9.—The copper conference held in Europe failed to adjust the future management of the depressing stock of Paris and London. The American delegates are returning. There are no definite rates here. Some lots of ingots are offered at 14@12¾c; casting brands, 12@12½c, free; 28,000 of the latter, 12c. Pig lead is steady, with a strong feeling. May, $4; August and September, $4@4 20; October, $4 25, with sales. Borax is steady at 8¾@9¾c refined and powdered, 7¾@8¼c concentrated. Quicksilver is in light demand. Sales at 57@58c. cases.

San Francisco Metal Market.

WHOLESALE.

THURSDAY May 9 1889.

ANTIMONY—	— @	14
BORAX—Refined	11@	11
Powdered	11@	11
Concentrated	— @	—
COPPER—		
Bolt	28 @	27
Sheathing	26 @	—
Ingot	17@	18½
Fine B. S. Sheets	— @	20
LEAD—Pig	4@	—
Bar	5@	—
Sheet	5@	—
Pipe	6@	—
Shot, discount 10% on 500 bags Drop, ₱ bag	1 45@	—
Buck, ₱ bag	1 65@	—
Chilled, do	1 85@	—
STEEL—English, ₱	16@	20
Cast on tool	8@	—
Black Diamond tool	17@	18
Pick and Hammer	8@	10
Machinery	4@	5
Tire, bolt	4@	—
TINPLATE—B. V. steel grade, 14x20, P. S.	4 85@	4 85
B. V. steel grade, 14x20, spot	4 75@	4 80
Carcoal, 14x20	6 50@	6 60
Charcoal, 14x20	5 75@	5 80
Pig tin, spot, ₱ lb	24@	25
do, do prompt shipment	23½@	—
QUICKSILVER—By the flask	— @	50
Flasks, new	1 05@	—
Flasks, old	85@	—
COPPER—English, ton spot	00 @	—
Do, 30 to 60 bbl	13 50@	13 75

IRON—	Spot.	To Load.
Glengarnock ton	— @ —	30 00
Eglinton, ton	29 00 @ —	29 00
Auchengaich, No. 1, ton	— @ 30 00	31 00
Original Pig, ton	— @ 28 00	—
Clay Lane White	— @ 24 50	—
Shotts, No. 1	28 50@29 00	—
Bar Iron base price ₱ lb	2½@ 3	—
Chrome iron ore, ₱ ton	— @10 00	—

Lumber.

Fine, Fir and Spruce.

	RETAIL.	WHOLESALE.
Rough Pine, merchantable, 40 ft	$19 00	$.....
41 to 50 ft	20 00	.....
51 to 60 ft	22 00	.....
61 to 70 ft	26 00	.....
1x8, fencing	21 00	.....
1x4, "	20 00	.....
1x3, 1x4 and 1x6, odd lengths	18 00	.....
Second quality	16 00	.....
Selected	28 00	.....
Clear, except for flooring	30 00	.....
Clear for flooring	1 00	.....
Clear V. G. No. 1 flooring	5 00	.....
Fir and spruce	13 00	.....
Dressed Pine, flooring, No. 1, 1x6	31 00	.....
No. 1, 1x4	33 00	.....
No. 1, 1¼x4, 1¼x6, and odd sizes	36 00	.....
All sizes, No. 2	26 00	.....
Stepping, No. 1	43 00	.....
Stepping, No. 2	33 00	.....
Ship timber and plank, rough	28 00	.....
Selected, planed 1 side, avge 40 ft	28 00	.....
" " 2 " " "	30 00	.....
" " 3 " " "	32 00	.....
" " 4 " " "	34 00	.....
Deck plank, rough, average 35 ft	34 00	.....
Dressed, average 35 feet	39 00	.....
Pickets, rough, B M	19 00	.....
1x1½, 4 ft long, ₱ M	5 50	.....

Coal.

TO LOAD

	Per Ton.		Per Ton.
Australian	$ 6 50 @ 7 00	Cardiff	9 50@10 00
Liverpool Steam	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	5 50 @ 6 00	Cumberland bk	16 00@16 50
Scotch Splint	5 00 @ 5 50	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	6 00
Seaton Splint	8 00	Seattle	6 00
West Hartley	10 00	Coos Bay	5 00
Greta	8 00	Cannel	10 00
Westminster Brymbo	8 00	Egg, hard	17 00
Nanaimo	9 00	Cumberland, in sacks	18 50
Sydney	$ 8 00	do, bulk	17 50

Mining Share Market.

Trading in Comstock stocks the past week was quite active, the first four days under an upward movement in Belcher due to a report of having run into ore. The move was so quick that few got out stock at the advance. Tuesday and yesterday Wednesday the market was heavy, and at times had the appearance of going to pieces, but did not, owing to a few well-directed bids. A slight recovery set in only to be followed by another sagging in values. Those in position to know, look for more active movements, based on the nature of the work going on in the leading mines of each group. While expecting this, they do not think that much ore will be uncovered, but a large number of assessments are sure to be run into before long. This latter opinion is confirmed by the monthly financial statement of the mines given below. In outside stocks the Tuscaroras have hung heavy, with lower prices except for Commonwealth. The Quijotoas were inactive, but fairly steady. The Bodies had another of their cat-like moves. There is a growing impression that the moves are made to put out stock ready for more assessments, probably in June. Of course, ore must be found to make it a success.

A gentleman who is well versed in mining affairs and withal a practical miner, has just returned from the Comstocks. He reports having inspected the Hale and Norcross mine, and says that the stock ought to command more money, judging from the extent and richness of the ore deposits. He also expresses himself favorably impressed with the joint Hale and Norcross and Savage crosscut.

Crown Point took out last month about $54,000 in bullion, and Con. Virginia a little over $207,000.

The following companies report having had balances on hand May 1, 1889: Con. California and Virginia $103,064.50 in cash and $133,378.71 in unsold bullion, with further shipments to be received. Occidental, $2233.68; Alpha Con., $10,164.90; Exchequer, $1919.95; Utah Con., $15,226.23; Locomotive, $224.64; Hale and Norcross, $5 1907.02; Gould and Curry, $2201.09; Mexican, $14,790.64; Andes, $7097.77; Sierra Nevada, $9654.83; Lady Washington, $23,170.18; Alta, $56 535.01; Silver King, $58,477.92; Peer, $1239.44; Crocker, $3427.90; Peerless, $7275 66; Mono, $25,985.21; Bodie Con., $38,210.74; Bullion, $21,605.44; Belcher, $16,372.59; Con. Imperial, $12,983.43; Navajo, $11,249.34, with bullion valued at $10 000 in transit: Independence, $1693.09; Standard Con., $5563.47; Caledonia, $10,222 34; Confidence, $61,659 94: Overman, $11,595.12; Benton Con., $94,472 82; Eureka Con., $4184.99; Julia, $5747.85: Justice, $6451.25 in cash and $5822 in unsold bullion: Scorpion, $6200.65: St. Louis, $2689 65; Syndicate, $8322.71: and Union Con., $3301.70.

The following companies report having had an indebtedness on hand May 1, 1889: Seg. Belcher, $17,357.47: Con. New York, $6691.48: Nevada Queen, $54,812.51, but bullion of the net value of $12,588 51 has been received since May 1st as a partial offset; Commonwealth, $70,799.85; Challar, $14,327.66; Potosi, $37,838 20; Bulwer Con., $1510.83; Best and Belcher, $7331.36; Weldon, $626.30; Holmes, $4002 48; Ophir, $2251.71; Savage, $21,125.28; Crown Point, $15 745; Grand Prize, $26,051.01; Challenge Con., $5680.20; North Belle Isle, $14,252.71; Belle Isle, $5617.21; North Commonwealth, $24,303.69; Del Monte, $6673.97; Kentuck, $2015.31.

The stock market opened to-day Thursday weak and low, advanced in the informa. session, but as noon approached weakened off under light business.

Sales at San Francisco Stock Exchange.

THURSDAY, May 2, 9:30 A. M.

500	Alta	50	N Belle Is
100	Andes	200	Nev. Queen
100	Belcher	100	Overman
100	Challenge	50	Opeir
500	Chollar	200	Potosi
100	Crocker	100	Peerless
400	Commonwealth	500	Savage
100	Crown Point	200	Scorpion
40	Con Va & Cal	200	S. B. & M
170	Exchequer	100	Sierra Nevada
100	Grand Prize	50	Silver Hill
150	Gould & Curry	100	Utah
100	Hale & Nor	550	Union
350	Meriean	250	W Comstock
350	Mono	150	Yellow Jacket
100	Navajo		

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELIN'T.	SALE.	SECRETARY.	PLACE OF BUSINESS
Belle Isle M Co	Nevada	12	10	Apr 19	May 23	June 13	J W Pew	310 Pine St
Bodie Con M Co	California	10	50	Mar 25	Apr 30	June 4	B L Burling	309 Montgomery St
Buena Vista Petroleum Co	California	34	50	Apr 24	May 30	June 27	J Monzio	325 Montgomery St
Bulwer Con M Co	California	5	25	Apr 10	May 15	June 12	L Osborn	309 Montgomery St
Calaveras Blue Gravel M Co	Cal	2	05	Mar 28	Apr 30	May 27	B Burris	240 Montgomery St
Eureka Con M Co	Nevada	11	50	Mar 19	Apr 27	May 29	H P Bush	306 Pine St
Exchequer M Co	Nevada	27	25	Apr 2	May 7	May 28	C E Elliott	309 Montgomery St
Found Treasure M Co	Nevada	5	12½	Apr 10	May 16	June 6	J Stadfeld Jr	309 Montgomery St
Gould & Curry M Co	Nevada	62	30	May 1	June 5	June 27	A K Dustrou	309 Montgomery St
Gray Eagle M Co	California	12	05	Mar 19	Apr 23	May 14	O H Bogart	327 Pine St
Grand Prize M Co	Nevada	20	30	Mar 15	Apr 30	May 13	R R Grayson	327 Pine St
Kentuck M Co	Nevada	13	30	Apr 26	May 29	June 19	J W Pew	310 Pine St
Los Putos Coal, Iron & Manf Co	Cal	1	1½	Mar 25	Apr 30	May 20	W C Stedfeld	309 Montgomery St
Locomotive M Co	Arizona	4	50	Apr 25	May 29	June 18	A H Fish	309 Montgomery St
North Commonwealth M Co	Nevada	2	30	Apr 3	May 8	May 30	J W Pew	310 Pine St
Occidental Cons M Co	Nevada	4	50	Apr 8	May 13	June 5	A K Dustron	309 Montgomery St
Oak Con M Co	California	2	3	Mar 29	May 25	June 20	E J Ryan	220 Montgomery St
Peerless M Co	Arizona	12	25	Mar 25	Apr 26	May 21	A Waterman	309 Montgomery St
Pinal Con M Co	Arizona	8	13	Apr 13	May 20	June 12	A Chemlinant	328 Montgomery St
Potosi M Co	Nevada	32	50	Apr 10	May 15	June 5	C E Elliott	309 Montgomery St
San Francisco Copper Co	California	3	10	Mar 18	Apr 23	May 21	G Ruegg	405 California St
Silver Hill M Co	Nevada	24	20	Apr 20	May 23	June 13	D C Estes	309 Montgomery St
Sierra Union M Co	California	1	1½	00	Apr 10	May 13	W Y White	218 Sansome St
Trinity Riv Tun & M Co	California	1	7	1-2c	Apr 11	May 24	June 13	L H Parkman
Taylor M & M Co	California	17	3	00	Mar 30	May 1	May 18	A E Ball
Yellow Jacket M Co	Nevada	45	50	Mar 28	May 1	June 1	W H Blauvelt	Gold Hill

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
California Slate Co	California	J O Hanscom	9 Mission St	Annual	May 21
Christy M Co	Utah	G R Spinney	310 Pine St	Annual	May 20
Liv. Oak Drift Gravel M Co	California	J Monzio	328 Montgomery St	Annual	May 20
Mohaw Gravel M Co		G R Spinney	310 Pine St	Annual	May 22
P and P Con M Co		J W Pew	310 Pine St	Annual	May 16
Piedmont M Co		J J Scoville	309 Montgomery St	Annual	May 15

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M Co	Nevada	A S Chemlinant	328 Montgomery St	03	Apr 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Apr. 17	WEEK ENDING Apr. 24	WEEK ENDING May 1	WEEK ENDING May. 8.
Alpha	1.85 1.95	2.00 2.75	1.90 2.25	1.90 2 30
Alta	2.00 2.10	2.00 2.60	2.00 2.10	1.75 2.00
Andes	.70 .85	.85 1.10	.80 .90	.75 .80
Argenta	.06 .06			
Bechler	3.15 3.50	3.45 5.00	3.50 4.40	3.75 6.25
Best & Belcher	3.90 4.50	4.25 6.00	3.90 4.40	3.15 4.20
Bullion	.70 .80	.80 1.30	.80 1.05	.90 .95
Baltimore	.25 .30	.30 .35	.25 .30	
Belle Isle		.20	.20	
Bodie Con	1.05 1.10	1.10 1.45	1.60 1.80	1.75 2.00
Benton	3.00	3.00		
Bodie Tunnel				
Bulwer	.20 .30	.30 .35	.30 .35	.30 .35
Commonwealth		5.00	5.50	5.25 5.50
Con. Va. & Cal	5.25 5.00	5.75 6.00	5.25 5.00	5.25 5.50
Challenge	3.00 3.80	3.80 3.80	4.00 3.25	4.25
Chollar	1.95 2.75	2.30 3.50	2.00 2.85	2.35 3.30
Confidence	11 11	10 11	10 11	5.50 10.00
Con. Imperial	.55 .60	.65 .80	.65 .75	.80 .70
Caledonia	.30 .33	.35 .40	.35 .40	.35 .40
Con. Pacific				
Crown Point	3.75 4.05	4.00 5.25	4.00 4.65	3.80 4.25
Crocker	.45 .55	.50 .60	.50 .65	.55
Central	.20			
Dudley		.30 .30	.30 .30	.25 .30
East B. & B				
Eureka Con	1.10 1.20	1.30 2.50	2.00 3.00	2.00
Exchequer	.70 .75	1.10 1.70	.85 1.65	1.10
Grand Prize	.70 1.00	.80 1.00	.75 .85	.70 .80
Gould & Curry	2.20 2.60	2.60 3.80	2.55 2.90	2.35 2.60
Hale & Norcross	4.10 4.45	4.30 5.25	4.45 4.90	4.50 5.00
Holmes				
Independence				
Iowa				
Julia	.25 .35	.30 .45	.25 .35	
Justice	1.10 1.25	1.20 1.70	1.35 1.40	1.25 1.40
Kentuck	.50 1.00	2.30 1.65	1.75 1.45	2.10
Lady Wash	.35	.40	.40 .30	.35
Locomotive		.10		.10
Martin White				
Mono	.90 1.25	1.40 1.55	1.50 1.75	1.75 1.65
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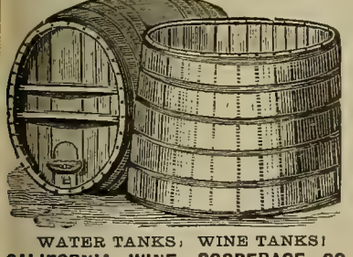

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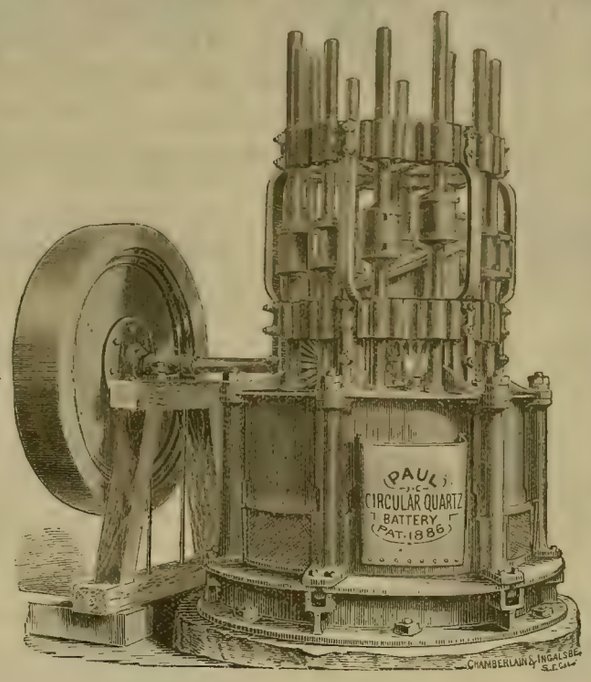

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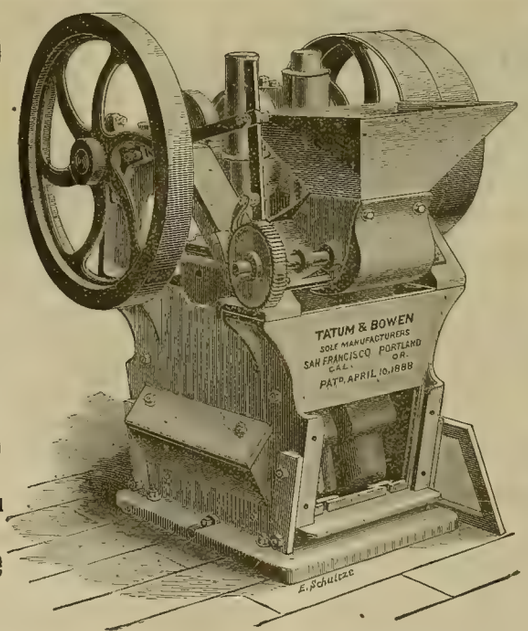

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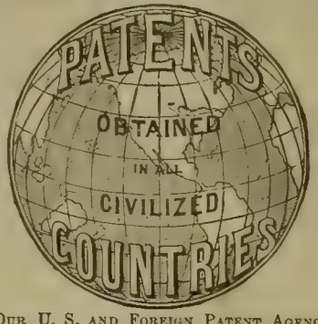

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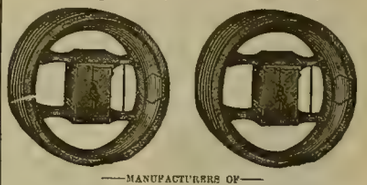

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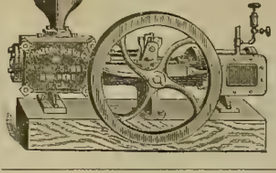

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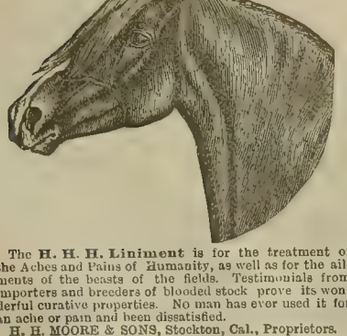

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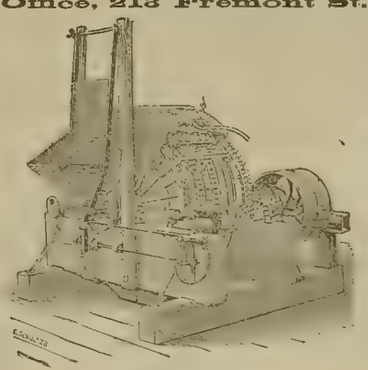

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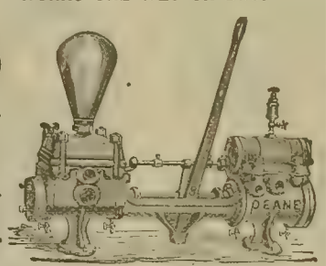

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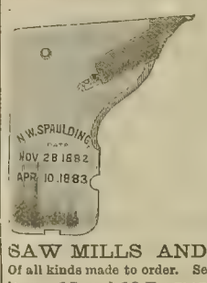

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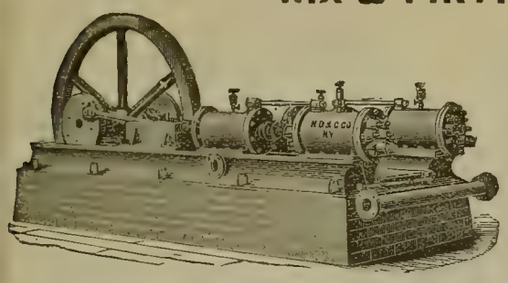

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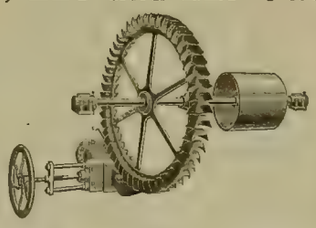

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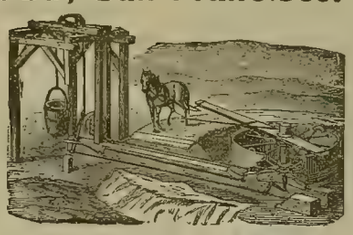

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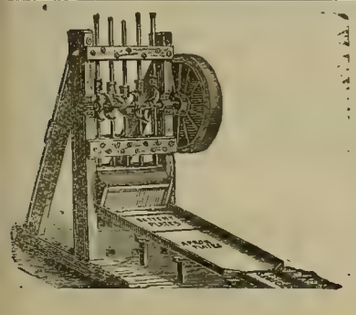

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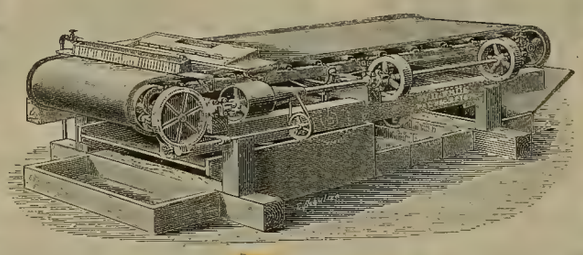

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N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

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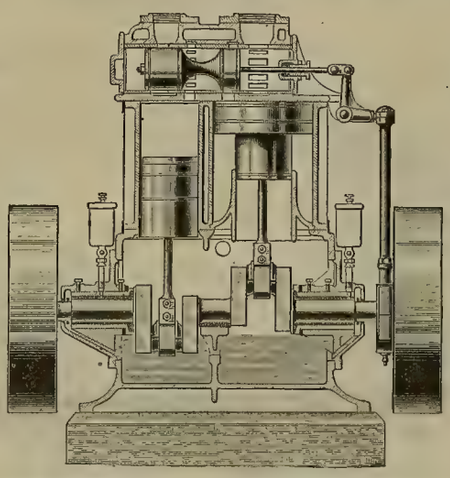

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

TWENTY-PAGE EDITION.

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Tuolumne County.

Considerable space in the PRESS this week is devoted to consideration of mines in Tuolumne county. On this page is given a photo-facsimile of Sonora, the county seat and the principal town of Tuolumne. Here, at an altitude of about 1900 feet, is located the famous bonanza mine which is fully described in another column. Tuolumne is famous for its "pocket mining" and a considerable part of the prosperity of Sonora is due to this branch of mining. A prominent example of a pocket mine is illustrated and described on another page.

Tuolumne county is bounded on the northwest by Calaveras; on the northeast by Alpine and Mono; on the south by Mariposa, and on the southwest by Stanislaus. The following paragraph concerning the county is taken from the last report of the State Mineralogist:

Like most of the counties lying along the main gold belt, Tuolumne covers a portion of the foothills and the westerly slope of the Sierra Nevada, giving to the whole county a rugged surface, and to the eastern portion of it a considerable altitude. In the Sierra Nevada, on the confines of this and Mono county, stands Mt. Dana, 13,227 feet high, with Castle peak, a little further north, and nearly as high. A remarkable feature in the topography and geology of this county is the basaltic mesa, known as Table mountain, which, running near and parallel with its northwestern boundary, extends for a distance of nearly 30 miles. This formation consists of a lava flow, which, having filled the channel of an ancient river, stands now, through the degradation of the adjacent country, an isolated mass, its top nearly level and its sides nearly perpendicular, the former more than 2000 feet above the bed of the Stanislaus which breaks through it.

Flowing through this county in a westerly direction is the Tuolumne river with its three forks, also the three forks of the Stanislaus, all large streams, the main Stanislaus and its north fork forming in part the boundary between this and Calaveras county. As these several rivers have many confluents, some of them considerable streams, this becomes a well-watered county. About the sources of the Tuolumne river are many small lakes, some very deep, and all remarkable for the purity of their water. As Tuolumne is well supplied with water, so is it also abundantly timbered, the more elevated portions of it being covere with pine, fir, spruce and cedar, and the lowest portions with scrub pine and oak. While gold mining continues to be in the county the leading industry, farming, viticulture, fruit-growing, lumbering and stock-raising are here important and growing pursuits, many of the inhabitants dividing their time between these vocations and mining.

SONORA, THE COUNTY SEAT OF TUOLUMNE COUNTY.

OWNERS of Six-mile canyon blanket sluices are making fair wages in concentrating the sulphurets contained in tailings flowing from the Nevada mill, now that its full complement of 60 stamps are dropping.

THE new mill, concentrators, etc., belonging to H. M. Van Name, Big Bug district, Arizona, were destroyed by fire last week.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

The Mines of Tuolumne County.

A History and Description of Prominent Claims.

[Written for the PRESS.]

Tuolumne county's history dates back to the summer of '48, when a party of Philadelphians began mining at Woods Creek, the pioneers being Rev. James Wood, James Savage, J. H. Rider and Charles Bassett. Following them came the Mexicans, and soon after the '49ers. Jamestown was first settled; then came Tuttletown, and in rapid succession the other well-known camps of the county. While the placers were the magnet that drew the miners by the thousands to this rich field, the quartz mines attracted attention at the earliest date by reason of their richness, the quartz yielding $100 to $300 a day per man by simply pounding it up in a mortar.

The record of the early days, with its high prices, deep drinking, heavy gambling, big strikes, frequent shootings, has passed into history, showing that "Old Tuolumne" was at the head of the swim.

Columbia.

This was first called American Camp. The diggings were discovered in March, 1850. The "Hildreth Diggings" attracted attention, and miners poured in from every point. The first miner, Capt. Arent, realized two and a half-pounds of gold from his first day's work. Thirty days after discovery 6000 men had struck camp. Then followed the famous "Foreign Miners' tax" of $20 a month, the effects of which were as surprising to those securing it as the passage of the Chinese Exclusion Act is to-day. The foreigners left in a body, and as they constituted the greater portion of the population, the diggings wore a deserted air, but the proven richness of this vast extent of placer ground soon drew a large mining community, who, seeing the need of a liberal water supply, incorporated the Tuolumne Water Co. and brought water into Columbia in May, '52. With this new stimulus the camp grew apace. Miners realized from $5 to $1500 a day per man. The fire of '54 left but little of the old camp, consuming a half-million of property.

Such was Columbia then, but "the days of gold, the days of old, the days of '49," have left little else save their history for Columbia. The population which once thronged its streets has long since departed, and the old stores and other evidences of past prosperity are but the relics of bygone days. Sonora now claims the prestige and Columbia has settled down to be a quiet mining town of a few hundred inhabitants. That Columbia will always remain as now is not to be believed, for it must be but a question of time until her numerous quartz ledges will attract the needed capital to develop and work them, when the town will awake from her Rip Van Winkle sleep.

Of the mines in this vicinity the following deserve examination: The Wine Spring, the property of Mr. Geo. F. McPherson, has a 2½-foot vein of quartz of the value of $20 a ton and sulphurets giving, when concentrated, $2000 a ton. No more beautiful site for a home and mine could be selected. Far below winds the Stanislaus, like a thread of silver in the distance, while the rugged hills stand out in bold relief on the opposite river-bank. While Mr. M. does not claim to be a rancher, his business tact enables him to realize $6000 a year from the surface of the soil in the sale of fruits, wines and farm products. His nine-stamp mill is hung up for the present. The Gem mine, Geo. Morgan superintendent, has a 10-stamp mill, on a 2½-foot ledge developed 100 feet, yielding $10 a ton by mill process. The Riverside mine has been in operation for 30 years, is developed 400 feet in depth, and keeps 20 stamps dropping steadily on its ores. The Shanghai, intersected by the Morgan, is a mine of good reputation. The old Shanghai carries a 2½-foot ledge of $16 rock, which has been developed to a depth of 250 feet. An excess of water made it necessary to drive a drain tunnel on the Morgan, which is now in 900 feet and will cut the Shanghai 300 feet deep; but as the vein pitches rapidly gives 400 feet of backs. As the tunnel is driven on the Morgan lode, the work shows up a big amount of reserves. Mr. Geo. Morgan is the fortunate owner of this property and invites capital to inspect it.

The Star mine of Mr. F. McPherson, a 2½-foot ledge cut 200 feet deep by a 300-foot tunnel, with a record of $100,000 in past workings, will bear investigation, as the rock taken out in the last workings, by its large amount of visible free gold, gives evidence.

Mr. Neubamen's Tiger mine and the Ham and Barney mine promise well. The latter will soon be put in operation by an English company. The Lavi, R. C. Davis superintendent, is opened by tunnel and drift 950 feet long, showing a five-foot ledge of $20 rock. The Experimental mine, which in the early days yielded 50 cents to $2 a pound, is now opened by an incline shaft 400 feet deep on the vein and by three tunnels of 150 to 200 feet. The vein shows an average of three feet; 15 men are employed, and the ten-stamp mill runs steadily on $5 rock. The Black Hawk plumbago mine of Mr Geo. Morgan is a deposit which has been cross-cut 100 feet. Four tons shipped to Liverpool sold for £4 a ton.

Sonora.

On the 7th of November, 1849, the citizens of Sonora met and organized a town government, the population at that time being 5000. Sonora was as famous in her early as she is in her present history in the production of large amounts of gold. In the history of Tuolumne, we find in 1850 nuggets of 23 pounds 2 ounces; 1851, chispes of 28 pounds 4 ounces; 1852, $1100; 1853, $1500; 1854, 16½ pounds; 1855, 30 pounds; while the past 30 days has seen $120,000 come out of the Bonanza mine as the result of the labor of six men, making the present equal to the past.

Within the city limits is the San Giuseppa mine, the property of Mr. F. Sutton. This property is somewhat noted from the fact that the gold is 9.88 fine, which is exceptional. The mine is opened by a shaft 130 feet deep, showing a 12-inch vein of sulphuret ore of $50 value. By the present method of roasting and arastra, but $35 a ton is saved.

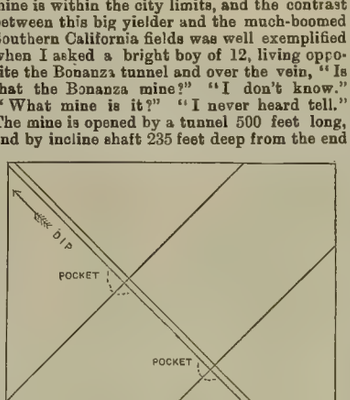
The Golden Gate is opened by a 250-foot shaft, opening up a three to eight-foot ledge of rock running from $10 to $22 per ton, the concentrated sulphurets yielding from $2000 to $6000 a ton. About 1500 tons have been extracted to date from the 300-foot chute. The Neil mine is opened by 1500 feet of tunnel and crosscut showing a two-foot vein of pocket and milling rock.

This property yielded in early days pockets from $30,000 to $60,000. The present work is intended to undercut the old line of pockets, when Mr. Neil expects to give the Bonanza boys a neck-and-neck race. Mr. Neil is also superintendent of the Monitor.

The Mt. Vernon ore running from $40 to $500 a ton, these properties will be started up the coming month by McKee & Co. of San Francisco. The Bull Pen is now down 250 feet on incline, and will crosscut the Bonanza vein. Ferguson & Smith are down 250 feet on incline immediately over the Bonanza, on a parallel vein. Drake & Cody are drifting on the south extension of the Bonanza, with telluride ore coming in, and are hopeful and expecting soon to reach a "bonanza."

The Bonanza.

This mine is now the center of attraction, having yielded within the past month as the product of six men's labor as follows: Feb. 17, 1889, $17 295 57; Feb. 21st, $40,295.42; Feb. 25th, $26,507.15; March 18th, $27,977.28; March 20th, $8000. Total, $120.075.42. This is all in free gold, besides a large amount of tellurium ore running according to Mr. Lou's Blanding's workings, $145,000 to the ton. In February one mass of gold was extracted which it was necessary to cut into three pieces to take it out handily, which gave $17,000, $12,000 and $10,000, or $39,000 as one nugget. The mine is within the city limits, and the contrast between this big yielder and the much-boomed Southern California fields was well exemplified when I asked a bright boy of 12, living opposite the Bonanza tunnel and over the vein, "Is that the Bonanza mine?" "I don't know." "What mine is it?" "I never heard tell." The mine is opened by a tunnel 500 feet long, and by incline shaft 235 feet deep from the end



of tunnel. The vein is about eight feet in width and is composed of porphyritic granite, with small stringers of quartz running near each wall and through the center on the course of the vein. The vein is traversed nearly horizontal by small seams stained with oxide of iron, called gold seams. At the crossing of these gold seams and the quartz stringers, the pockets are found. The present lessees confine their operations to the footwall and that section of the vein having metallic slate for walls. This mine has been operated irregularly since 1850, yielding in the neighborhood of $1,000,000. It was not until the present lessees, with one of their number, Mr. Oliver, an old resident miner in charge, that the working was got down to a system. At present the owners feel as confident of the future as they have reason to be jubilant over the past; but as Charlie Fitch expressed it, "Their luck hasn't spoiled them a bit." The lessees and men employed about the mine are all of that class that have the good wishes of the people of the town. That the coming months will give an income equal to that of the past is confidently believed by every one familiar with this most wonderful gold deposit of which all Tuolumne county is justly proud.

Bald Mountain Pocket Mines.

Within sight of Sonora are the numerous pocket mines on Bald Mountain. Here the pockets occur at the "crossings," as the miners term them; that is, where one vein crosses another, the gold usually being found on the footwall. A pocket ledge is sunk on by incline shaft until another quartz vein coming down through the slate cuts or crosses the vein, when a drift is run following the junction of the two veins.

Of the mines now in operation, the following is their yield in pockets to date:

Wilson mine	$ 75,000
Garrett mine	200,000
Austrian mine	80,000
Ford mine	100,000
Sugarman mine	80,000
Total	$535,000

Mr. Stewart of the Wilson is confident that "Old Baldy" has only given a foretaste of her mineral contents, and, with the other mines, is energetically driving ahead. "Hope springs eternal in the human breast" might well be changed to "Pocket mines' breast." Day after day, year after year, they delve away, hoping each day that the morrow will see them in bonanza. May they meet with the success they so fully deserve for their faith and labor.

Hyde Mines and Ranch.

This property is within seven miles of Sonora and 1½ miles of Soulsbyville. The mines are on the same vein as the Eureka Con. at Summerville. The mine is called the Golden Treasure, and consists of three parallel veins, which are cut at right angles by two intersecting veins.

On the crosscutting veins but little has been done to prove their character, but the croppings look fully as good as those of the other veins. A shaft 400 feet has been sunk on the center vein and drifts run at each 100 feet. The bottom drift shows a vein 26 feet wide at the end of the 210-foot drift, going $8 to the ton. The south end is four feet in width at the end of the 212-foot drift, quartz going $10 to the ton. The east and west veins are opened by separate shafts and tunnels. The ore being milled at the time of my visit yielded $18 a ton, and came from the east vein. The three veins are all within 75 feet of each other and are evidently one in depth. The mine is equipped with good steam-hoist and pump, Huntington mill and Victor concentrators. The rock mills exceedingly easy, the Huntington crushing 25 tons a day (24 hours). The mine has its own water for milling purposes. Water for power can be obtained free by piping one mile and 350 feet of fall obtained; or 1200 feet of fall can be secured by piping two miles and tapping the Tuolumne water ditch. About 1500 tons of quartz have been milled to date, leaving the stopes practically untouched. The mine takes in a ranch of 320 acres of exceptionally fine land most favorably located, while the "bottoms" are filled with pay gravel; some $1500 taken from a small gulch 300 feet in length gives sufficient "color" to this fact.

Within sight of the house is a fall of 200 feet, adding, if it were needed, the one element wanting to make farm-mining life on the Hyde property as pleasant as it is profitable.

Soulsbyville.

The Soulsby, W. Sherwood owner, was discovered in 1856, yielding up to date about 100,000 tons of rock of an average value of $35 per ton. The vein is opened by an 800-foot shaft on the 16-inch vein. The mine is equipped with a fine hoist and 10-stamp mill. The machinery in use is largely of the invention of the present owner of the property, and cannot but strike the visitor favorably in its strength, simplicity, absence of all unnecessary expense, and the effective manner in which it does its work. Mr. Sherwood's automatic brake is a feature which alone will pay for a visit of inspection. The mills and hoists erected by Mr. Sherwood for other mines are all that can be desired, and the owners congratulate themselves on their cheapness and general merit. The ores of the Soulsby mine are largely sulphuret. The quartz after crushing flows over battery plates, then on to Morris canvas tables, and the concentrates from the tables through settling-tanks, thus cheaply and effectually saving almost all of the gold. The sulphurets on the mine exceed $40,000 in value at this time. Mr. Sherwood is desirous of enlisting additional capital to open up known ore reserves and continue the mine in its old-time prosperity.

Parallel with the Soulsby is the Wheel & Perrin lode, which is now being opened by San Francisco parties. The ore will be worked in the Soulsby mill. This vein of 10 inches has been prospected to a depth of 110 feet, giving $54 to $60 to the ton.

Blatt & Gilson.

This property is owned by fortunate San Francisco merchants, with Mr. A. Trittenbach as superintendent. Their shaft is now down 200 feet on a two-foot vein, with a drift 425 feet long on the ore chute. The ore is free sulphuret, going from $5 to $60 a ton. Their 10-stamp mill has just been completed. The Gates rock-breaker is in use at this mill.

At the Hyde mines the Victor concentrators are condemned by the old amalgamator because "the concentrates have to work through a pinhole, which is all the time clogging, and the thing wants some one pottering at it all the time." Some of the concentrates were very clean, others are half sand. I am informed that the Victor is now free from these objections by reason of recent improvements.

Black Oak.

W. P. Scott is manager of the St. Louis Co. Their ore is of the same character as all of the mines of Soulsbyville, and carries about six per cent of sulphurets, which, when concentrated, give $150 to the ton, the mine yielding 20 tons of concentrates a month. The mine is opened by two shafts of 250 feet each on the three-foot vein of quartz running from $10 to $60 to the ton. The mill and mine are equipped with both steam and water power in every department, so that in the failure of one the other can be brought into use. The mill has ten stamps, six Frues and four Morris canvas tables. W. T. Coleman has purchased the extension of the Black Oak and is having it opened by shaft.

Cherokee.

The Lotta is opened by an 80-foot shaft and a 6 to 18 inch vein of rich rock, and is the property of Mr. N. Symons, whose modesty forbid us giving any further details. The ten-stamp mill of the North Star is way up.

East of Soulsbyville is the Independent, opened by 300-foot shaft on an 18-inch vein of $17 to $25 rock. The Draper has a 200-foot shaft on 15-inch vein of $30 rock. This is the property of Mr. John Leechman, who is also the owner of the Grizzly, 11 miles northeast of Sonora. This ledge is opened by a 40-foot shaft with levels 300 to 400 feet run on the four-foot ledge of $13 rock. The 20 stamp mill of this property was burned down last season.

The Buchanan mine is 28 miles northeast of Sonora. The vein is opened to 700-foot level by two shafts and tunnels, showing a vein of an average width of five feet. The mine is equipped with a 20-stamp mill and eight Frues. The sulphurets, which go from $100 to $250 a ton, are treated by the company's chlorination works.

Summerville.

The Con. Eureka—better known as the Dead Horse—is now the property of Messrs. Hayward & Hobart. The shaft is now down 700 feet on a 4-foot ledge of $6 rock. The 20-stamp mill and Frues are run by water-power of 600-foot pressure. The New Albany, the property of Dr. Jno. Walker of Sonora, is opened by shaft and tunnel to a depth of 800 feet on a 10-foot ledge of $8 25 rock, and has a 10-stamp mill. A recent crosscut on this vein shows up remarkably rich rock, and the doctor in consequence is open for congratulations, but declares "not for sale."

Quartz Mountain

Is one and a half miles south of Jimtown. The Heslep has been worked for 30 years. Ore is now coming from the 450-foot level, where the ledge is 12 feet in width of ore at this time, running $3 to the ton. The mine is equipped with hoist and 25-stamp mill run by water-power. The vein matter is mineralized slate, being parallel with and but a few feet from the "mother lode."

Whisky Hill

Is near Jimtown. The mines on this hill are upon the mother lode, but are all working on parallel strata of mineralized slate within 50 to 150 feet of the main vein.

The Gem mine, a six-foot ledge of $6 rock, is opened 150 feet by tunnel. It is equipped with 10-stamp mill run by water-power. The rock is mined and milled for $2 a ton. W. N. Harris is owner.

The Alabama is owned by Harris & Bell, and is in litigation. There is a 40-stamp mill now idle. There is a 7-foot vein of $4 rock.

Crystalline is opened by tunnel and crosscut 70 feet long, showing a 40-foot vein of $2 rock. The mine is equipped with 15-stamp mill run by water-power. The ore is mined and milled for $1 a ton, and they crush three to four tons to stamp in 24 hours.

Jimtown.

The Bonanza mine of J. Pereria has yielded $20,000 in pockets and is doing well now. The mother lode crosses Mr. Pereria's ranch and has been prospected across its width, showing 11 veins 3 to 40 feet in width, going from $3.50 to $5.50 a ton. This property is about sold to an English company, as are his Peoria gravel mines on Table Mountain, the latter being a tract of 528 acres of gravel deposit averaging 36½ cents to the cubic foot, where prospected. Its bottom has never been even reached.

Tuttletown.

The Patterson mill is running its 20 stamps on custom rock, the mine being shut down.

Chinese Camp.

Mr. Moffitt is waiting for the Stanislaus river to lower, when he will renew his river mining.

Tioga district, near the Mono county line, has recently interested Mr. Geo. Hearst in the mines of that section and the future is reported as promising.

The Tuolumne Water Co. and Woods creek ditch supply the mines with water at prices ranging from 5 to 15 cents an inch for 24 hours. Miners' wages in the county are $3 a day. Sonora is distant from Milton 35 miles and Oakdale 38 miles. Freight comes via Oakdale and passengers by way of Milton; the headquarters for all mining and smelting men being at that excellent hotel "The City," in Sonora.

The reader who has followed me through this article must see that Tuolumne is rich in mineral. Of her agricultural resources I have not space here to write; suffice it that no mountain county can excel it.

In Sonora

The county has a town affording every requisite to make life pleasant. There are fine residences, large stores, hotels, schools and churches, with a population ever ready to wel-

come the visitor and afford him every opportunity to gain all the knowledge desired of the county's resources. The photograph sent herewith gives a good general view of the town. (See page 353 for photo facsimile.) The county is fortunate in her newspapers, the *Independent Democrat* and *Banner*. Taking the county as a whole, she may boast of being the equal of any of the mountain counties. A visit to "old Tuolumne" will be both pleasant and profitable to miner or investing capitalist in search of mines. E. H SCHAEFFLE.

The Divol Bonanza.

Pocket Mining in Tuolumne County.

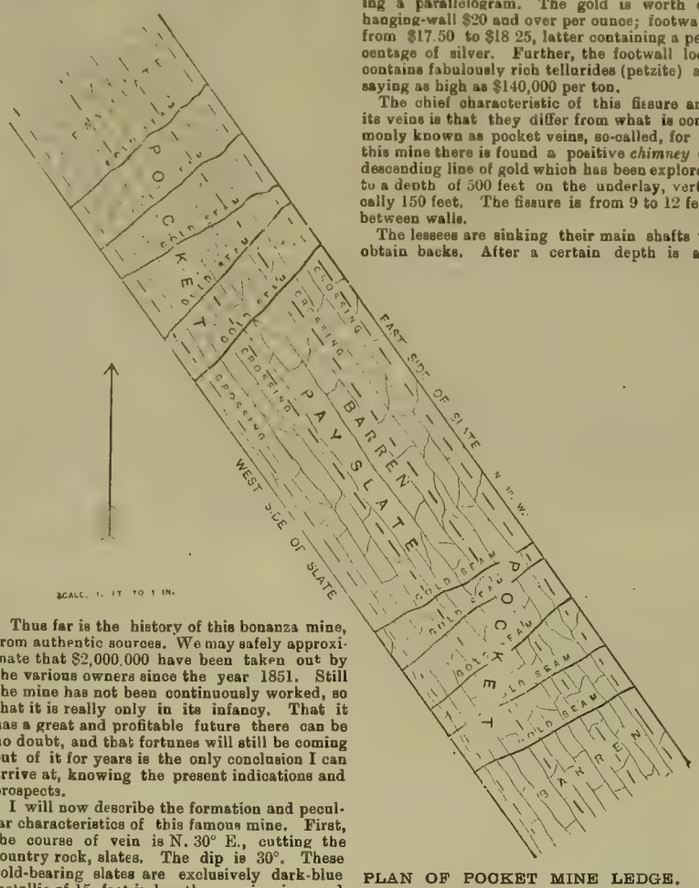
[Written for the PRESS by Abouta.]

A brief and correct description of this wonderfully rich mine at Sonora, Tuolumne county, will doubtless be read with interest by many of your subscribers, for it has, of late, become quite a topic of conversation, and the wonderment by mining men and others, for its apparently inexhaustible richness in the great productiveness of its golden resources. It may be best to first give its early history, from its inception, dating back to 1851, the date of the first discovery by Chilians. They mined the gulch, now the main street of Sonora, following up the denuded quartz and detritus, being in alluvium form, which by time and erosion of the quartz veins above had then filled up the gulch. Working upward to the hillside, they discovered the croppings of the vein, which was found immensely rich. They coyoted and gouged around and took out all that was in sight. Naturally the find created great excitement among the eager miners, who rushed there and would have dispossessed them of their claim had not they (the Chilians) taken in as partners two Americans. In short, the whole party was made rich, and thinking they had worked out the claim, sold out to an English company, who in their turn unearthed considerably more gold; they sold it or left it. Then a party of Mexicans became the owners. We have data that they took out $50,000 and left, or sold to Messrs. Edwards and Sexton. The latter were not very successful, and gladly disposed of the claim to Messrs. Clarke and Joe Bray, who worked it for nearly two years without getting very much pay, but being most indefatigable miners stayed with it; having good prospects of free gold to the pan, they made a strike in sinking and drifting of a few thousand dollars. By this time they began to determine the course of the chute or chimney, and kept following down on the crossings by sinking. Eventually they struck a bonanza. About this time James Divol became directly interested, he being at the time a partner of Joe Bray in other undertakings and now joined forces.

The three up to 1882 took out over a million dollars, and all extracted from the hanging-wall of the vein. After this date Clarke and Bray sold out to Divol; hence his name to the mine became as familiar as household words in the county. Divol now worked it alone, under the superintendency of Bray, taking out over $100,000 in a very short time. The mine became wet and somewhat expensive to work, which necessitated a steam hoist and pump. The machinery not being efficient, but only a makeshift, did not accomplish much. Divol sublet to Colby, another old pocket miner, who had been very successful on the same vein north of the Bonanza. In this case, however, his lease was not a success pecuniarily, although he was so near to a rich deposit that he actually set the foot of one of the timbers on a slab of gold of great value without discovering its proximity, and it was found lately by the present lessees, with the identical timber in question resting on its golden base. Divol again retook possession, and became associated with two gentlemen from San Francisco as partners, for certain stipulations, one of which was to put in a crosscut to drain the mine from the Creek level; that is, the adit tunnel, through which the mine is worked to-day. This tunnel was in a sense a failure, as it did not drain the mine by nearly 200 feet of bottom of incline shaft, where Colby left it full of water. This discouraged the owners and the mine was shut down till reopened by the present lessees.

But I must not forget to mention that before this a most expensive lawsuit occurred on some technical point in reference to boundaries. The case was ably defended on both sides by the best lawyers, Divol gaining the suit. Foremost among his attorneys was Judge E. A. Rodgers of Sonora, who not only won the case for his friend and client, but obtained subsequently a share for himself in this valuable mine. Rodgers proudly owns in the mine today, a testifying monument of his legal acumen and forethought.

We now have to speak of the mine under the tenure of Messrs. Dart, Oliver & Johnson, who went vigorously to work above water level and opened up the footwall vein, then unexplored ground. They reasoned that, as the gold had been so rich on the hanging-wall, the same line should be found in the lower vein. Facts proved the correctness of their theories, as they very soon took out $60,000 to $70,000. Their lease expired, but was renewed, with Messrs. Kiel and Harriman joining the party, and up to date these five gentlemen have actually extracted $250,000 so far from the two leases. Twenty per cent of this amount goes to the owners of the mine, Messrs. Divol, Rodgers & Bacon.



PLAN OF POCKET MINE LEDGE.

Thus far is the history of this bonanza mine, from authentic sources. We may safely approximate that $2,000,000 have been taken out by the various owners since the year 1851. Still the mine has not been continuously worked, so that it is really only in its infancy. That it has a great and profitable future there can be no doubt, and that fortunes will still be coming out of it for years is the only conclusion I can arrive at, knowing the present indications and prospects.

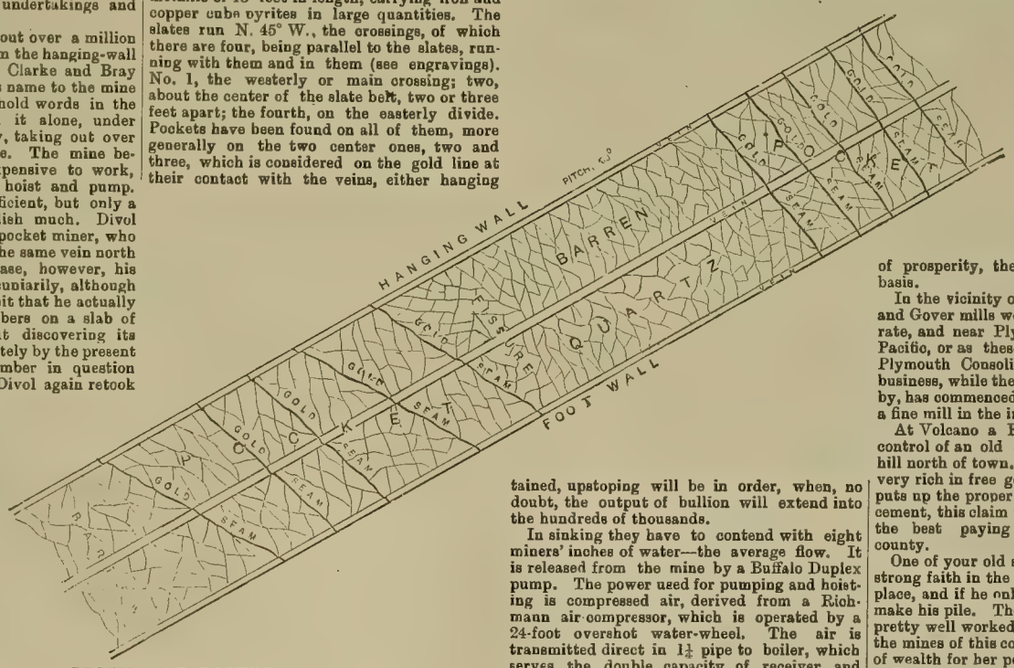
I will now describe the formation and peculiar characteristics of this famous mine. First, the course of vein is N. 30° E., cutting the country rock, slates. The dip is 30°. These gold-bearing slates are exclusively dark-blue metallic of 15 feet in length, carrying iron and copper cube pyrites in large quantities. The slates run N. 45° W., the crossings, of which there are four, being parallel to the slates, running with them and in them (see engravings). No. 1, the westerly or main crossing; two, about the center of the slate belt, two or three feet apart; the fourth, on the easterly divide. Pockets have been found on all of them, more generally on the two center ones, two and three, which is considered on the gold line at their contact with the veins, either hanging or footwall lodes. But there is another indispensable factor that produces these rich deposits called "gold seams." They are somewhat erratic in their distribution, often occurring in series of bunches when least expected There is no law governing them. They run at right angles to the crossings, and cutting into the veins vertically and in direct contact, and passing through the dyke in their course to the veins. Wherever they strike them, gold occurs, although all gold seams are not prolific. They must be free, not froze up, so to speak. If good, they always prospect in free gold, and sometimes show gold in the quartz. They are small leaders or feeders and will throw the gold generally in both main veins, but the center vein is barren; the hanging and footwall veins, bonanzas. The crossings show themselves by a small fine line or forming a cleavage through the dyke and filling matter of the fissures, which is diorite.

The gold deposit appears to be formed on the hanging-wall vein in concentric rings—richest in the center—which is almost pure bullion, and gradually weaker, till exhausted to the outer circle, which is then rich milling rock.

The footwall pockets are somewhat different in form, adapting themselves to a plane, forming a parallelogram. The gold is worth on hanging-wall $20 and over per ounce; footwall, from $17.50 to $18 25, latter containing a percentage of silver. Further, the footwall lode contains fabulously rich tellurides (petzite) assaying as high as $140,000 per ton.

The chief characteristic of this fissure and its veins is that they differ from what is commonly known as pocket veins, so-called, for in this mine there is found a positive *chimney* or descending line of gold which has been explored to a depth of 500 feet on the underlay, vertically 150 feet. The fissure is from 9 to 12 feet between walls.

The lessees are sinking their main shafts to obtain backs. After a certain depth is attained, upstoping will be in order, when, no doubt, the output of bullion will extend into the hundreds of thousands.



SECTION OF POCKET MINE LEDGE.

In sinking they have to contend with eight miners' inches of water—the average flow. It is released from the mine by a Buffalo Duplex pump. The power used for pumping and hoisting is compressed air, derived from a Richmann air-compressor, which is operated by a 24-foot overshot water-wheel. The air is transmitted direct in 1¼ pipe to boiler, which serves the double capacity of receiver and steam boiler, should there be any lack of water to run compressor. The receiver, etc., is stationed outside of adit or crosscut level 557 feet long, leading to the works within. Through the kindness of S. P. Dart, mining and civil engineer, I was furnished with two diagrams showing the veins, slate crossings, gold seams, etc., which explain my report.

The south extension of the Bonanza is 7⅓ acres, leased from I. S. Cady and worked by Drake and party. This mine has been well developed and steadily mined for the past four years, so far without any result, but at the present the outlook is very flattering, the shoot having been found. The surface was exceedingly rich; pieces of gold $2300, $500 and $400 were found in the early days, when the gold was worked by sluicing, which paid handsomely. This party is cutting out a station at the junction of adit level with incline shaft. The mine in general appearance is a photo-facsimile (minus the gold) to the Divol bonanza, so far as the same class of metallic cube slate, dyke, crossings, etc., are concerned; but the explorations so far have disclosed a disrupted condition of the slates, now becoming more regular, with good walls and veins which prospect. They expect in the next 100 feet of sinking to be in bonanza, when it is to be hoped that their long patience and perseverance will be rewarded with success.

Mining at Plymouth, Amador County.

EDITORS PRESS:—The principal mining operations of Amador county at this time seem to be almost entirely confined to the great quartz ledge, which stretches across the county in a diagonal course from the Mokelumne to the Cosumnes river.

On this ledge are located some dozen or fifteen mills, varying in capacity from 5 to 80 stamps each. Only about one-half of these are in operation at this date, but several of the old mills, besides a number of new ones, will start up very soon.

Most of the ore in this district is of rather low grade and is somewhat difficult to work. Free gold is in very limited quantities, and most of the mines are provided with chlorination works for the final reduction of their ores.

Among the most noted of the mines in this county are the Kennedy, Zeile and Amador, near Jackson, the latter company having just completed a 60-stamp mill with all the latest improved machinery, and as they have already a large lot of ore ready for milling, this mine will soon be in running order.

Just above Big Bar bridge on the Mokelumne there is a 10-stamp mill finely located for economical working. It stands directly on the river-bank, with no expense for water, and the ore is run from a tunnel direct to the mill without any expense for hoisting. I did not learn the owner's name, but judging from appearances he has a "sure thing."

The Reed mine, a few miles east of Jackson, is also running right along. They have cheap power also, as their mill is on the main Amador canal, and has a large wheel in the flume, so as to use the whole force of the big ditch without wasting any of the water.

At Sutter Creek several mines and mills are running, but only working a small force at present. The one formerly known as the Wildman mine has a very complete outfit, and, as far as I could learn, is doing a fair amount of business with satisfactory results to the company.

The sulphuret or chlorination works here, under the management of E. Voorhees, is doing custom work for the surrounding mines that have no furnaces of their own, and as the sulphurets yield from $100 to $200 per ton, it will be seen that this part of the mining business is of considerable importance. Before the discovery or application of this chlorination process all the fine gold contained in these sulphurets was washed down the creeks and was a total loss.

The Keystone mine, in Amador City, is in full blast, and, judging from the amount of material on hand and other indications of prosperity, the mine is on a solid paying basis.

In the vicinity of Drytown the Bunker Hill and Gover mills were pounding away at a lively rate, and near Plymouth the old Empire and Pacific, or as these mines are now called, the Plymouth Consolidated, are doing a rushing business, while the New London Company, near by, has commenced making preparations to erect a fine mill in the immediate future.

At Volcano a French company has secured control of an old cement gravel claim on the hill north of town. This mine is reputed to be very rich in free gold, and when the company puts up the proper machinery for grinding this cement, this claim will, no doubt, turn out to be the best paying mining property in the county.

One of your old subscribers, N. W. Peck, has strong faith in the richness of his claim at this place, and if he only had water he would soon make his pile. The placer mines of Amador are pretty well worked out, but, taken as a whole, the mines of this county are still a great source of wealth for her people. W. W

Plymouth, Amador Co.

THE general business outlook on the Puget Sound, from a commercial standpoint, is improving, in the local, coastwise, and foreign lumber trade, and is fast assuming the larger proportions that were generally anticipated at the commencement of the year. The large list of tonnage under engagement to load on the Sound is an excellent indication that the lumber-mills will be more active than usual this summer and autumn. Capitalists are eagerly purchasing all the available timber lands in Washington Territory, and the near approach of Statehood has brought an influx of immigration from the Eastern States, which is making investments in all available enterprises. A Wisconsin syndicate has purchased a mill-site near Seattle with a large acreage of timber, and within 12 months will have in operation one of the largest lumber-mills on the Sound.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

STRIKE IN THE MORLEY.—*Ledger*, May 11: At the Morley or Wetzlar mine, in Hunt's gulch, some exceedingly rich ore was struck Thursday of last week. It is of the same character of gold-bearing black metal met with in the Mammoth and Valparaiso claims. It was met with in the winze, and also in the two drifts. A number of sacks were taken out and stored in the office. The strike has considerably raised the spirits of those interested.

MISCELLANEOUS.—The Rudd pulverizer, which promised great things in the way of reviving gravel and cement mining in Amador and other counties, has not met expectations. It was tried in Volcano some two weeks ago, with the intention, should the trial prove satisfactory, of adopting it in the reduction of the hard, auriferous cement met with in the French company's claim. The company, however, have decided to have a cannon-ball quartz-mill instead. Some big prospecting is being done at the old Keystone mine, at Amador City. It is said the force employed by the company at present is about as large as before the shutting down of half the milling capacity. At the Plymouth Con. they are still running 40 stamps. Some work is being done on the Empire shaft, which conveys the idea that this mine is not to be permanently abandoned, as was generally supposed. John Tregloan was in San Francisco recently purchasing cable for the Wildman, also arranging for the introduction of an air-compressor in this prosperous mine.

PLYMOUTH.—Cor. Amador *Ledger*, May 11: The mines are all running as usual, with an abundance of water for power to run with. Work will commence right off on the New London mill foundation. Duff Reeves has got his mill all ready to run, and will start it up about the first of the week. H. P. Gordon and George Lamb have got their Huntington mill running, and as their rock is reported to be very rich, we expect to hear of a rich cleanup before long. The Leventon gravel claim is yielding some very rich pay dirt, going as high as $50 to the pan.

DRYTOWN.—Work on the Drytown Con. mine started in earnest yesterday morning. There are three shafts with several drifts and stopes to drain, but they expect to reach the bottom inside of five weeks, if the main shaft is in good condition. During the first 24 hours the water lowered 18 feet. Donnelly & Howard's contract has been finished and accepted by the directors as a first-class job in every respect. The machinery and framework is substantial, and capable of running to a depth of 1000 feet. The entire length of pipe, about 3000 feet, was laid under the direction of Mr. Moyle, and the leakage will not exceed one inch of water. All the stockholders who have visited the mine are well satisfied with their property. The owners of the Minnie Moore mine are making preparations to sink their shaft about 100 feet deeper.

SUTTER CREEK.—Cor. Amador *Ledger*, May 11: The miners are jubilant, and are all taking advantage of the abundance of water. The rainfall here now foots up for the season 20.10 inches. Sinking at the North Star is proceeding favorably. The contractors find that they can make about two feet per day, which at the contract price, $10.50 per foot, enables them to earn good wages. It is calculated that it will take four months to complete the job.

Butte.

FROM INSKIP.—Cor. Chico *Enterprise*, May 11: A storm of this duration and at this time of the year has rarely been known by the residents of this ridge, and especially 20 inches of snow. It is unprecedented. No doubt much damage has been done in the valley, by so much rain falling at this season of the year. We are, however, above high-water mark, not inclosed by a levee, but unfortunately not above the snow belt. Mining and milling are the principal interests in our section. Although the early part of the winter was not favorable for the miners, owing to the dryness and light fall of snow, only 2½ feet in December being the deepest. However, welcome March came in with a very heavy 15-day rain, in fact the heaviest rain that was ever known here that supplied their wants, and the frequent showers in April kept it replenished, and now the snow will make a very good run for them. According to reports some have done remarkably well, namely, W. Rooker and W. Boyer, taking out eight ounces in about three weeks run in Little Secret. W. J. Gordilla occasionally picks up half-ounce pieces. Messrs. Morgan & Henderson of the famous Golden Bnzzard mine are engaged in driving a new tunnel to tap the vein deeper, and expect to reap a golden harvest.

Calaveras.

UNION COPPER.—Cor. Angels *Record*, May 14: The Union copper mine at Copperopolis has been at work actively since June, 1887, and has up to this time taken out and shipped to New York about 5000 tons of 16 per cent ore. Have on an average worked about 50 men. Are now prepared with new machinery, and will from this time increase the force of men in all the departments, and will also, as a matter of course, increase the output of ore. Heretofore the ores have been shipped East for reduction, but considerable copper will hereafter be produced or extracted by a process known as lixiviation or leaching. This process, though in use by others, and recommended by Mr. J. A. Ferson, the superintendent, has only recently been adopted at this mine, and is now becoming a decided success. They have recently put in a new six-inch Cornish plunger pump, which is now in successful operation, raising water 500 feet at one lift; also have recently put up a new engine-house and introduced a link machine, 12 inches, V. Goering latest patent, but use the old 16-inch engine for the pump. Thus after many delays with the old machinery the company have made ready to do a successful business.

Colusa.

AROUND SULPHUR CREEK.—Cor. Willows *Farmer*, May 8: Our first visit was to the Manzanita mine and mill, where we found everything working up to about a full capacity. The 10 stamps are kept regularly running night and day, mostly upon the ore from what was the Cherry mine, but were unable to learn the result of its milling. The two Victor concentrators at the mill are working quite satisfactorily, and Supt. Northey seems pleased with them. For simplicity and perfect work we have yet to find anything superior to them of the kind. Leaving the Manzanita, we proceed in the direction of the Clyde and Keeley mines. But before reaching the steep ascent of the hills we called at Alex. Hunger's, where we saw some fine specimens of bituminous coal he has been prospecting for a short distance below his house. At present he has not found it in any large quantity. After a tedious pull up the hill, we arrived at the Clyde and Keeley mines and found that H. M. Cooper had discontinued work upon the tunnel, but were informed that he expected to resume at an early day. At the Keeley mine, J. W. Brim informed us that he had completed placing his machinery in position and that after starting up found all to work to a nicety. In connection with his Huntington mill he has also a Victor concentrator, with which he seems to be quite satisfied, being able to save about all the gold he can work through the mill. He informed us he was about fairly started, and thought his reservoir at the confluence of the two branches of the gulf would afford water sufficient to run one shift all summer, and perhaps two. He seems to be quite satisfied with his claim and hopeful of future results. At the quicksilver mine of J. P. Rathbun we found considerable work had been done, but nothing doing at present.

El Dorado.

LEASED.—Georgetown *Gazette*, May 10: Armstrong and Christy have leased from Sam Forni a quartz mine on his land some two miles below town. It is a new prospect, having been little worked by some prospectors about two years since, with encouraging results, but abandoned because of Forni's ownership to the land. They have started to run about 200 feet of tunnel to cut the ledge at some 80 feet in depth. It is about a foot wide and is said to be well worth mining and milling.

Napa.

MINING IN CALISTOGA DISTRICT.—*Calistogian*, May 11: Interest in prospecting has revived somewhat here lately, mainly on account of a number of locations made well up on the side of Mount St. Helena, where rich croppings have been found at a point which attracted attention when the excitement about the old Calistoga gold and silver mine prevailed. Ten or twelve locations have been made, and a portion of the ground is to be prospected as soon as the weather will permit. Preparations for doing work are being made. Not a great way from this point locations were made a few weeks ago by probably a dozen persons from Napa and vicinity, and they have been doing considerable work. Prospects on the mountain are pretty bright, judging from the croppings we have seen and the reports bronght to us. The assays from claims located by Calistogians are surely very encouraging. In the King canyon group of locations, work is being continued in the long tunnel of the Calistoga Con. Co. Though still 35 feet from the ledge, there are indications which strongly incline interested parties to believe that the much-wished-for ore is ahead of them. The prospects are surely encouraging. The finding of good ore and the opening of another mine there would create increased interest in mining business here. In the matter of prospecting in the Calistoga mining district, we feel greatly encouraged at present, as the work is being done in a more thorough manner than common, this being true from the fact that more money than usual is being used. The day for digging gopher-holes seems to have almost passed, and in our opinion the good results will soon be made apparent. In the Palisade mine, work continues as usual, and the reduction works are kept running the same as during several months past. Stoping ore in the Easly vein from the first level toward the surface has occupied time there many weeks past, but, as is usual in such cases, the value of the ore grew less as they ascended on the vein toward the top. Preparations are being made to take ore from points lower down, and also from the Palisade vein. There is a great deal of water on the lower, or third level, and this is to be removed. An engine and boiler to be used for this purpose was purchased in San Francisco last week, and will be located at the shaft in King canyon. The boiler will be received first and taken to the canyon as soon as the ground is hard enough to move it. The mining prospects in the district we believe are better now than at any time in a number of years, and we see no good reason why they will not continue to improve. One more mine and mill in full operation is needed to help place the district in a more favorable light before the public, or, more particularly, mining men; and we believe the second mine is going to be opened soon.

Nevada.

ACTIVE OPERATIONS.—*Tidings*, May 10: The Crown Point shows a three-foot ledge of ore that should yield well, if appearances are an indication. The ledge improves in appearance as it is uncovered. Active operations are soon to be undertaken at the Peek-a-Boo (Downing) mine. This property is advantageously situated between the Old Eureka and Coe. It is understood that a hoisting and pumping plant to be operated by water-power will be put up. At the Evening Star two stations have been cut out and some timbering done. A six-inch pump is to be put in. The water in the Coe is now lowering rapidly. And this reminds us that yesterday a man employed in the shaft found some pieces of quartz in one of the levels, and the quartz is as "pretty-looking milling ore as a man would want to see."

TO BE PROSPECTED.—Nevada *Transcript*, May 10: W. H. Veale is to take charge of the work of prospecting Myron Foote's quartz claim which adjoins the famous Banner situated a short distance east of this city. Mr. Foote owns 3000 feet on the ledge, and his property is generally believed to be a valuable one. Some very rich quartz has been found there heretofore, and Mr. Veale will proceed to more thoroughly explore the ground with a view to definitely determining the extent and character of the deposit.

ANOTHER MINE STARTED.—*Transcript*, May 15: The Muller & Walling mine, on Woods ravine, just north of the Nevada City, is to be developed this summer. The water has been pumped out of the 65-foot incline shaft and sinking will be commenced Wednesday. When the shaft is down the required depth, drifts will be run. Two shifts of three men each are to be employed for the present, and the force will be increased as soon as room is made.

Placer.

IOWA HILL.—Placer *Herald*, May 11: The Horhman mine road is, I hear, completed, with the exception of planking two short bridges. The mill pit is also completed, and the grading for a boarding-house and sleeping-house is under way. The sleeping-house will be some little distance from the boarding-house, to avoid the noise, which is a good idea for those who work nights, and the mill is situated quite a distance down the canyon, so that the chances for a good sleep in the daytime will be number one. I hear that there will be two large boilers to furnish motive-power, and a possibility of water being used next winter to run the machinery. It is now understood that the crushing will be done with a large Bryan roller-mill, although it is reported that the firm has been considering whether stamps would not be preferable. The cement is quite hard and will require to be crushed rather finely in a rock-breaker, for quite a large amount of gold seems to be fastened on the rocks, which will necessitate their crushing also. The Morning Star still continues to show a fine appearance. I hear the average per load for the past nine months is over $7.50 per carload. Reports from Red Point are very satisfactory.

CONCENTRATOR TEST.—Placer *Republican*, May 10: The owners of the Hathaway mine are making some severe comparative tests of three concentrators, the Frue, the Woodbury, and the Victor. The competition has been conducted at the mill below Ophir by experts, each interested in the success of his own machine.

TO BE STARTED UP.—The old Bellevue mine above Ophir is to be started up again after being idle for several years. A gentleman named Curtis from Boston has charge, and is occupying the house built by A. Shurtleff. Water with 75 or 80 feet head will be brought from the ditch for power.

POCKET.—A. Shurtleff struck a small pocket in St. Patrick the other day, which produced about $100, and he thinks he is on the eve of something good.

Shasta.

SQUAW CREEK MINES.—Redding *Free Press*, May 11: The various mines on and adjacent to Squaw creek were never in a more promising condition, respecting both development and prospects. We gathered a few items of interest from Ben Conroy. Ben had several specimens from the Balaklala in his pocket, one of which would mill 3000 ounces silver to the ton and another 8000 ounces. The 3000-ounce specimen had been heated and the silver stuck out all over it like great beads of sweat. The other specimen was in its native state, resembling somewhat in color a dirty, gray-streaked indigo, and was almost as heavy as lead. The Balaklala, from which these specimens were taken, is owned by a company of about 18 people. Over 2000 feet of tunnels have been driven in this mine, and the work still goes on. It is possible that the company may soon commence shipping ore below. A rich strike was made in the Black Bear mine last week. A contract for a new tunnel was let some time ago by Edward Reilly, the owner, and this rich strike is the result. The face of the tunnel is figuratively bespangled with gold-bearing quartz. The Sierra Buttes Co. is working 50 men. The company is getting out timber for the mine, and lumber with which to erect dwellings for occupation by miners with families. The construction of dwellings by the various mining companies for the use of employes will soon enable Squaw creek to put on village airs. The construction of the wagon-road from Kennet to the mines is progressing slowly.

NO PATENT.—Shasta *Courier*, May 1: A sale of another mine was prevented this week for the simple reason that no Government patent had been obtained. Men like Wm. T. Coleman and others who control capital want to know just what they are buying when offers for investment are made. A Government patent shows what is secure. Men purchasing mines all over the coast don't want to buy into a lawsuit, or bring their blankets up in the mountains of Shasta and sleep on claims in order to hold them, and they will not do so. Wm. T. Coleman, who has spent a couple of weeks inspecting his mining and milling properties in Trinity and Shasta counties, was in town Tuesday, en route for home, and accompanied by Supt. Jas. Sutherland of the Niagara, French Gulch. Mr. Coleman was in good spirits and feeling well over the result of his investigations.

LAID OFF.—A number of men were laid off at the Lost Confidence mine Monday, the rainstorms having interfered with the mill works.

Sierra.

THE KENTUCK MINE.—*Mountain Messenger*, May 11: The Kentuck is a quartz mine, and is situated about half a mile below Pearson's Ranch, at St. Charles Hill. The property is bonded to Mr. Belshaw, who is putting up a quartz crusher there, to be run by a steam engine. The boiler is on the ground, and the engine and all the other machinery has got as far as Goodyear Bar. Work was suspended a few days this week on account of the storm. Mr. Belshaw has been up from below for the past ten days. Mr. Rouse is in charge of the work.

Siskiyou.

SALMON RIVER GOLD.—Yreka *Journal*, May 15: It is reported that at least $200,000 will reach Etna within the next two months from the various mines on Salmon river, and the Know Nothing creek, Methodist creek and Quartz Valley mines. A very large quantity will also be received at Fort Jones from McAdams creek, Scott river, Oro Fino and other sections. In Yreka the income from the various quartz mines of Humbug, Greenhorn, Hawkinsville, Klamath river, Shasta river, Little Humbug, and other places, is also large, but when the Klamath river miners reach bedrock, the amount will be immense.

San Bernardino.

THE BAGDAD MINES.—*Times-Index*, May 11: Each report that comes to this city from the Bagdad mining camp is an improvement on the preceding report. The Craig boys have just shipped to this city 1000 pounds rich silver ore which have been re-shipped to the Selby Smelting Works in San Francisco, and in a few days the report from this shipment will be made public. Mr. Craig, Sr., the veteran assayer, says it is very rich but does not give the figures. A large number of claims are being opened up and all look well. In the vicinity of these mines is to be found large quantities of smooth boulder stones which upon examination prove to be almost pure lead, carrying silver to the extent of about $20 to the ton. One of these rocks was brought in to Mr. Craig and he sawed it in two. These specimens vary in size from that of a bullet to rocks larger than a man can lift, but the ledge from which they came has not as yet been found. They are all round and smooth as though they had been washed in a stream for ages or cut by the drifting sands of the desert.

San Luis Obispo.

A PROMISING LOCATION.—*Tribune*, May 11: A fine discovery has been reported to us which has been made within 10 miles of this city. A ledge crops out about four feet in width showing about 30 inches of ore carrying lead, silver and copper. The ledge is in a canyon with plenty of wood and water, and can readily be made accessible. The ledge can be easily developed; a tunnel run in 150 feet would tap the ledge at a depth of about 300 feet. Five locations have been made and samples of ore have been sent to San Francisco for analysis. If the reports of the test are satisfactory, work will be commenced at once.

Trinity.

QUARTZ.—Trinity *Journal*, May 11: We understand that the quartz interests on Eastman gulch are looking well. The prospects of the Venetia mine are more favorable than for some time past. Jack Chichobie, on the Deer Horn, near the Venetia, is doing good work, taking out ore and developing his mine. He has a very good looking ledge.

Tuolumne.

GRIZZLY.—*Union-Democrat*, May 11: This mine, located near the Consuelo on the Tuolumne river, is now being inspected by a mining expert, with a view to purchase. It is the property of Mr. Leechman.

KELTZ.—There is now being developed by a tunnel a fine body of ore of good grade in this mine. The chute of ore is over 150 feet in length. The tunnel originally driven had a wrong course to reach this chute. This has been remedied under charge of Mr. Sharwood, and the tunnel has now struck and proved the existence and good character of the body of ore. The mill of 10 stamps will start into operation at an early day.

MARY ELLEN.—This mine, also situated on the Tuolumne river, is showing exceedingly well in free gold, and the sulphurets go unusually high, a late assay giving $19.25 per ton. A 10-stamp steam mill is now being erected on the mine, and Blanding concentrators will be used to save the sulphurets. In time, water will be substituted for steam.

CONSUELO.—Situated on the Tuolumne river, has been sold to McCann and others, and work is now being done on it. This mine was operated extensively in early days and had a large mill upon it.

NEVADA.

Washoe District.

ALTA.—Virginia *Enterprise*, May 11: The ore extracted from the winze being sunk from the 825 level to connect with the ore stopes above the 925 level is more than sufficient to keep the mill running in connection with the ore extracted in raising. The connection is now nearing completion.

BELCHER.—No. 2 east crosscut and No. 2 west crosscut on the 200 level are out 95 and 65 feet respectively. The 1100 west crosscut is out 186 feet, and has reached what is believed to be the footwall. Twenty-five feet back from the face a streak of ore about one foot in width was encountered, assaying from $80 to $160 per ton, and from that point to the face the ground is composed of porphyry and quartz, showing bunches of ore. Have started a west crosscut on the 1300 level, 70 feet north of the 1100 crosscut, and are preparing to start a south drift from the 1000 incline station to ascertain the value of the ledge at these points.

SAVAGE.—On the 400 level the joint west crosscut has been advanced 24 feet. The face is still in vein porphyry. The winze from the north drift is now down 27 feet and continues in ore of good quality. From No. 1 and No. 2 west crosscuts are stoping ore of fair grade, and are also extracting ore from the old stopes in the north and south drifts. During the week hoisted 508 tons of ore and shipped to the Rock Point mill 489½ tons and have milled 490 tons. Average battery assays $20.83 per ton. Total bullion shipments for last month, $24,426 58.

HALE & NORCROSS.—On the 400 level the stopes in the north drift from No. 1 crosscut continue in good ore. On the 600 level are extracting the usual quantity and quality of ore from the several stopes. On the 700 level the grade of the ore is improving in the stope from the west drift above the eleventh floor. During the week hoisted 1178 tons of ore, shipped to the Nevada mill 1072½ tons and milled 1149 tons. Milled last month 4579 tons of ore, which produced $90,525 in bullion.

CONFIDENCE.—The joint Challenge-Confidence north drift on the 300 level is out 135 feet, having been advanced 23 feet during the week. The joint Challenge-Confidence raise from the 300 level is up 50 feet, 10 feet having been added during the week. The face shows low-grade quartz. The joint Challenge-Confidence east drift on the 1250 level is in 4 feet, having been commenced during the week.

CHOLLAR.—The north lateral drift on the 750 level is out 160 feet; face in clay and quartz. North lateral drift, 850 level, is out 230 feet; face in hard porphyry. The east crosscut in north lateral drift, 50 feet south of north line, is out 35 feet; face in quartz giving assays of from $15 to $25 a ton.

EXCHEQUER.—On the 382 level, the east crosscut on the north line is out 125 feet; face in soft porphyry. The west crosscut on the north line is out 130 feet; face in hard porphyry. The north lateral drift on the 500 level is out 475 feet north of the Alpha shaft; face in clay and quartz.

CROWN POINT.—Have opened the seventh floor in the 400 south stopes, and find the ledge narrowed to 4½ feet. The quality of the ore is good. Have

shipped to the Mexican mill during the week 810 tons of ore, the average battery sample of which is $18.52 per ton.

POTOSI.—South lateral drift, 750 level, is out 345 feet; face in quartz and porphyry. South lateral drift, 850 level, is out 260 feet, face in hard porphyry. South lateral drift, 930 level, is repaired 350 feet south of the Chollar shaft.

OVERMAN.—Extracted 280 tons of ore and shipped 320 tons to the Vivian mill. On the fifth floor of the stopes have extended the upraise from the northeast drift 13 feet, total 25 feet, through quartz giving low assay.

SEG. BELCHER.—The west crosscut, 1100 level, is out 304 feet, having advanced 37 feet during the week. The ground is composed of soft porphyry with no indications, so far, of approaching the footwall.

ALPHA.—On the 500 level, the east crosscut on the north line is cut 70 feet, and the face is in clay and quartz. The east crosscut, 50 feet south of the shaft, is out 50 feet; face in clay and quartz.

CHALLENGE CON.—The work continues, to be jointly with Confidence, and is described in the letter from the latter mine. Ore extraction has been indefinitely suspended.

JUSTICE.—Resumed sinking. The new double-hoist engine works smoothly. The mill is running steadily and regular shipments of ore are made.

BALTIMORE.—Are crosscutting on the 225 and raising from the 338 level, in both of which places ore is extracted and saved for milling.

THE OTHER MINES.—The work reported from the Scorpion, New York and Silver Hill is merely with reference to progress.

BULLION.—Are running a north lateral drift in the ledge on the 750 level.

Pahranagat Lake District.

PROSPECTING.—Pioche *Record*, May 8. Messrs. McDonald and Christian, who, for a year past, have been prospecting in Pahranagat lake district, came in Wednesday bringing a small quantity of high-grade ore. They have done the work necessary to hold their several locations and will strike out now for a new grub stake.

Pioche District.

REDUCTION WORKS. — Pioche *Record*, May 8: The greater part of the material comprising the two Bruckner roasters to be placed in the new reduction works has arrived; 84,000 pounds arrived during the week. About 36,000 pounds more are now on the road. The roasters were taken down at Secret canyon, eight miles from Eureka, under the supervision of Billy Culverwell, and shipped on by Mormon teams at two cents a pound. Eureka teamsters wanted none of it at three cents. Seventy-four horses and 32 wagons were employed in transporting the material. When in operation the two roasters can handle 42 tons of ore in 24 hours. At the Geddes & Bertrand mine, from which these roasters have been removed, a third roaster is in operation. The ore, which is of a rebellious character, is chloridized and then leached to 85 per cent of its value, the bullion being 995 fine.

Tuscarora District.

BELLE ISLE.—*Times-Review*, May 10: Have resumed work on the west lateral, 150-foot level. South drift from west crosscut, 250-foot level, extended 14 feet.

COMMONWEALTH.—The stopes are all looking well. Hoisted and sent to the mill 250 tons; average assay $130 per ton. Mill has been shut down to change the draft of the furnaces; it carried too much pulp back into the dust chambers. One furnace and 10 stamps now running; doing good work. The other will be running by Monday.

NEVADA QUEEN.—Crosscut, 350-foot level, has been advanced nine feet, showing low-grade ore; assays return $15.08 per ton. The concentrator running well and doing good work; 280 tons of concentrating ore hauled during the week; assay $21 per ton. Have $15,000 in crude bullion on hand.

NORTH COMMONWEALTH.—Joint east crosscut, 225-foot level, extended 14 feet; entering favorable formation. West crosscut from the end of the south drift, 100-foot level, is in 20 feet and is still in vein matter showing some rich ore.

NAVAJO.—South drift, 250-foot level, extended 15 feet, showing low-grade ore. Work has been discontinued in No. 7 upraise, 350-foot level. The usual quantity of ore has been sent to the mill.

NORTH BELLE ISLE.—North drift, 500-foot level, has been extended six feet. Rock continues very hard. Good progress has been made with the work at all other points.

DEL MONTE. — East crosscut from the end of north drift, 100-foot level, is in 22 feet, and is still in vein showing some high-grade ore.

Wild Rose District.

PARADISE NO. 3.—*Silver State*, May 14: It is reported that Martin McCurdy struck a very rich and big ledge of ore in the Paradise mine No. 3, Sunday afternoon. The mine is located in Spring City and it is to be hoped that it is a big bonanza.

ARIZONA.

NOTES.—Prescott *Journal-Miner*, May 8: The quartz-mill in Big Bug district was destroyed by fire last Sunday night. C. W. Culver's big teams arrived yesterday from the Congress mine with a cargo of ore for shipment to Denver. John Whitman has conveyed for $500 to the W. G. W. R. Co. the Smuggler and Swindler mines and mill-site. J. S. Chambers brought in a five-ton lot of ore yesterday from the Black Canyon country, to the sampling works. Four carloads of Congress ore have been shipped within the past four days. The Howard mine continues to look well, and still holds its own as development progresses. The two-stamp mill is kept busy crushing ore. A lot of machinery, consisting of a Cornish roller, crusher, and concentrator, arrived from Denver, for the Dixie mine. A number of teams were engaged in loading them. F. E. Murray continues to make regular shipments of ore from his Copper Wonder mine at Yucca to the Copper Basin smelter. From two to four carloads arrive each week. A report prevailed this morning that the Senator had suspended operations permanently; but the fact that men have been engaged to work for it during the last two days contradicts the rumor. They will commence to ship ore soon from this mine. The United Verde Copper mines are not being run to their full capacity, only one smelter being in operation. The price of copper is at this time so reduced that it has become necessary to limit the production of bullion. Mr. Isaac L. Stoddard, president and general manager of the Oro Bella Mining Co., is in the city purchasing supplies for his mines and camp at Bayard. He reports that the company's mill will be completed and start up about the 15th inst. Regular shipments of concentrates are expected to be made, via Prescott, after that date.

MAMMOTH. — Tombstone *Epitaph*, May 10: From Mayor Thomas, who has been down to the Mammoth mine, in Pinal county, we learn that the mine has not been sold and that negotiations are at a standstill. The company has an immense ledge of gold-bearing rock and ample machinery of the latest and most improved kind. There have been several attempted sales of this property, but some unforeseen difficulty has always arisen and interfered. Mr. Thomas brought back with him some very fine specimens from some mines owned by him and others in that district.

COLORADO.

LEADVILLE'S APRIL OUTPUT.—Denver *Republican*, May 11: Approximately the output of Lake county mines for the month of April was about 30,000 tons. This shows a decrease of over 7000 tons less than the product of March. To the persistent low price of lead, together with a loss of faith in the prospect of Mexican lead ores being soon practically prohibited from entering our markets, may be mainly attributed the material decrease in the production of Lake county mines last month. The only mines which have noticeably reduced production through necessity in the month of April are the Matchless and Silver Cord. They have fallen off respectively from 80 to 35 tons, and from 100 to 50 tons a day. It is held, however, that this marked decrease in both mines is temporary. The outlook for a largely increased production of Lake county mines this month is prominently apparent. The Agassiz mine and new mill will be running in full blast in a few days; the President mine and new mill will soon renew operations; the Continental Chief, in Iowa gulch, and the Bartlett, on Sugar Loaf, will each double their usual daily output in a short time; the Helena, in Iowa gulch, and the Harvard, on Fryer hill, will add more generously than ever to the production of the district; while the La Plata and other properties of lesser note will also fall into line and help swell the output of Lake county during the month of May.

DAKOTA.

GOLD EXCITEMENT.—An Associated Press dispatch from Deadwood, dated May 11, says great excitement prevails, it being caused by the discovery of a new and rich placer diggings about 40 miles from here. Prospecting these diggings last year on a small scale showed gold in quantities, which was kept quiet; but on renewing the work this spring the secret got out, and now the men are rushing to the new gold-fields from all directions on foot, horseback and with teams, taking tents, provisions and complete mining outfits. All are on the rush. Parties from the diggings returning for provisions and supplies show plenty of gold dust, and they state the diggings are extensive and worth 60 and 70 cents to the pan.

IDAHO.

CŒUR D'ALENE. — Wardner *News*, May 4: The suspension of operations in the Bunker Hill & Sullivan mines has been a general topic during the week and drawn much comment from all interested in the welfare of Cœur d'Alene. The closing has not been brought about by hasty conclusion, but from mature deliberation on the part of the company, who considered it the most advisable course to be pursued at present. The freight rates demanded by the Northern Pacific railroad company were greatly in excess of what the owners of the mines could afford to pay. Had the market price of lead kept up to a moderate figure, work would undoubtedly have been continued, but no concession being made by the railroad company in view of the falling off in the value of lead, the B. H. & S. company were forced to the course they have adopted. As matters now stand with these two great ore-producers, the public while reflecting on the past can look hopefully toward the future. A force of men is still retained on the main development work of the mines and will continue operations uninterruptedly. The *News* is informed by Superintendent Clement that no more work will be done in the present concentrator, but the erection of a mammoth mill will be commenced as soon as desirable rates can be obtained from the railroad companies. The Bunker Hill & Sullivan company have two plans in view for connecting the mines with the mill-site on which the new concentrator will be erected. One is the erection of a Bleichert wire tramway which would be two miles long with a fall of 910 feet. The other proposition is the building of a railroad with a track of four miles, a survey of which has been already made.

ROCKY BAR CONCENTRATES. — Wood River *Times*, May 8: About three tons of concentrates belonging to the Bear Creek Gold Mining Co. are on the way to Hailey from Rocky Bar. This is the first lot of concentrates that has been shipped this way from Rocky Bar, and it is probably only the forerunner of many more that will come regularly from this time on. This result is undoubtedly due to E. C. Coffin, manager of the Alturas Fast Freight line, as the advantage of having freight both in and out is apparent. This will, in time, prove no inconsiderable source of revenue to Hailey.

LOWER CALIFORNIA.

MINING PURCHASE.—Cor. San Diego *Union*, May 11: I arrived at Ensenada from El Alamo today. The most important matter that has occurred during the past week was the sale of the Lopez mines to the International Company, the consideration being $30,000. The purchase includes the Princess, Ulysses, Telemaco, Grandata and Cocinero. General Manager Scott, accompanied by engineer Sutherland, visited the camp last Saturday, and after a thorough and satisfactory investigation of the different ledges by Mr. Sutherland, the sale was consummated. This group of mines had previously been bonded by Wm. Denton for $60,000, but he failed to produce the amount within the stipulated time. It is the intention of the International Co. to proceed immediately with the development of the claims, the work to be in charge of Mr. Sutherland, and several stamp-mills will be erected for the reduction of the ores. The people at El Alamo are jubilant over the sale and it has already awakened a new impetus to mining developments. The second sale of importance was the Keynota ledge, owned by the Messrs. Castillo, to Mr. Hice of San Bernardino, the consideration being $15,000. The discovery and announcement of new finds occur daily, no fewer than 12 having been made during the past week. A. H. Butler is entitled to the credit of having nerve enough to introduce the first quartz mill. It is now on the ground and he is busily at work with a corps of assistants putting it in working trim. Every kind of business at the mines is booming.

MONTANA.

THE ORO FINO DISTRICT. — *Inter-Mountain*, May 8: Mr. C. E. Gable, superintendent of the Mountain Lion mine, came in to the city to-day. He reports sinking in that property to have progressed to a depth of 175 feet. It will continue to the 200, when a crosscut will be made to the south for a distance of about 50 feet. At that point it is expected that a lead, parallel to the one on which sinking has progressed, will be found. The shaft has already run through about 15 feet of quartz in one of the leads, and it is thought at the 200 station the shaft will be about in the footwall of this lead. Mr. Gable is confident that the Mountain Lion will prove a great mining property. Work progresses on the Franklin, adjoining the Mountain Lion. A tunnel has been driven 700 feet to the west on this property, and work is still progressing.

GRANITE MOUNTAIN.—Phillipsburg *Mail*, May 9: The output for the week ending May 9th was 59 bars of bullion containing 88,905.52 ounces silver and 120.55 ounces gold.

THE HOPE. — The report that spread rapidly throughout the district Monday morning to the effect that the Hope mill had shut down and suspended operations indefinitely was received among the people of this camp with much regret. The Hope, it is well known, has been the life of this camp, and kept the place in existence when it had no other resources. On investigating the facts regarding the report, we find that a liberal amount of exaggeration and imagination had been added to the truth. The mill, however, has been shut down for an indefinite length of time, the ore reserves being insufficient to keep the mill running on a paying basis. Also a general cleaning up and the making of repairs that have long been needed will be attended to, and when done the mill will be in better shape to continue operations. The force at the mine has consequently been reduced from 40 to 20 men. It is known to the older residents that it is no unusual occurrence for the Hope to shut down temporarily, as several times in its history operations have been suspended, owing to an insufficient output from the mine to pay working expenses; and this is the principal reason for the discontinuance at the present time. Owing to the peculiarity of the pay ore in this mine laying in pockets, it is only reasonable to suppose that there are many yet to be encountered equally as rich as those that have kept the company in existence for the past quarter of a century.

BIMETALLIC.—At the Bimetallic tramway they will start buckets running, conveying the ores of the mine to the mill, to-day, and it is thought there will be no difficulty whatever to contend with. The cable has been running since Tuesday and works with entire satisfaction. The distance from the mine to the mill is about two miles, via the tramway.

TWO PER CENT.—The Two Per Cent property, or better known as the Poormau, is to be operated again, and a shift of men will be put to work on it the first of next week. This property is among the oldest prospects in the camp and was the first to make a shipment of ore from this county.

NEW MEXICO.

CARLISLE.—Silver City *Enterprise*, May 10: H. J. Longmaid has been made general manager of the Carlisle works. A change all round has been made in the officers and directors of the company. H. J. Walton from Telegraph reports the Gila still booming. A good pay streak of $60 ore has been encountered in the 600-foot level of the Tecumseh. John Bragaw, who has a lease on the McNulty at Georgetown, is cleaning out the old workings and putting the mine in good shape. He is opening out some new ground and is taking out ore. The bullion shipments since the 1st, through Wells, Fargo & Co., are as follows: Mogollon Mining Co., two bars weighing 73½ and 77 pounds, valued at $1250 each; Silver City National Bank, $2400; Thos. B. Pheby, seven bars, $10,972.80; First National Bank, $700, gold; Key Co., $2500, gold; Aztec Co., $1500, gold. A mining deal is on the tapis for a group of mines near Cook's peak in the Granville district near Clifton, consisting of the Lucky Jim, Belle Isle and Rainstorm, in which Capt. Cooney, James McCarthy, J. H. Hovey, Geo. Mowland, Dan Wadhams and others are interested. The prominent deal of the week was the transfer of the Night Bird mine at Pinos Altos, to Albert Freudenthal of New York City. Harry Fowler recently shipped four cars of zinc ores from Hanover. One car went to James S. Matthews & Co., Denver; one to Joplin, Mo.; and the others to the St. Louis sampling and testing works. These shipments have been made merely as samples and to ascertain where the best results can be had. This ore will average from $12 to $16 in silver. The St. Louis people promise to give returns for all there is in the ore. Two carloads of zinc ore will be shipped from the Thunderbolt, of Hanover, this week. The ore goes to Joplin, Mo., one of the best zinc markets in the country. H. N. Castle, who has been in charge of the lixiviating process at Chloride, in the Black Range, claims that the lixiviating process has been a complete success on ores of that section, but states that it requires some experience with ore to know how to handle it. When the plant was started up only 57 per cent of the metal was saved, but now the average is 90 per cent, and has been run up as high as 97. Mr. Castle thinks that the metal in the ores of the Black Range can be saved to a much higher per cent through the lixiviating process than any other method of treatment.

PINOS ALTOS.—A new discovery is reported by Messrs. Lee, Spaulding and Walker, near the head of Rich gulch, in close proximity to the Mountain Key location. The vein carries 10 inches of pay material, which, it is thought, will mill at the rate of $40 per ton. In addition to this find, another of importance has been disclosed in the nature of a fairly rich placer within the boundaries of the claim. As predicted in the last issue of the *Enterprise*, the new shaft on the Mountain View mine, recently purchased by New Orleans capitalists, is opening out in a good vein of pay ore in about the same ratio as the work of development is progressing under the energetic management of D. J. Lewis, superintendent. The Gold and Silver Ribbon south drift is in a fine grade of ore, and this exploration clearly proves the theory that to the southward of the discovery shaft there is an ore chute equal in extent and value with those which have produced so handsomely on the northern side.

UTAH.

MARYSVALE CAMP.—Cor. Salt Lake *Tribune*, May 3: We thought that the quiet little mining camp of Marysvale had sunk into oblivion until we had occasion to visit it a few days ago, and witnessed a thrift that convinced us to the contrary. Marysvale is destined to have a boom in the near future, and the boys even fancy that they can hear it now rumbling in the distance. In the Last Resort mine, formerly known as the Antelope, they have struck it rich. The mine was leased and bonded last October by Johnny Flynn, Jack Jacobs and Doc. Bailey, who have been prospecting it ever since with a view to finding the vein that had been lost by the old company. These gentlemen commenced sinking a shaft about 75 feet west of the old workings, and struck the vein at a depth of about 70 feet. The vein at this point is about five feet wide, containing three feet of free milling ore that averages $50 a ton, of which character of ore they have about 150 tons on the dump. In prospecting along the course of the vein about 200 feet west of this shaft the vein was struck again within a few inches from the surface. The vein at this place and the character of the ore is very much the same as that in the shaft, with the exception that here the ore averages about $90 in silver and $10 in gold. The Bully Boy and Webster mines, owned by R. C. Chambers, are leased and bonded to Secretary Hall and others, who have been working the mines for the past three months. They have a vein containing from one to three feet of high-grade ore, and have a force of men working on the mine taking out 10 tons daily, most of which is worked at the Bullion mill and averages $73 per ton—the higher grade ore being shipped to Sandy for reduction. The Glen Erie mine, owned by H. D. Lisbonee, is situated about 600 feet west of the Bully Boy and Webster, and supposed by some to be on the same vein as those mines. There has recently been shipped from this mine some very high-grade ore—assaying as high as $1700 per ton. This character of ore is found in pockets along the vein. The Deer Trail, with its mountain of ore assaying from 20 to 40 ounces silver, is now lying idle waiting for cheap transportation, or a reduction works near by. The Alma, joining the Deer Trail on the south, is under the control and management of Mr. David Giles, an experienced miner. He has sunk a 40-foot shaft on the vein, which exposed ore all the way down assaying from $10 to $80 per ton. He is now actively at work with a force of men pushing a tunnel in to tap the vein 500 feet from the surface. Besides these mines there are many good prospects being worked around and in the vicinity of the camp. There was, perhaps, never a time in the history of Marysvale when the mines looked so well as at the present time.

APEX OPERATIONS.—Park *Record*, May 11: Operations for the present in the Apex workings consist chiefly in drifting on the big rich vein, and as soon as the roads are in condition for shipping ore a large amount of stoping ground will be opened up.

CAMP CROSSCUTS.—The Ontario tunnel is in about 1200 feet and the progress through the running ground is necessarily slow. No ore was brought down over the Crescent tramway the fore part of the week owing to the bad weather and also to the fact of repairs being made to the engine. There are now several parties in camp looking for profitable investments in mine leasing. Many more such men may be expected here in the near future, and mine-owners who have not the means or inclination to develop their properties themselves should advertise the fact and thereby bring their properties well under the observation of mining men.

ORE AND BULLION SHIPMENTS.—During the week the Crescent shipped 230,400 pounds of concentrates. The Ontario bullion for the week was 30 bars, containing 16,167.91 fine ounces of silver. For the week just ended the Mackintosh sampler received 423,500 pounds of Woodside leasers' ore; 342,800 of Ontario, and 175,620 of Daly; total, 950,920 pounds.

GREEN RIVER GOLD-FIELDS.—Salt Lake *Tribune*, May 14: Judge Powers returned on Sunday from a trip to Green river, and while there he learned some interesting particulars concerning the discovery of new gold-fields in Southern Utah. The fields are located below Dandy Crossing, 120 miles south of Green river, and are close to the Arizona line. To a *Tribune* reporter, who asked him what he thought the discoveries amounted to, Judge Powers replied: If the reports which are coming in from them are true, the fields are very rich, running from 25 cents to $3 per yard. While the gold is fine, it is not "flour dust," and is easily separated. Three camps have already been established there and about 50 men and 2 women are on the ground. The climate is very mild, and the past winter has been like spring, so that the miners have been able to work all winter. Mr. Beardsley of the Green River house has gone down to the fields to look the ground over, and on the day I left Green River five boats and a complete mining outfit arrived by train, and I believe this party proposes to make the trip down through those canyons, which Lieut. Powell says are almost impassable. As to the gold-fields, without expressing any opinions as to whether all that has been said is true, those who have visited the place say the diggings are the richest discovered since the flush times of California.

MECHANICAL PROGRESS.

Do We Need a New Motor?

The announcement that a new motor has been discovered will attract the attention of the average business man or mechanic more quickly than almost any other announcement. Now I do not wish nor expect to enroll my name high on the temple of fame by the side of Keely and others, but I wish to open up a discussion on a much-needed subject: Do we need any new motors in addition to what we now have?

I take the ground that we do not, provided we can accomplish two other things which are more likely to be accomplished; the first is a cheap, convenient and effective way of storing up power; second, a cheap and effective method of transmitting it. The latter seems to be practically accomplished in the electric motor and wire. Now, if electricity will accomplish the first, then a new motor will have but a small demand. To illustrate, I run a factory where I need 25-horse power for 10 hours a day for three or four days every week. Now I can, by a wind-wheel running when the wind blows night and day, secure that much power every week at a small part of the expense necessary to run a steam engine. If I could store about two days' power ahead to use at pleasure, without too great expense for storage plant, the question of a cheap motor would be solved. Over our western prairies there is a great surplus of power, which can be cheaply used by the common windmill, and it is very doubtful if they are near perfection yet.

Then, again, see the great power going to waste in our waterfalls and flow of tide, which could be utilized if a cheap and effective storage system could be devised. The irregular power of the tides, the fitful power of the wind and the small but steady power of small streams and springs, could thus be used in any quantity and at any time desired.

The method of storing by pumping water into reservoirs is too expensive, as we can get but little, if any, over one-half of the power used for effective purposes; besides, the expense of the plant is too great.

Let Edison and the "Inventive Yankee" set their wits to work to give us a good system of storing power, and "future generations will arise and call them blessed."—*Practical Mechanic.*

HOW TIN FOIL IS MADE.—It is melted and run into blocks weighing from 200 to 400 pounds each, and in this form the metal is kept for ordinary use. The old method for reducing it to the necessary thinness for foil was by hammering it by hand as the gold-beaters do gold leaf, and this process is still in vogue to limited extent. This, however, is a very laborious process, as the sheet must be constantly beaten without intermission, to keep up the heat generated by the continuous strokes of the hammer, and the great drawback to it was that only one surface or face could be produced. This brought about the invention in this country of rolling-mills for this kind of work, and it is notable that prior to their invention nearly all the foil used in this country was imported, and that the introduction of the rolling machines has completely revolutionized the trade, so that in place of importing we now export. In these mills the metal is run between two heavy rollers, which give it a beautiful polish on both sides; it is then cut into widths of from 12 to 15 inches, rolled on reels, and cut to order by cutting machines. The great advantage of the machine-rolled foil over the hand-beaten foil is that while the latter is full of minute holes, so small as not to be visible to the naked eye, the former is, as a rule, perfectly intact, and thus being air-tight, forms a wrapper for tobacco that cannot be equaled by any other substance.

A NEW IDEA.—The Cumberland Valley Railroad Company has just completed at its shops at Chambersburg, Pa., a movable electric light station of wonderful illuminating power and a novelty in railroading. It is intended to furnish light for wrecking purposes. The main car is 33 feet long by 9 feet wide, and 13½ feet high. The floor is of iron. In one end is a 40-horse power vertical boiler and a 35-horse power vertical automatic engine. The engine and boiler rest upon a cast-iron floor plate 9x11 feet. In the other end of the car are two dynamos, one of 25 lights, the other of 15 lights, both of 2000 candle power. The dynamos are connected by belting with the engine. In the car are also folding-beds, closets and all the conveniences for operating the plant. Under the car the lamps are carried, and also the tools for erecting the line. Attached to the car is a tender to supply water and coal for the engine. Upon the tender are racks for carrying the poles, hoods for lamps, and a reel for holding the wire. The poles are made of hollow iron piping of a handy and convenient pattern. The car will form a novel auxiliary to the equipment of the road, and it has attracted much attention from railroad men.

HOW TO TURN A BRASS BALL TRUE is answered in the query column of the *American Machinist* as follows: For turning a complete sphere you would need, in addition to a tubular hand tool, a cupped chuck on the live spindle. This may be simply a piece of cast iron 1½ or 2 inches in diameter, held in an ordinary jaw chuck, and the outer end bored out to a depth of about an inch, leaving a thickness of metal around the hole of about one-fourth inch. The inside corner being rounded a little and made true, it will act as a driver for the ball previously made as true as possible upon centers. A piece of iron or brass about half an inch thick and one inch diameter, having a center in one side of it to run on the dead center of the lathe, the other side being cupped out to bear on the ball near its edge, completes the equipment. By turning the ball in all possible positions, and applying the tubular hand tool, you may secure a very accurate sphere.

THE AGE OF INVENTION.—Those of us not yet 50 years of age have probably lived in a most important and intellectually progressive period of human history. Within this half century the following inventions and discoveries have been among the number: Ocean steamships, street railways, elevated railways, telegraph lines, ocean cables, telephones, phonograph, photography, and a score of new methods of picture-making, aniline colors, kerosene oil, electric lights, steam fire-engines, chemical fire-extinguishers, anæsthetics and painless surgery; gun-cotton, nitro-glycerine, dynamite, giant powder; aluminum, magnesium, and other new metals; electro-plating, spectrum analysis and spectroscope; audiphone, pneumatic tubes, electric motor, electric railways, electric bells, typewriter, cheap postal system, steam heating, steam and hydraulic elevators, vestibule cars, cantilever bridges. These are only a part. All positive knowledge of the physical constitution of planetary and stellar worlds has been attained within this period.

WHAT KILLED THE COPPER SYNDICATE.—The error of the syndicate was in making the price of copper too high. Had the general selling price of lake copper been put at 12 cents, the syndicate basis 10 or 11 cents, and other brands in proportion, the syndicate, though in that event unnecessary, would still be in existence, and the violent and injurious fluctuations we are now having or are likely to have in the price of the metal would have been avoided. The outcome of this wild attempt at cornering the copper of the world has been the utter bankruptcy of the Societe des Metaux, the most important copper-manufacturing concern on the continent; and of the Comptoir d'Escompte, the second largest banking institution in France, and the more or less serious embarrassment of several lesser institutions and individuals.—*Engineering Journal.*

STEEL SHOES ON STEEL TIRES.—That the use of steel brake-shoes upon steel tires does not produce good results has been demonstrated by the experience of many who have given them trial. We recently saw an irregular lump of steel formed by the cuttings occasioned by the use of steel shoes. The cuttings from the tire had lodged in the recess of the shoe, which was of the Ross type, and had become a solid mass that was removed with difficulty. The other shoes upon the truck were in the same condition. An inspection of these shoes and tires might cause those who are using steel shoes upon steel tires to reflect deeply upon the wisdom of their course.—*Railway Review.*

THE PROCESS OF GALVANIZING TIN PLATES is, comparatively speaking, a simple one. All that is necessary is to use pure zinc in the galvanizing-pot and cover it with a coating of sal ammoniac, which acts as a flux, while the tin on the plate itself also serves as a partial flux. According to our information on the subject there is little difficulty in doing the work, provided care is exercised in all the steps of the progress. We would, however, state that it is not economical to run a galvanizing bath unless the work is done instantly.—*Metal Worker.*

TO MAKE SOLID PLASTER OF PARIS CASTS.—Take a sufficient quantity of water to mix into a stiff paste—this can be determined by a few trials—and pass the plaster through a sieve into the water very slowly, stirring all the time, and be very careful not to take the article used for mixing out until finished. Stir with a circular motion, and from bottom upward; of course care must be taken in pouring into mold; if possible, incline it at an angle and pour slowly.

METALLIC SURFACES.—The surface of metal is said to have a moire appearance when it bears a resemblance to watered silk. Moire metallique is tin plate acted upon by an acid, so as to display, by reflected light, the crystalline texture of the tin. A superior moire appearance is given to brass by boiling in a solution of sulphate of copper. Sometimes friction with a resinous or waxy varnish will bring out the wavy appearance characteristic of moire.

IMMENSE SHEARS.—Messrs. Bolckow, Vaughn & Co. of Eston, England, are putting down for their own use immense shears for the purpose of cutting nine-foot steel plates. The plant necessary for the shears will weigh nearly 350 tons. The demand which is growing for very large plates in the shipbuilding trade has necessitated this.

HOW THE RECORD IS KEPT.—At the intelligence bureau of the U. S. navy department a large map shows by colored tags the present location of the world's war vessels, which include about 150 belonging to Great Britain, 100 to France, 40 to Germany, and 40 to the United States.

SCIENTIFIC PROGRESS.

Earthquakes and Their Influence on Mine Gases.

Herr Falb, an Austrian scientist, has been advancing some peculiar views on the above subject. He recently spoke before a large audience, made up largely of mining engineers, at Bocham, the center of the Rhenish-Westphalian coal-mining district. A correspondent of the *Colliery Guardian* refers to this lecture as follows:

The very fact of so large a number of practical men coming together, many of them from long distances, to listen to an exposition of the grounds of his belief, shows that his doctrines are no longer regarded as the outcome of mere dreams, unworthy the attention of men engaged in the matter-of-fact business of life. Practical men are beginning to think that after all there may be something in Falb's theory. This was made evident by the earnest attention with which the lecturer's discourse was listened to. Judging from the impression which seemed to have been produced, the result of Falb's visit to the Rhenish-Westphalian coal miners has been to win over to his view a great number of disciples.

As long ago as the year 1868, Falb called attention to the possibility of the moon exerting upon the great ocean of molten matters beneath the earth's crust the same influence which at surface occasions the tide in the ocean of water; and he argued that if such is the case, as, indeed, it seems likely enough, the solid crust is at certain times severely strained, and more or less warped and broken. A few years of observation raised this possibility into a probability, and 20 years of experience has sufficed, according to the lecturer's statement, to transform the probability into a certainty. There is, perhaps, some exaggeration in this statement; but as Falb says, it is more easy to ridicule than to argue, a lighter task to reject than to disprove.

Anyhow, there is much to instruct in the lecturer's discourse, and many will read with interest and profit his remarks concerning the origin, character and results of earthquakes. These disturbances are, in a degree inappreciable by the senses, very frequent. But though unfelt, they may be sufficient to liberate gas in mines. Herr Falb assures us they do; and he brings forward an imposing array of facts in support of his assertion. These disturbances, he says, are of three kinds. There is first the vertical shock, in which the force acts from the center of disturbance to the surface; next we have what he calls the horizontal wave shock; and third, there sometimes occurs the whirl shock, a description which is self-explanatory. I will only add to what I have already written that in the course of the week following the delivery of the lecture, one of the local journals published a list of all the serious colliery explosions that had occurred in the last five years, and showed that by far the greater number happened at those periods which Falb describes as "critical."

THE PENDULUM PROVES THE EARTH'S ROTATION.—The longest pendulum on this continent, says the Philadelphia *Times*, swings in the technological school at Atlanta. It is a heavy pear-shaped piece of iron attached to a brass wire 42 feet long. The upper end of the wire is pivoted in a steel point which rests on the center of a steel plate so as to cause the least possible friction. The swinging of the pendulum gradually describes a circle on the floor in a direction following the sun, showing in this way that "the earth do move." Directly under the pendulum is a large circle divided into 24 parts, of 15 degrees each, to correspond with the hours of the day. The North Pole is placed directly under the pendulum, and the meridians of longitude meet there. The parallels of latitude make smaller circles inside the first. Dr. J. S. Hopkins, president of the school, who made and put up the pendulum, performs the experiment as follows: The iron is brought to the edge of the circle in the meridian of Atlanta and let swing across. Apparently it goes straight across, but gradually it traverses the circles in the direction taken by the sun, and opposite to the revolution of the earth. The pendulum not being directly over the axis of the earth, does not move in exactly the same time as the sun, but falls behind some hours a day. It is said that if it were at the North Pole, where it would be immediately over the axis, it would traverse the circle in exactly 24 hours, and at the equator it would not traverse it at all, for gravity would operate to prevent.

THE LAUGHING PLANT.—Palgrave, in his work on Central and Eastern Arabia, mentions a plant whose seeds produce effects analogous to those of laughing gas. The plant is a native of Arabia. A dwarf variety is found at Kasum, and another variety at Oman, which attains a hight of from three to four feet, with woody stems, wide-spreading branches and light-green foliage. The flowers are produced in clusters and are yellow in color. The seed pods contain two or three black seeds of the size and shape of a French bean. Their flavor is a little like that of opium, the taste is sweet and the odor from them produces a sickening sensation and is slightly offensive. These seeds, when pulverized and taken in small doses, operate upon a person in a very peculiar manner. He begins to laugh loudly and boisterously, and then sings, dances and cuts up all kinds of fantastic capers. The effect continues about an hour and the patient is extremely comical. When the excitement ceases the exhausted individual falls into a deep sleep, which continues for an hour or more, and when he awakens he is utterly unconscious that any such demonstrations have been made by him.

LIQUID CARBONIC ACID.—The manufacture of liquid carbonic acid has already become an industry of considerable importance in Germany, in one establishment in Berlin as much as hal a ton of this commodity being produced daily. The acid is sent out in steel bottles, each containing from 17 to 18 pounds, and the price being somewhat less than 25 cents per pound; the quantity contained in a bottle, when expanded into gas, occupies over 10,000 cubic feet, and is principally used in the manufacture of mineral waters and for beer engines. In this connection, the fact is of special interest that, a few years ago, an important use of carbonic acid was suggested by Dr. Raydt of Hanover for raising of wrecks, and who demonstrated the possibility of this application by an experiment at Kiel. The apparatus consisted of a steel bottle containing the liquid acid, and collapsed canvas bag placed over the neck of the bottle; on the whole being submerged and attached to the object to be raised, a cock was opened and the liquid in the bottle allowed to expand in the bag, inflating the latter and thus causing it to rise.

INTERESTING EXPERIMENT.—Herr J. Puling of Vienna has devised an ingenious method of rendering visible the form of a stretched string set in vibration, by having one of its extremities attached to one prong of a tuning-fork, which was kept in motion electrically, and gave a definite note, the pitch of which was carefully determined. The vibrating string was lighted up by a vacuum tube connected with a Rumkorff coil, the rate of discharge through the tube being alterable at will, and when this is made equal to or some aliquot multiple of the number of vibrations made by the string, the latter was only illumined when occupying some one definite position, and, owing to the persistence of its image on the retina, appeared as if at rest. In this way the shape of the string, and the positions of the modes and vertical segments, were rendered clearly visible.

SUDDEN FORCE OF DYNAMITE.—Dynamite is so instantaneous in its action that a green leaf can be compressed into the hardest steel before it has time to flatten. One of the experiments at the United States torpedo works was to place some leaves between two heavy flat pieces of iron, set them on a firm foundation and see what gun-cotton would do in forcing the iron pieces together. A charge was placed upon them by compressing the gun-cotton into a cylindrical form about one inch thick and three or four inches in diameter, through the center of which a hole was made for a cap of fulminate of mercury, by which the gun-cotton is exploded. The reaction was so great, from merely being exploded in open air, that one of the iron pieces was driven down upon the other quick enough to catch an impression of the leaves before they could escape.

A NEW METHOD OF PREPARING SILICON.—H. W. Warren suspends small bars of ferro-silicon immersed in dilute sulphuric acid from the positive pole of a battery, and resting upon a platinum plate that forms the negative pole. After solution of the iron, the residue consists of graphite, silica and amorphous silicon; this residue is heated to redness in carbon dioxide, and then to bright redness in a closed iron tube with zinc. The silicon is dissolved by the zinc, and is obtained in crystals when the zinc is treated with hydrochloride acid. If aluminum be used instead of zinc, and the temperature raised to whiteness, graphitoidal silicon is obtained.

SCIENCE AND CREATION.—"The researches of science," says Dr. W. H. Dallinger, F. R. S., "are physical. The observable finite contents of space and time are the subjects of its analysis. Existence, not the cause of existence; succession, not the reason of succession; method, not the origin of method, are the subjects of physical research. A primordial cause cannot be the subject of experiment nor the object of demonstration. It must forever transcend the most delicate physical reaction, the profoundest analysis, and the last link in the keenest logic. Absolute knowledge concerning it can only be the prerogative of itself."

A DISTANT POSSIBILITY.—A curious speculation has been made concerning what would happen were the earth's rotation to cease. The equatorial diameter being 26 miles more than the polar diameter, the earth would present an equatorial zone of solid ground miles high above sea level, the water all being drawn to the poles. This land zone would then be like our Arctic regions, and would be banded by a ring of permanent ice and snow.

HOW THE EARTH MIGHT BE SUBMERGED.—The mean hight of the land above sea level, according to John Murray, is 2250 feet, and the mean depth of the ocean is 12,480 feet. Only two per cent of the sea is included inside a depth of 500 fathoms, while 77 per cent lies between 500 and 3000 fathoms. If the land were filled into the hollows, the sea would roll over the earth's crust to a uniform depth of two miles.

Plans of the California River Commission.

William Hammond Hall, State Engineer and one of the examining commissioners of rivers and harbors in California, was appointed a committee at a recent meeting of the board to draft a memorandum for the general guidance of the board in its consideration of the subject of its labors. In his report, which is quite long, he reviews the obligations of the Government of the United States to its citizens, and its jurisdiction over the navigable rivers of the country. But the policy of the Government in ordinary improvement matters being based solely on the idea of promoting the interests of commerce, only holds in view the betterment of navigation facilities and gives no attention to the great arterial drainage problems which confront our people. The Government has never done anything toward the betterment or preservation of the flood-carrying channels in this State, but on the contrary, it has encouraged practices which have damaged its rivers in this respect.

The report, after showing the duty of the Government in the premises, says:

It is absolutely impossible to compass the control of floods in the great central valley of California except through the agency of works and regulations carried out and administered by some general power having authority over the whole. The State may co-operate and property-owners may contribute and assist, but it would seem that the National Government alone has the scope of power sufficiently great to take the initiative and maintain the requisite general authority.

The report then shows that the general laws of the United States are inadequate to give California the relief she needs, cites the course of Arkansas, Mississippi and Louisiana in procuring the creation of "The Mississippi Commission" and the inauguration of a new national river policy, which has wrought wonders in the Mississippi river, and proceeds to show that there is a necessity for such national action for California. But this matter is not understood at Washington, and it is the object of this commission to make it understood. Mr. Hall says:

The merits of causes such as that which California has to urge respecting her main rivers are not adequately presented at Washington. Our Congressmen are at as much disadvantage in this special cause as are the military engineers in the cause of river improvement generally.

There is wanted in Washington an authoritative professional representation of the technical and equitable phases of our local river problems and State claims to National action in solving them. Such work need in no way conflict with the work or reports of the Government engineers, nor with the efforts of the State's representatives, but should supplement each. This commission should attempt such representation, and for this purpose it should prepare itself:

First—To forcibly present and make clearly apparent the equitable claims which California has to special consideration at the hands of the National Congress in this regard.

Second—To show the extent and nature of the land, municipal and commercial interests involved and the probable extent of benefits derivable from a successful treatment of our rivers.

Third—It should outline in general terms the engineering possibilities of the several river navigation and arterial drainage problems, and present general estimates of cost of the greater works and of each improvement as a whole.

Fourth—It should illustrate the entire subject with maps designed and drawn especially for exhibition and as the basis of argument at Washington.

Fifth—It should prepare synopses of existing data and arguments, and generally brief the cases for the use of our representatives at Washington.

Sixth—And finally, its members should serve as professional advocates in explaining and presenting the cases to our members and Senators and others.

The report sets forth that no extended and expensive surveys and field examinations are necessary, the past work of the State Engineering Department being directly applicable to the uses of the commission. Mr. Hall says that the points to be made by the commission are:

First—That the rivers shall be taken in hand rationally for their betterment in each drainage basin to perform every legitimate function required of a river.

Second—That a special exception in national legislation be made in their favor in matters of administration and treatment, because of the peculiar circumstances recited.

Third—And that enough money be appropriated annually by Congress to keep the work going at a due and proper rate.

The report then shows that the Board of United States Army Engineers working under the "Biggs debris" law can accomplish only temporary good, and declares that what is wanted is a permanent Federal commission of engineers to manage and improve the California rivers.

As to the immediate work of the State Commission, Mr. Hall says:

Our consideration of plans should be for the presentation of engineering possibilities only and the formation of general estimates of probable cost, which can be readily done without going into details of methods or espousing and advocating special lines of river or arterial drainage treatment. With this idea, in my judgment, it will be well to confine our surveys for the most part to local re-examination of the main rivers to see what changes have taken place since the State surveys of them were made eight or ten years ago. * * * We shall be compelled to consider the extent of damage to the main rivers already affected, however, to illustrate the necessity for actively dealing with the river conditions as they now exist. As to other rivers than the Sacramento and San Joaquin and their tributaries, and as to the harbors, the law makes it obligatory upon us to examine them if called upon so to do by the Governor, but not otherwise.—*Chronicle.*

USEFUL INFORMATION.

Facts About Feet.

The ideal foot of modern ladies is about a No. 3.

The common unit of lineal measure, a foot, was derived from the length of the human foot.

In a man 5 feet 11 inches tall, the foot measured 10½ inches, and the middle toe 2½ inches.

In Chinese subjects, the ordinary hight being five feet, the length of the foot was nine inches and five lines.

The longest foot of measure is that of old Turin, which is equal to 20 inches of English measure.

There was a time when not only each country but each town had a foot-measure of its own, indicating different averages of the different feet in various localities.

Among a tribe of low-stature Indians whose hight varied from 5 feet 1 inch to 5 feet 3 inches, the length of the feet was found to be from 9 inches 4 lines to 9 inches 6 lines.

In order to get an idea of the length of shoe sizes in inches, it may be stated that a foot measuring 10 inches, with the weight of the body resting upon it, may comfortably wear a 6 shoe.

A youth in the South Sea islands, 6 feet 7 inches in hight, had a foot 12½ inches long. His lower extremities measured 38 inches in length, circumference of calf of leg 17½ inches, and his ankle 10 inches.

CARE OF CARPETS.—It is quite desirable to have something with which to sweep carpets, to prevent raising a dust and to brighten the colors. Probably the safest and best way is to take half a package of soft paper and cut or tear it into bits not over an inch square. Wet it and press out the water, then scatter over the carpet. It should not fall in large lumps, but be picked apart so that it will cover almost an entire room. When the broom is used it will roll into little balls, and, as it is swept over the carpet, will take up the dust quite thoroughly. Some housekeepers go over the carpet the second time with clean paper. Very coarse salt used dry is good. If the house has damp corners it should be used sparingly, as it has a tendency to attract moisture. Wet leaves are used by some country families. One old lady has a quantity of cuttings of calico and white goods. These she moistens and throws over the carpet. When she is done, the scraps go into a tub of water, are whirled about, and then thrown upon an old wire screen, where they dry, and are clean for the next time. Brooms should always be hung up by a ring in the top of the handle. If they are set upon the floor, especially while damp, they get out of shape, and the ends of the brush are curved out, rendering them almost useless. Do not stand them up with the brush uppermost. If they are damp, the water will soak into the body of the broom, and not only rust the wire and rot the cord with which the broom is made, but will make the broom straws smell musty and disagreeable, and finally rot them altogether. Mops and window-brushes also should be hung up by the handles.

HOW TO CARE FOR A TOOTHBRUSH.—"If," said a young lady in an Albany drug store this morning, says the *Journal* of that city, "you can sell me a toothbrush the bristles of which will not come out after I have used it two or three times, I will buy one." Said the druggist as he placed before her a box of toothbrushes: "I will tell you a secret about that matter. These brushes have been in the case for a long time. Now, when you buy one, take it home and put it in water for an hour or two before you use it. The bristles are dry and are apt to come out when they are used. Always remember that when you buy a toothbrush."

SPONTANEOUS COMBUSTION.—Reports made by insurance companies on the substances especially liable to spontaneous combustion show that cotton-seed oil will take fire even when mixed with 25 per cent of petroleum oil, but 10 per cent of mineral oil mixed with animal or vegetable oil will go far to prevent combustion. Cotton cloth in rolls, which had been dyed black with logwood, potash, sulphate of copper, and sulphate of iron, and which had by oversight been dyed without washing, was destroyed by spontaneous combustion, even the wooden rollers on which the rolls were wound being heated almost to the point of ignition. Olive oil is combustible, and, mixed with rags, hay, or sawdust, will produce spontaneous combustion. Coal dust, flour dust, starch, flour, especially rye flour, are all explosive when mingled with certain portions of the air. New starch is found to be highly explosive in its comminuted state, when confined in a close chute and water directed on it. Lampblack, when slightly oily and damp, with linseed oil especially, is dangerous; so, also, commercial zinc dust or gray zinc oxide, in fact, many finely divided metals, such as lead, zinc and iron, take fire when exposed to the air. Chloride of lime and turpentine, in contact, are dangerous.

DON'T TURN KEROSENE LAMPS LOW.—For the benefit of those over-economic people who have a way of turning down low the light of the kerosene lamp when leaving a room for a little while, it may be said that experiment demonstrates that the saving in oil by this means is hardly appreciable. With the low flame a considerable quantity of the products of incomplete combustion are making their escape into the air, and these are not only offensive to the sense of smell, but are injurious to the health.

CONDENSED COFFEE.—An Iowa grocer has discovered a process of condensing Java coffee with cream, in such a manner that by moistening the product a delicious cup of coffee can be obtained in a few minutes. He discards the tannin in the coffee, but retains all the valuable properties of the bean. The preparation will be put on the market in a short time.

AMERICAN KEROSENE FOR INDIA.—The British ship Palgrave, now on the way to New York from Calcutta, will, it is reported, carry back to India 1,300,000 gallons of kerosene oil. The Palgrave is a strong iron vessel of 3078 tons, and on Nov. 6, 1886, left with the largest cargo of grain ever taken from a Pacific Coast port.

THE POSTAGE STAMP CRAZE.—The highest price on record for a postage stamp was realized recently, when an unused four-cent British Guiana stamp of 1856 was knocked down at auction to Mr. Buhl, the dealer, for $250. The same gentleman also bought a similar stamp, which had, however, been through the post, for $190.

AMERICAN MINERS IN CHINA.—A New York mining expert, says a journal of that city, took four skilled men to China and has 200 natives at work developing silver mines for the Government 300 miles northwest of Tein-Tsin. Fifty thousand dollars' worth of machinery has been brought from the United States.

GOOD HEALTH.

Poisoning the Baby Unwittingly.

It is probable that many parents kill their infant children, without meaning to do so, from ignorance of the dangerous nature of popular sedatives and soothing syrups; while many more, without knowing what they are about, form the dreadful opium habit in their babies before the latter are weaned.

In connection with this subject, Taylor's Medical Jurisprudence, 1880, says: "It is important for a medical jurist to bear in mind that infants and young persons are liable to be killed by very small doses of opium. They appear to be peculiarly susceptible to the effects of this poison. The syrup of poppies, paregoric, elixir, Godfrey's cordial, Dalby's carminative and a variety of soothing syrups owe their narcotic effects to the presence of opium. One-sixtieth part of a grain of opium has thus destroyed life in an infant. Two children, twins of six weeks, died recently from the effects of a teaspoonful of Godfrey's cordial, given to each. This dose of cordial equals three-tenths of a grain of opium. Mrs. Winslow's soothing syrup, called also 'Quietness,' a compound resembling syrup of poppies—two doses of this caused the death of a child 15 months old, with the usual symptoms of narcotic poison. An analysis of this syrup showed that an ounce of it contained one grain of morphia with other opium alkaloids. It is not surprising that it should prove fatal to infants in small doses. It has been remarked that most of the poisoning by opium proves fatal in from about 6 to 12 hours. This drug in all its forms is especially fatal to infants. They die rapidly from very small doses. I have no doubt many a parent who has noticed the prolonged stupor following a dose will realize how close to the border line he has been. Extreme caution in the use of this drug is essential, not only in the young but the aged, and with those who indulge to excess in alcoholic beverages."

H. C. Wood, in his work on materia medica, published in 1886, cites a case where a few drops of paregoric proved fatal in a child aged nine months. He particularly admonishes against the use of Dover's powder for the reason that owing to the improper admixture of the opium with other drugs entering into its composition, no reliability can be placed on a dose for uniform strength.

ELEVATED RAILROAD PARALYSIS.—Residents along the lines of the elevated railroads and persons whose business has brought them on or near these lines have developed a singular periodicity in intervals of speech as the result of enforced habit during a considerable portion of their waking existence. Involuntarily they cease speaking, even in the middle of a sentence, at the end of each measured term of four minutes. Should not their attention be called to the habit, by the remark of others, they will remain silent for a few seconds—the length of time an elevated train ordinarily takes in passing—and then go on with their speech, unaware that there has been any break in it. During those few seconds there seems to have been entire cessation of mental action. The interruption is like a wink in a steady visual contemplation, only that it is a little more protracted. The cause of the habit is the compulsory stoppage of speech, or increased effort, during the regularly recurrent deafening roar of passing trains. Only a portion of those subjected to this influence are affected by it to the extent described, but those who are have been noted in sufficient numbers to call attention to this new malady of the nerves of action. Instances of its manifestation among women are infrequent—the deduction from which fact is obvious.—*New York Metropolis.*

PHYSICAL EFFECTS OF ALCOHOL.—But if the physical results of alcohol are varied, much more diverse are its effects upon the mental and moral nature of man. Indeed, they are as multiform as man himself. One general classification only is possible. Certain individuals (fortunately the small minority) are always pleasurably affected by stimulants. Each successive dose arouses in them increased exhilaration, and when intoxication supervenes, their sensations are delightful. Their every sense is exalted; they fancy themselves endowed with every gift—with all power and possession. As is often remarked, these are generally men of the most brilliant intellect and of the most charming moral qualities. Once led captive by alcohol, these unfortunates seldom have sufficient power of will to refrain from renewed indulgence. No moral considerations avail to restrain them, and with few exceptions, they yield wholly, finally and fatally to the tempter. For such men total abstinence is the only refuge. * * * Upon the large majority of men the effects of alcohol taken to intoxication are clearly and essentially different; although at first exhilarated, repeated indulgence brings drowsiness, dullness of apprehension, anæsthesia, vertigo, nausea, and vomiting—in short, bodily and mental symptoms which are excessively disagreeable. Of this class very few become drunkards, and those are men to whom anæsthesia becomes desirable as a temporary refuge from bodily pain and mental distress. Herein lies the sole explanation of the fact that the proportion of drunkards to moderate and habitual drinkers remains so small.—*Dr. W. S. Searle in North American Review.*

CURATIVE POWER OF MAGNETIC IRON ORE.—Mr. W. H. Lake of San Bernardino recently discovered what promises to be a veritable mountain of magnetic iron ore. Soon after his discovery he, in company with two assistants, went up to the mountain to develop the ore. Mr. Lake, who is 62 years of age, was so crippled with rheumatism that his joints were distorted. After being there four days, he made a singular discovery. The iron seemed to be permeating his system and acting like a tonic of the tincture of iron. His improvement continued, and now Mr. Lake is entirely recovered and equal to any exertion. He has recently experimented with the ore and others who have rheumatic troubles, or pains in the back or head, and it seems to be a cure as well for heart disease. The miners at Daggett now use the ore for a remedy. They tie it in a cloth and bind it on the affected part. The curative powers of magnetism have long been a subject of study and practice in certain diseases—rheumatism, in particular, has been benefited by its use in one form or another. It is possible that its use, as above, direct from nature, may be more successful than its indirect use. At all events, the miners who have been at work at this particular mine are quite sanguine in regard to the curative power of this particular deposit, and it is said that the establishment of a sanitarium on this mountain is among the early probabilities.

CARBOLIC ACID IN INDIGESTION.—In a recent number of the *Practitioner and News*, a correspondent says: "I have just passed through a severe attack of indigestion accompanied by colic, pyrosis, food eructations, epigastric weight, uneasiness, etc. Alkalies, muriatic acid, pepsin and pancreatic extract failed to give relief. Seeing your note in the *American Practitioner*, on the use of carbolic acid in acid eructations, etc., I took, with almost instant relief, two or three drops of the acid as soon after food as regurgitation, distention or acidity occurred. One dose was usually sufficient. On two occasions only was a second dose required. This I took half an hour after the first. I dropped the acid on a bit of fresh bread and rolled the mass into a pill. Since my own case I have given it in a similar case, with like good result. Here I added a scruple of carbolic acid to one ounce of glycerine. Dose, a teaspoonful."

THE EYESIGHT.—It is well known that practice in looking at distant objects improves the eyesight. In the test for color blindness among the engineers of the New Jersey Central road, it was found that the oldest man in the service had the best sight for long-distance purposes and was better able to distinguish the various shades and colors.

MINING AND SCIENTIFIC PRESS.

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TABLE OF CONTENTS.

EDITORIALS.—Tuolumne County, 353; Passing Events: The Lead Tariff; The Copper Situation; The Trial of the Charleston; A "Water-power" Cable Road; The MINING AND SCIENTIFIC PRESS, 360; Fracks for Inclined Planes, 361.
ILLUSTRATIONS.—Sonora, County Seat of Tuolumne County, 353; Arrangement of Tracks and Safety Devices for Incline Railways in Mines, 361.
CORRESPONDENCE.—The Mines of Tuolumne County, 354. The Divol Bonanza; Mining at Plymouth, Amador County, 355; Lower California Mines, 362; The Golden Treasure Mine, 365.
MECHANICAL PROGRESS.—Do We Need a New Motor; How Tin Foil is Made; A New Idea; How the Record is Rept; The Age of Invention; What Killed the Copper Syndicate; Steel Shoes on Steel Tires; To Make Solid Plaster of Paris Casts; Metallic Surfaces; Immense Shears, 358.
SCIENTIFIC PROGRESS.—Earthquakes and Their Influence on Mine Gases; The Pendulum Proves the Earth's Rotation; The Laughing Plant; Liquid Carbonic Acid; Interesting Experiment; Suction Force of Dynamite; A New Method of Preparing Silicon; Science and Creation; A Distant Possibility; How the Earth Might be Submerged, 358
MISCELLANEOUS.—Plans of the California River Commission, 359.
USEFUL INFORMATION.—Facts About Feet; Care of Carpets; How to Care for a Toothbrush; Spontaneous Combustion: Don't Turn Kerosene Lamps Low; Condensed Coffee; American Kerosene for India; The Postage Stamp Craze; American Miners in China, 359.
GOOD HEALTH.—Poisoning the Boby Unwittingly; Elevated Railroad Paralysis; Physical Effects of Alcohol; Curative Power of Magnetic Iron Ore; Carbolic Acid in Indigestion; The Eyesight, 359.
MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 356-7.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 368.

Business Announcements.

[NEW THIS ISSUE.]
Assessment Notice—Gray Eagle Mining Co.
See Advertising Columns.

Passing Events.

The late heavy storm, accompanied by considerable snow on the high mountains, is destined to make an average season after all for the miners, especially those in the northern counties of California. Up on the Comstock in Nevada the storm is as much good as the discovery of a rich strike. The *Enterprise* says that "it will insure employment to 1000 men at least two months longer than if the dry weather had continued, and enable the Hale and Norcross and Con. Cal. and Va. to pay dividends."

The result of the conference in Paris on the subject of the copper syndicate shows pretty clearly that the American mine-owners have the whip hand, and will bring the Bank of France, the Rothschilds, and others to their terms. Mr. Haggin's speech at the conference is printed in this number of the PRESS and states the situation very tersely.

The Anaconda Co. is to rebuild the big smelter at Carroll. The new one will be larger than that recently burned. The immense building is to be of iron throughout.

The latest gold excitement is near Deadwood, Dakota. Good prospects are reported, though little is yet known of the diggings.

The building of stamp-mills at El Alamo, the new Lower California quartz-field, will very soon prove the value of the ledges.

The Assistant Secretary of the Interior is this week listening to mine-owners on the question of how much the present tariff law really applies to the admission of foreign smelting ores that carry more or less silver. The result of the hearing is of great importance to lead miners.

The Lead Tariff.

Delegations of lead miners and smelters appeared before Assistant Secretary Tichenor in Washington on Wednesday for a hearing on the subject of the importation of foreign lead ores. Under a ruling of the Treasury, all ores in which the value of precious metals exceeds the value of base metal are allowed free of entry as precious ores. Lead and lead dross are dutiable at 1½ cents per pound, but by this ruling lead ores are practically duty free. It is also claimed that great frauds are committed by bringing in trainloads of lead ore with high-grade silver on top of the carloads and dutiable lead ore beneath in great quantities. It is contended that the ruling of the department is erroneous, and that it was the intention of Congress to make lead ores dutiable where there was a greater quantity of lead than of silver in the importation, notwithstanding that the value of silver might be greater than that of lead. The importation of silver with lead is made in many cases for no other purpose than to evade the payment of duty on lead.

Imports of lead ores at El Paso, Texas, during the year 1888, were 68,212 tons, on which $30 a ton is the duty, but not a cent was paid by the smelters. They imported these Mexican lead ores, under guise of silver ores, free of duty, and defrauded the Government of a revenue of $2,046,360. Besides, they extracted from these ores in 1888 41,647,290 pounds of lead, which, in place of paying two cents per pound duty, undersold the miners of this country and almost ruined an industry in which millions of dollars are invested.

By way of Eagle Pass, Texas, 12,125 tons of lead ores were admitted free of duty, being invoiced as silver ores, and the 10,000,300 pounds of lead extracted therefrom were sold all over much below the cost of production in this country.

By way of Laredo, Texas, 8432 tons of lead ores were smuggled from Mexico, and 5,629,789 pounds of lead thrown upon the market, on which the duty of two cents per pound was not paid either. Is it a wonder, with an importation of 57,277,379 pounds of lead free of duty, the present prices of lead range from 3½ to 3¾ cents per pound, instead of 5 to 5½ cents?

It is not only the miners in the Southwest who are being injured by this, but Utah, Idaho, Montana and Dakota are very largely interested. The Bunker Hill and Sullivan mines, Idaho, recently closed down by reason of this ruling. Lead ores are coming in from British Columbia, as well as from Mexico. This free admission of lead has seriously affected the lead-mining interests of this country, but some of the large smelting companies are interested in having the present condition of affairs continue, and they have great influence. The hearing in Washington will bring out all the facts, for the delegates who have gone there are fully posted in all details. Mr. Tichenor will report the hearing to Secretary Windom, who will then make a decision.

"WEST AMERICAN OAKS."—A review of the monograph with this title was published in the PRESS of last week. It may be well to say, in addition to what was remarked then, that the work is not only a memorial to Dr. Albert Kellogg, but a valuable contribution to scientific knowledge and a large factor in the forestry question of this coast. Dr. Kellogg was the fittest man on this coast to illustrate such a work; his love of the subject and his minute accuracy of drawing and knowledge of plant structure, controlled him and turned all labor into a work of love. This work—and we hope others to follow—will stamp his character and lift it above what his modesty would have shrunk from.

A FOUR and a half ounce gold nugget has been found about 20 miles from the famous Broken Hill mine, Australia. So it is probable a new district will soon be opened.

The Copper Situation.

Later news confirms the statement made in the PRESS of last week concerning the situation in the copper mining industry. The conference at Paris was not very satisfactory, and the French syndicates were unable to "bluff" the representatives of American mines. They wanted production restricted; and export from this country restricted to 20 per cent of the product. The Americans came away without any definite conclusion being reached. Mr. J. B. Haggin of San Francisco, one of the representatives for this country, said in New York when he returned, Monday: "There's nothing to say except that every tub must stand on its own bottom, and we've come back to throw our copper on the market for what it will bring."

It is said that at first the Frenchmen did not show much inclination to attend the meetings. The Rothschilds and the Bank of France people in particular, seemed to consider it *infra dig* to comply with the request of the American committee for a conference. At last a number of meetings were held, and finally Mr. Haggin rather astonished and startled the Parisians by the following plain and characteristic speech. He said:

"Gentlemen, I have listened to this discussion several days. If I have been edified I have not been instructed. You do not seem to appreciate the situation. It is this: I mine copper to sell, not to keep it to look at. It costs me nothing to mine my copper. The silver extracted from my ore yields such a profit that my copper is practically a by-product. But suppose I say copper costs me three cents per pound, ready for delivery in bars, you will see I can sell it at a profit whether you agree on a price or not. The Calumet and Hecla copper is better than my own, but it does not cost its owner over two cents a pound more. The Calumet and Hecla mine and my mine, the Anaconda, produce at the present time 60,000 tons of copper annually, but neither of them works full capacity. The Calumet and Hecla has 13 shafts and works only three. If that concern and the Anaconda work full capacity they can supply the world with nearly three-fourths its annual consumption of copper. We who compose this American committee have crossed the Atlantic to confer with you and assist in relieving your difficulties—for the difficulties are yours, not ours—but we are prepared to make concessions, and to expect you to do likewise. As I mine copper to sell, I shall return to America within a few days and sell it; meanwhile, if we can make an arrangement, well and good; if not, I shall put my copper on the open market and sell it for what it will bring, and you must be prepared for the consequences."

The Mining and Scientific Press.

We hope that our readers will notice the especially interesting number of the MINING AND SCIENTIFIC PRESS which is published this week. Our correspondents have contributed several articles of value and interest which should be read carefully by all interested in mining matters.

Owing to the broadening of the mining field, the increase in correspondence and advertising patronage, and a desire to improve the paper, we have found it necessary of late to add four pages to the regular size of the paper, making 20 instead of 16. This has enabled us to present a greater variety of reading-matter each week, and has also given more space for illustrations. It will have been noticed that more engravings have been used of late than was formerly the case, and this feature we intend to still further broaden.

The PRESS, now the oldest mining journal in the United States, is to be found in all the mining camps on this coast. If our old subscribers will call the attention of new-comers to its merits and usefulness, they will confer a favor on them and on the publishers. No one connected with the mining industry can afford to be without a paper which is devoted to that interest.

MINING ENGINEERS COMING.—A special train with a party of mining engineers, numbering about 75, will start from New York for a tour of this coast soon. The trip will be for pleasure, but the route will be such as to afford the engineers an opportunity for visiting some of the larger mines of Colorado, Nevada, California and Arizona. The party will arrive in San Francisco about the 1st of June.

R. W. CHASE, formerly superintendent of the Savage mine, Virginia City, died suddenly of pneumonia last Sunday.

EXCITEMENT prevails at Hope, Idaho, over recent mineral discoveries.

The Trial of the Charleston.

The new steel cruiser Charleston, built by the Union Iron Works, returned on Monday from her preliminary trial trip in the Santa Barbara channel. Altogether the trial was satisfactory, but some changes will be necessary before the speed trial is finally made. The vessel was found to be a good sea boat. The steering apparatus, boilers, etc., all worked well, but there was some difficulty with the air-pumps and the cross-head slides of the starboard engine. With 40 revolutions the speed was about 6½ knots; with 72 revolutions, the speed was 12 knots; with 98, 17 3 10 knots; and with 109 revolutions, 18¼ knots, which speed was maintained for 15 minutes. The indicated horse-power was, with the auxiliaries, 5900, this being within 100-horse power of what the engines must develop to be accepted.

Hard spots on the hammered-steel engine slides caused heating with the starboard engine, so that the 4-hour speed trial could not be made. New shoes for the crosshead will be put on or new phosphor-bronze slides substituted for the steel. A vacuum of 27 was maintained at ordinary speed; but it is probable that larger air-pumps will be substituted for those now in the vessel in order that this part of the machinery will be more satisfactory.

The naval officers detailed to inspect the Charleston declare that with a developed horse-power of 5500 she is one of the fastest fighting ships in the world, and, with the modifications to be made at the works, she will not only be able to excel with 7000-horse power the record of the Naniwa-Kan, her sister ship, but threatens to rival the one or two exceptionally fast cruisers which have covered 19 knots. All of those on board during the first trial were pleased with the results, though further trials must be made before the ship will be accepted by the Government.

Some changes were made in the air-pumps from the original designs employed in the Naniwa-Kan, but these do not appear to have remedied the defects sufficiently to make a complete success, so that larger ones will be made.

The fact that the ship made such good speed on her preliminary trial proves that she will be a very fast ship when everything is in good working order. It usually takes several trials before everything is satisfactory to the Government officials. It might be as well to make future trips only as far as the Farralone islands and back until everything is found to work well, since in that case the ship will only be a few hours from the shops, where repairs or changes can be quickly made. When everything works smoothly she can then go to Santa Barbara channel for her speed trial in smooth water.

A "Water-Power" Cable Road.

An enterprise that gives promise of very flattering results is that of the Spokane Cable Road now being built at Spokane Falls, W. T., by the Western Cable & Street Railway Company.

The largest item of expense in running a cable road is necessarily that of power. The road referred to will be operated by water-power originated by the Spokane falls, and located in the heart of the city. It is calculated that at least 30,000 horse-power can readily be obtained from the river at this point, for manufacturing and other purposes, of which perhaps some 150 horse-power will be used to operate this road, and at a merely nominal cost.

The road is 3½ miles long, single track with turnouts, and passes over two bridges, one of which is 1600 feet long and a first-class example of bridge construction, costing some $45,000.

The machinery for the road is being built at the Vulcan Iron Works of San Francisco, from designs of H. C. Holmes, Esq., the engineer of the road.

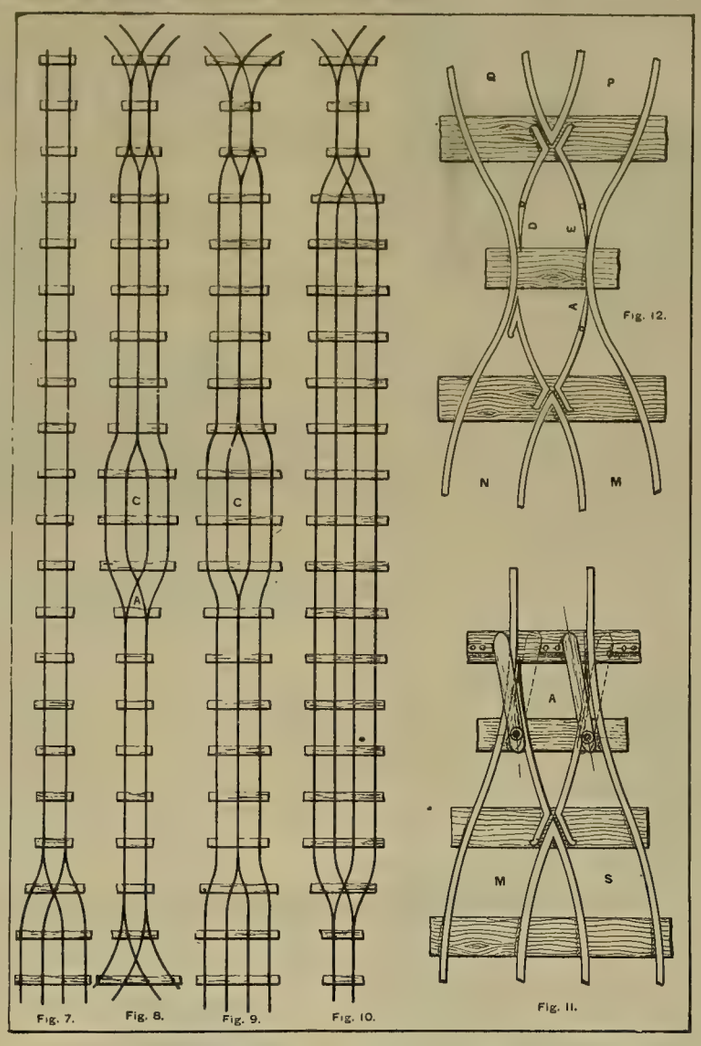
MECHANICS' FAIR.—Secretary Culver of the Mechanics' Institute says it is intended to make the machinery department the most prominent feature of the Institute exhibition this year. The city has been thoroughly canvassed, and all of the leading foundries and machine shops have promised to make exhibits.

JAMES M. MCKEOWN, once a millionaire Nevada miner, was murdered on his ranch near Aztec, Arizona, this week.

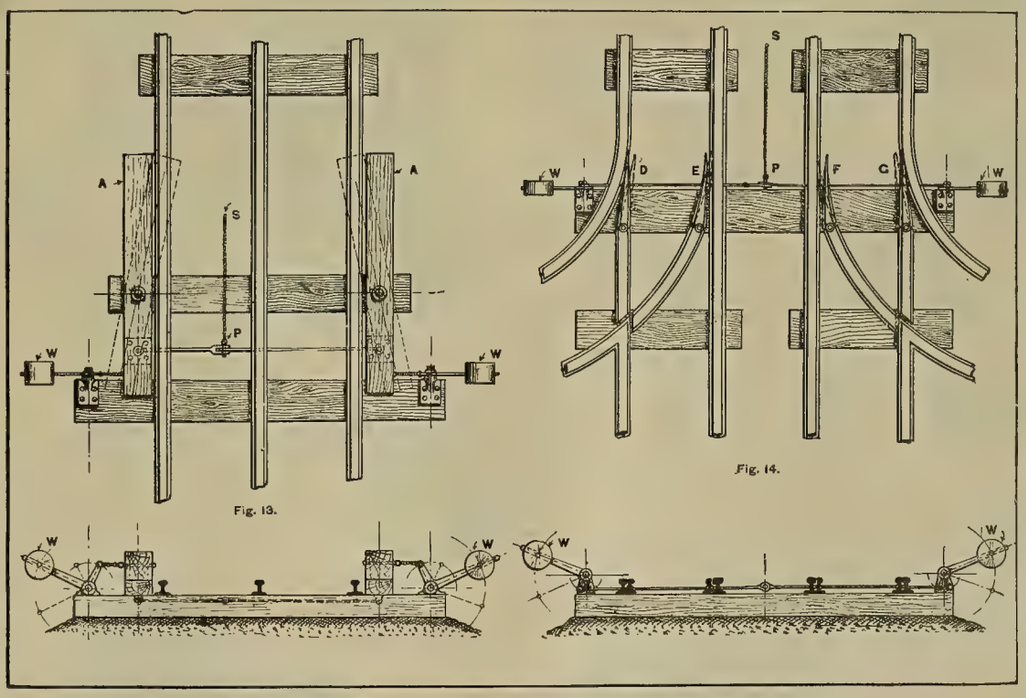
Tracks for Inclined Planes.

Inclined planes for shaft inclines or for bringing coal or ore down a mountain-side to cars or reduction works, are common in many places. In either type of inclined plane the line of descent may be curved or have variable grades, the only requisite being that the fall shall be in one direction and that the grade shall be sufficient to enable the loaded or empty car to descend by gravity. In a paper read before the American Institute of Mining Engineers by Frank C. Roberts of Philadelphia, he discusses quite elaborately wire-rope haulage and its application to mining, and gives considerable space to the inclined-plane systems. Fig. 7 of the cuts given herewith shows the method of running from double to single track and vice versa. Fig. 8 represents the most economical arrangement of tracks, while it has the merit of a capacity equal to that of any other. The section *C* is termed the *parting*, its purpose being to enable the descending and ascending cars to pass each other. For this reason it is placed in the center of the inclined plane. The distinguishing feature of this road-bed is that above the parting we have three lines of rails, while below we have but two. This plan necessitates the use of an automatic switch at the lower point (*A*) of the parting (see Fig. 11, which is, however, reversed in position as compared with Fig. 8). This simple arrangement consists in two iron-bound timbers pivoted at one end and moving over the rails. In the illustration the switch is arranged so that the loaded car going up will take the track *S*, while the wheels of the descending car on *M*, in passing *A*, will shift the switch to the position shown in dotted lines. When the next loaded car ascends, it passes into the parting on the track *M*. This arrangement of road-bed has been used with great success, and the general verdict of the mining community is that it answers, to all intents and purposes, the ends sought by more expensive devices. To avoid the necessity of the automatic switch at the lower end of the parting, the system illustrated in Fig. 9 has been devised. Its operation will be readily understood from the figure. The double-track incline, Fig. 10, is frequently employed, but the extra expense of broader road-bed renders it less common among mines of ordinary capacity. Where the output is very large, however, its advantages are evident.

An important detail in connection with all inclined planes is the arrangement of switches placed at the mine end of the plane. Fig. 12 shows a simple and efficient device. The switch consists of three pivoted tongues, which govern, according to their position, the disposition of the cars. In the gravity system the loaded cars descend alternately by the tracks *P* and *Q*, and the empty cars always pass to *N*. In the engine incline the loaded cars *ascend* alternately by the same tracks, the *loaded* cars here passing to *N*. As the switches are placed the empty cars in the gravity plane will pass to *N* and the loaded car advancing by *M* will pass to *Q*, while the empty car returning by *P* will open *E* and close *D*. *A* being closed, the empty car passes again to *N*, while the next loaded car advancing by *M* descends the plane by *P*. Except that the tongue *A* has to be kept closed by a tender, the switch is automatic. The same is true of the operation of the switch at the head of an engine plane, except that the loaded instead of the empty cars pass to *N*. In all inclined planes it is necessary to employ some form of safety device to provide against accidents arising from the breakage of the hoisting rope. The chief objection to these devices is that they are all controlled by a man stationed at the head of the plane.



Figs. 7 to 12—ARRANGEMENTS OF TRACKS FOR MINE INCLINES.



Figs. 13 and 14—SAFETY DEVICES FOR STOPPING RUNAWAY CARS.

Fig. 13 represents a simple device for stopping runaway cars. Two heavy iron-bound timbers *A* are pivoted near their centers at the side of the outer rails, as shown. The arrangement of counterweights is such that when it becomes necessary to bring the timbers into action the pin *P*, forming the connection between the two timbers, is withdrawn by pulling the wire *S*, connecting with the head of the plane. As a result, the release of the counterweights *W W* throws the timbers over the rails, as indicated by the dotted lines. A number of these devices are placed along the incline, all being connected to the single wire leading to the head of the plane. This method is somewhat inferior to the one illustrated in Fig. 14, owing to the uncertainty of stopping the cars when descending at a great velocity, their tendency being to jump the timbers and continue in their course. The device shown in Fig. 14 consists in side-switching the car. This is performed by the tongues *D*, *E*, *F* and *G*, actuated by a system of bell-cranks and weights, as shown. The switch is held open by the pin *P*, and when this is withdrawn by means of the wire *S*, the switches are closed by the action of the counterweights *W*. This device, although resulting in the partial destruction of the car, renders the danger to life and valuable property considerably less than the preceding arrangement. What is known as the *dead fall* is employed in some mines. A heavy timber, guided in an upright frame, is placed over the track, and when released falls over the rails.

Mexican Mining Districts.

Copalquin.

Continuing his interesting descriptions of Mexican mines, Mr. A. H. Dubois says:

Copalquin district is located in a deep gulch between ridges breaking abruptly from the mesas or high tablelands of the Sierra Madre mountains. The country rock here consists mainly of porphyries and highly metamorphic rocks and some shreds of granite. Farther up toward the mesas the rocks are metamorphosed in a lesser degree, still showing stratification.

The mineral deposits seem to be unproductive in the granite, whereas in the porphyry and metamorphic rocks there exist a large number of lodes and of smaller veins on which are to be seen numerous prospect holes, mostly very imperfectly developed. However, several of them have produced considerable quantities of gold and siver bullion.

The Refugio property between the years 1850 and 1860 yielded to a reckless mining laborer, "El Zacatecano," a considerable bonanza of extremely rich gold ores at surface. Some $2,000,000 worth of gold bullion was sold in Culiacan; nevertheless the owner died in abject poverty.

The vein or veins—for there seem to have been several at least on surface, the main pay streak being a narrow streak of decomposed carrying one ounce or more of gold per pound—seems to strike nearly due east and west with a northerly dip. These bodies seem to have laid nearly horizontal, the dip not having been over 15°. Farther into the mountains the dip seems to become steeper.

As might be expected, these outcrops were gouged out and the workings caved in; nevertheless the property was sold, on its record, for a considerable sum of money.

Subsequently the old workings were reopened and some little investigation instituted, but nothing of any consequence was met with.

A tunnel some 300 feet in length has been driven in the hope of crosscutting the ledge at a depth of about 120 feet, but owing to the small dip, it is probable that it is yet very far off. So far this tunnel has intersected mere stringers of quartz carrying but scant silver and gold ores.

Worked-Out Claims.

So much for mere records and for sanguine speculators who seem to labor under the delusion that a mine with a record—in fact, the shell of a worked-out bonanza—constitutes a property; and once such a property is obtained, the happy possessor is on the highway of acquiring at an expenditure of little labor and less judgment—an independent fortune.

Nothing is further from the truth. Bunches and chimneys of ore in mineral veins constitute the exceptions; large stretches of barren vein stuff or of low-grade ores seem to be the rule, these usually only being enriched when exceptionally favorable circumstances concur.

Copalquin consists of a straggling street of adobe houses in a narrow gulch 3000 feet above the sea level. On the precipitous declivity of a spur 900 feet above the town is the "San Manuel property," containing a large ore body, the "Santa Apolonia lode," which is in breadth over 20 feet and trending north and south (parallel to said spur) and with an easterly dip of 45 degrees, the mountain-side falling abruptly westward. This deposit is intersected by two small veins trending also north and south, but dipping to the west the same as the San Manuel lode proper, which is too far out on the mountain-side to intersect the Santa Apolonia, at least according to the present profile of the mountain.

San Manuel Property.

The developments on this property consist of a crosscut (from the open workings on the outcrop of the San Manuel, now leveled off as a platform) by which the Santa Apolonia has been reached. There is a chimney of ore (some 20 feet east of the crosscut) extending about 40 feet on the vein, which yields very good free-milling ore assaying in bulk some 50 ounces silver and one ounce gold per ton, besides a good deal of exporting

grades of ore. On sinking on this deposit, following down on the footwall, the dip was soon found to grow steeper and soon reached the perpendicular. It shortly changed to a westerly dip, the deposit narrowing down considerably. The vein stuff and ores also totally changed in character, besides becoming considerably poorer and baser.

It would seem that one of the veins (intersected in the main tunnel at about 200 feet in) which should intersect and naturally displace Santa Apolonia, was unconsciously reached and followed down; and eventually communication was effected on the same vein with the main tunnel.

The main San Manuel tunnel, now in 390 feet, was started by the former Mexican owners of the property, and by them driven over 300 feet, at a level 160 feet below the crosscut, in the hope of intersecting the Santa Apolonia at a little over 400 feet, as might be expected in case this deposit was not the displaced outcrop of the "Cucaracha."

In fact, on climbing up the steep hillside above the crosscut at a vertical hight of about 100 feet, we find an outcrop, the Cucaracha, on which some superficial prospecting points to a large deposit of low-grade quartz. The vein stuff and ores are all similar to the Santa Apolonia, and probably will prove to be the deposit of which Santa Apolonia would be merely the displaced (slipped down) outcrop.

The crosscut by which the Santa Apolonia was reached would have to be extended some 200 feet to reach the Cucaracha deposit.

Very recently I had a conversation with a gentleman connected with the Nashville, Tenn., enterprise. The Refugio Gold & Silver Mining Company are the owners of the Refugio and San Manuel properties. I understand that rational developments on the same will soon be energetically undertaken with view of exposing the Santa Apolonia deposit and of fully investigating the Refugio property. They will also develop some of the other properties owned by same company, these last alluded to consisting of half a dozen undeveloped prospects, some of them opened on promising deposits in the same camp.

This company has a 10-stamp silver mill with Washoe pans moved by steam-power, in which the ores derived mainly from the San Manuel property have been carefully and successfully worked with moderate losses of quicksilver producing a considerable amount of bullion, probably over $300,000 in value, one-third of which product was referable to the gold contained in the ore.

The character of the ores worked seems to be similar to those now derived from the Comstock.

Another Valuable Property in the Same Camp

Is the Soledad mine, owned by the same parties as the San Ignacio, previously described. The Soledad is some 200 feet in depth, worked on a large vein (5 to 10 feet in breadth), producing much free gold with silver ores proper and a considerable amount of rich pyrites. The best ores are exported and the bulk of the output, carrying from one to six ounces gold and frequently much more, besides 40 to 80 ounces silver per ton, are being piled up for treatment by Patio process, better returns being derived by same than by the Washoe process proper, using cupric sulphate and salt. This latter system has only yielded 60 per cent of the gold and silver called for by the battery samples.

Parallel to the Soledad vein and some 60 feet distant is another considerable deposit, the *Veta-tierra*, seemingly 10 to 15 feet in breadth. It has so far been investigated only by an open cut, showing it to carry red ocheraceous ores, both gold and silver bearing, evidently decomposed pyrite.

A tunnel now in about 250 feet will soon open out the lower level of this mine, at which depth a breast of ore some 10 feet in breadth, bearing ore probably worth $100 per ton and seemingly part of a chimney some 40 or 50 feet in length along the course of the vein, is now in sight.

Besides these, numerous strong veins exist, all showing silver and gold ores, on some of which prospects are scantily developed. Capital, energy, judicious development and efficient reduction works are alone requisite to make the Copalquin district a very flourishing one indeed.

Copalquin is at present the quietest, best-behaved and securest camp I have met in all Mexico. The sale of liquor—the maddening mescal—is carefully prohibited. Strict lynch law is carried out on all robbers and burglars in the large extent of these mountainous districts owned and controlled by the numerous energetic and influential Rocha family.

Following down the Copalquin creek a couple of miles, we come to

The Village of Limon,

Some 1500 feet above the sea level on the Limon river, with plenty of water all year round and presenting remarkable facilities for utilizing quite considerable water-power in convenient locations for milling purposes. Undoubtedly this is the location for the mills when the Copalquin district is developed as it deserves to be.

Some five miles further down the Limon river, on the trail leading to Culiacan, is the Chihuahuilla mine, a very valuable property owned by Mr. R. Rocha. The lode is several feet in width and produces rich gold and silver ores, of which a considerable proportion are exporting grades. The rest is ground in four arastras moved by water-power and reduced by Patio process.

These ores consist of a matrix of hard flinty quartz stained with hematite, and carry coarse gold, argentite, horn silver—often massive—besides polybasite and other silver minerals proper. Specimens of argentite with very coarse horn silver are found.

Lower California Mines.

Geology of the Alamo Camp.

[Written for the PRESS.]

Much has been said and written for and against the new gold discoveries on the peninsula of Lower California, particularly since the Alamo camp was founded; but so far, I think, no one has described the geology of that section so as to give intelligent mining men a chance to form opinions and draw conclusions without a visit to the district.

With many men the geological formation of a new mining camp decides the question at once, whether they will give the matter any further consideration or not; and these recent discoveries have been so decried by the press and so misrepresented by would-be reporters, that a truthful statement is due the country.

The country rock for many miles around the Alamo camp is a syenite, in most places much decomposed, so that the stream beds are filled with a sand or gravel of feldspar and quartz. On the bedrock in many places are accumulations of hornblende, which at first is mistaken for the ordinary "black sand" of the placers found elsewhere, and with this hornblende and epidote is found the placer gold in greater or less quantities.

But it is unnatural to look for placer gold in this district in any large amount. The alluvial deposits are everywhere light. There is no evidence of any glacial action in the mountains to have worn away the hard vein matter. There is very little frost at the present day to help the disintegration, and no great amount of rain to wash the gold into the gulches. Therefore, the soil on the level mesas and on the hillside pays nearly as well as the bedrock of the stream beds. Acres of this mesa soil have already been scraped up and taken to water, where it is put through the rocker, averaging at least day wages to all that work hard for it.

In the basin of the Alamo I found with the placer gold considerable native amalgam; also some platinum, iridisinine, etc., but not in quantities that would change the output very materially.

Now in regard to the quartz veins; here is where the great value of these discoveries must be looked for.

Through the syenite rock with a northwest and southeast course run great dikes of trap of the diabase order, but in some places changing to a porphyry. There are probably from 12 to 15 of these great dikes, cutting mile after mile through the country, crossing valley, mountain, and mesa alike, and between them all run the quartz veins, parallel to and conforming with the diabase rocks. Some of these veins are "blind," and are only found by moving several feet of soft syenite. Others again crop out plainly for a long distance. Generally, however, the quartz carrying the most gold is softer, being associated with iron oxide, and often the iron has re-formed as a hard hematite. Some of the veins are inclosed in walls of syenite; others again show one wall of chloretic slate, and nearly all stand vertical.

One thing is noticeable—where the quartz is mineralized with gold it is very uniform in its richness. Of course very little deep ore has been seen yet, but there are some pyrites observable, and it is arsenical and very rich in gold. There is no doubt but that this will be the character of most of the ores below decomposition, which will make concentration necessary.

Some of the veins show a little galena and lead carbonate on the surface, but so emphatically auriferous are these ores that the lead does not give a trace of silver, and the gold assays about $19 per ounce. Now, with the associate rocks and the well-defined condition of most of the veins, I see no reason to doubt the continuity of the ore bodies, but I do see strong reasons for thinking them continuous.

The camp is at an altitude of about 3200 feet. There is considerable timber within a few miles, mostly live oak. To the east in the main range are immense forests of pine. Water is plenty enough to run several stamp-mills and concentrators.

The writer of this has spent over two years on the peninsula, investigating its minerals, and during that time has traveled on mule-back 6000 miles, and is fully of the opinion that there are other points of equal interest in the mineral belt of the peninsula. All it needs is the right kind of men to explore and develop there. In regard to the mines at Santa Clara and Alamo, it all depends on who gets hold of the leading veins. With the right men at the helm, a splendid output of gold will be the result, and for this reason it is to be hoped that California mining men will lay aside their prejudice and the idea that "no good can come out of Nazareth," and investigate the country while fine prospects can be had at low figures. A custom-mill of say 20 stamps would be a grand investment, and would serve as an incentive to the prospectors to open up their claims. Sufficient ore for a mill of that size can be had without doubt. C. E. ANTHONY.

San Diego, May 5, 1889.

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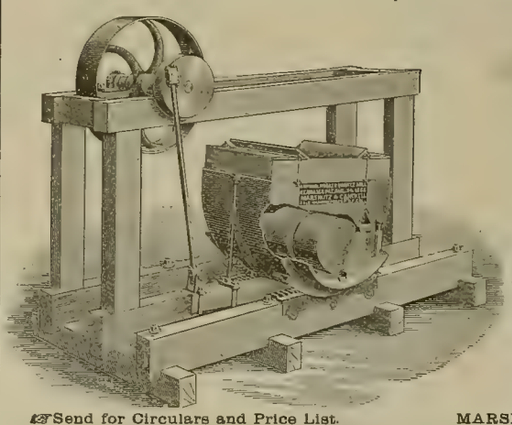

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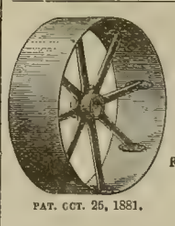

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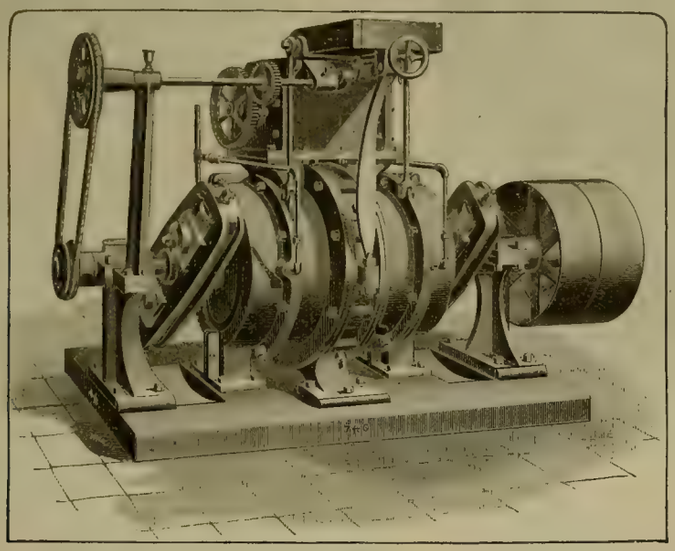

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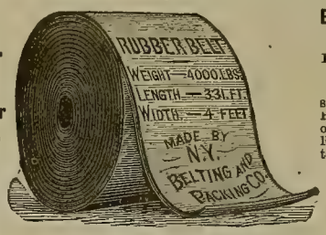

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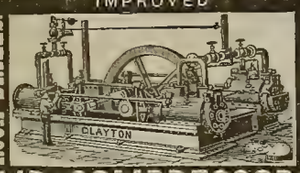

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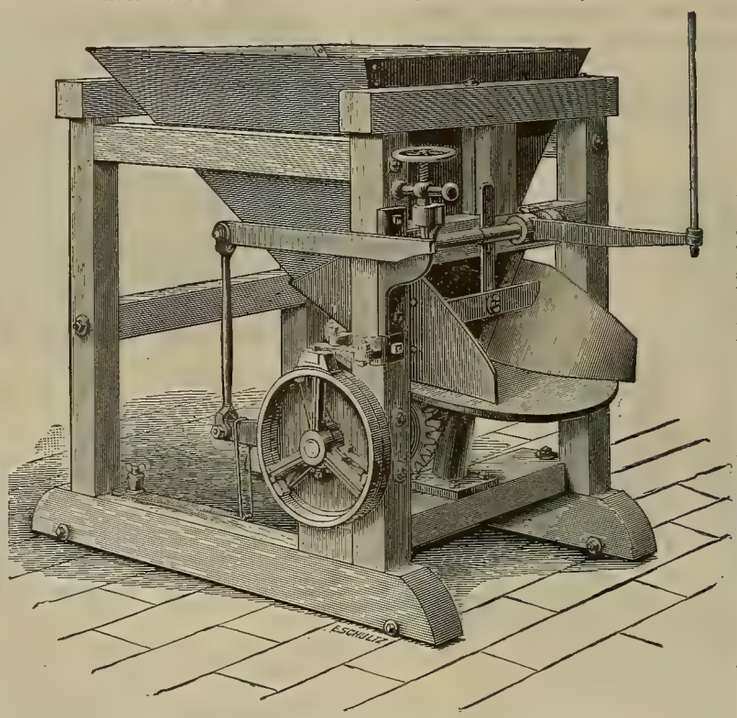

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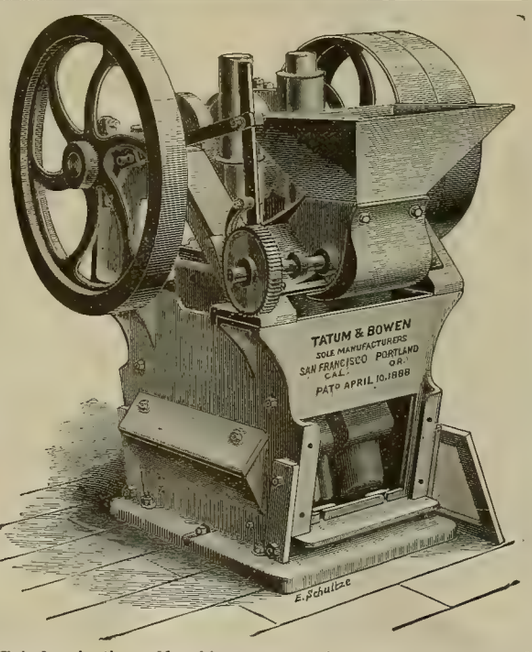


Attached to each Mill is an effective
Automatic Ore Feeder.

THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.
We manufacture, to go with the Mill, an

IMPROVED ROCK BREAKER.

Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address:

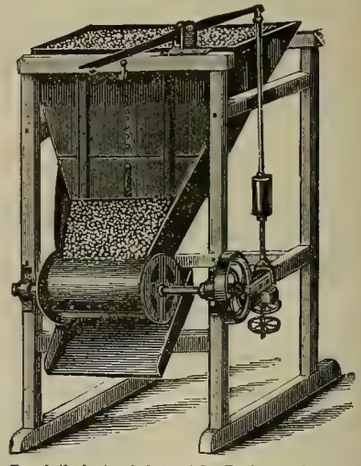
TATUM & BOWEN,
34 and 36 FREMONT ST., SAN FRANCISCO, CAL.,
AND PORTLAND, OREGON.
MANUFACTURERS OF MINING AND SAW MILL MACHINERY.

Dewey & Co.'s Scientific Press Patent Agency.

OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most *reliable* advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents,
220 Market St., Elevator, 12 Front St., S. F.
TELEPHONE No. 658.
A. T. DEWEY. W. B. EWER. GEO. H. STRONG.

THE ROLLER ORE FEEDER
[Patented May 28, 1882.]



THIS is the best and cheapest Ore Feeder now in use.
It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.
In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

Golden State and Miners' Iron Works,
Sole Manufacturers,
227 First Street, San Francisco, Cal.

TUBBS CORDAGE CO.
(A Corporation.)

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.
Extra sizes and lengths made to order on short notice.
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ADAM SCHILLING & SONS,
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Practical Machinists and Engineers.
Repairing of every description of Machinery promptly attended to.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING MAY 7, 1889.

402,727.—HAIR CUTTER—J. W. Eisenhuth, S. F.

402,816.—SASH FASTENER—Chas. H. Foster, Alameda, Cal.

402,918.—FIRE-ARMS—L. W. Gay, Wardner, I. T.

402,830.—INSULATOR FOR ELECTRIC RAILROAD—B. Jennings, San Jose, Cal.

402,139.—COMBINATION TOOL.—H. L. Kincaid, Stella, W. T.

402,791.—CAR COUPLING—J. A. Morse, Fort Bowie, A. T.

402,857.—WALL PROTECTOR—Robbins & Broad, Berkeley, Cal.

402,776.—STRAP FASTENER FOR TRUNKS—Chas. Sparks, Sacramento, Cal.

402,780.—ELEVATOR SAFETY DEVICE—P. B. Sullivan, Tuscarora, Nev.

402,932.—OILER—W. F. and C. E. Traves, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FASTENER FOR THE MEETING RAILS OF SASHES.—Chas. H. Foster, Alameda. No. 402,816. Dated May 7, 1889. This sash-lock for windows consists of a cam pivoted horizontally upon the top of the lower sash and having a V-shaped or beveled periphery, correspondingly shaped catches upon the vertical sash with which it may be engaged, a guard projecting over the opening or space between the two sashes to protect the cam from being moved from the outside, and a stop by which the movement of the handle in the direction of the window is limited. This device is specially useful for the purpose of locking and holding the upper sash when it has been dropped and partially open, and it enables one to lock one or both sashes at any point when partially open.

STRAP-FASTENER AND TIGHTENER FOR TRUNKS.—Charles Sparks, Sacramento. No. 402,776. Dated May 7, 1889. The invention relates to the class of fasteners especially adapted for securing and tightening up the ends of straps for boxes, trunks, etc. The invention consists essentially in a bar to which the opposing ends of the strap or band are secured, said bar being adapted to be rotated axially, whereby it rolls up the ends of the strap or band. The invention consists farther in connection with this bar, of a key for holding it in the position to which it is adjusted, and also in cases where found desirable of a bracket forming a bearing for the axially rotating bar. The object of the invention is to provide a simple and effective fastening and tightener for bands and straps of all kinds. It is especially applicable for securing and tightening the straps of trunks or boxes, especially of metal bands and straps, though it is applicable to tightening and holding clamping bands, which secure the metal couplings in the adjacent ends of hose.

INSULATOR AND HOLDER FOR ELECTRIC RAILWAYS.—Byron Jennings, San Jose. No. 402,836. Dated May 7, 1889. This invention relates to an insulator for the rails of conduit electric railways, the hood and the insulator by which the rail is suspended and insulated from contact with other conductors. The invention is specially designed to provide an insulator within which the electric conducting rails of a conduit electric railway are retained, and by which they are insulated from contact with their supports or other conductors. It has also for its object to retain the insulators within the hood in which they are held and prevent them from being drawn out of place by the expansion and contraction of the rail. In these roads there is an electric conducting rail in contact with which the wheels of a trolley (which conveys the electric current to the motor of the car) are caused to travel. As these rails serve to conduct the current of electricity throughout the length of the conduit, it is important that they should be properly insulated from the surrounding metal, and this is done by securing them in glass insulators which are fixed in hoods or supporting chairs attached at intervals to the yokes within the conduit. At present the rail is secured within the glass insulator by means of wire, which passes around the insulator and the rail, but the expansion and contraction of the rail is apt to draw the insulator out of its supporting hood or yoke, and the constant movement and vibration of the glass within the iron, caused by the passage of the trolley wheels over the rail, soon breaks off the projecting shoulders of the glass and causes it to fall out of its supporting hood, rendering it useless. These defects this invention is designed to remedy.

The Golden Treasure Mine.

[Written for the PRESS.]

This mine is situated on a ranch of 320 acres in Tuolumne county, all patented. Gold was discovered subsequent to the issuing of the patent, and by late decision of the Secretary of the Interior, goes with the patent, which makes the title perfect. The formation is granite, overlaying slate, with diorite dyke, accompanying the main lode, which is a direct continuation of the Buchanan and Eureka vein, etc., which I always designate as the main-master fissure, or mother lode of the upper belt, a contradistinction of the well-known mother lode of lower belt. The developments made on this property, which I will briefly describe, are principally found on the spur vein, which strikes from the main vein north 60° east. The course of the parent vein is north 45° west. The main incline shaft is sunk on the spur vein 350 feet deep, opened by levels; lowest 212 and 210 feet from near bottom of shaft, each side east and west. There are other levels from same shaft higher up of 70 and 180 feet long. The shaft is also connected by tunnel from almost water level of Sullivan's creek, a distance of 280 feet, through which the pumps discharge the water. It is in this tunnel the main vein was intersected, and proved to be a lode of 7 to 10 feet wide, which has been drifted 200 feet west, to intersection of spur vein, where very rich rock was found showing free gold. The poorest rock on this vein yields $7 to $9 a ton and sometimes as high as $20.

Parallel with this main vein runs a diorite dyke, near footwall, with soft granite between it and vein. The spur-vein rock has a milling value of from $8 to $40 per ton, and even higher in free gold. The deeper the lateral developments have been extended the richer the quartz is found to be. The chutes on the surface are not long but "fan out" as depth is attained, making, so far as explored, one continuous gold-bearing and payable deposit. The angle of pitch of the spur vein is 33 degrees; a flat vein dip about north. At the junction of the two veins at lower level in the shaft a body of quartz was crosscut, showing a vein of 25 feet wide and "pay" all through, milling an average of $8 per ton. No stoping has been done, but several thousand tons of rock have been extracted, and over 1000 tons crushed, with exceedingly good results. This ore was taken indiscriminately from the dump. About 125 feet from the main incline shaft another has been sunk 80 feet, disclosing rock of the value of $25 and upward per ton. Besides there are a number of small prospecting shafts ranging from 10 to 30 feet deep, all and each showing a large vein with good pay quartz, none of it worth less than $7 per ton where taken from a "chute." The spur vein contains rich arsenical pyrites from 1½ to 3 per cent of assay value, averaging $300 per ton concentrates. Further I find a rich molybdenite containing a heavy percentage of gold, which I have personally tested. I find also chalcopyrite and galena. All these bases contain considerable gold mechanically combined and of great value. I have seen some very pretty specimens of "mariposite," which, from its apple-green color, is readily distinguished. I have made a vast number of scorifications and fire assays, and have milled, or had milled under my direction, hundreds of tons, with in all cases payable results, often exceeding my most sanguine expectations.

The best feature of this mine is, that as the workings descend, the value of the rock steadily improves, and being nearly all below water-level, viz., 250 feet from adit, speaks alone for its general permanency. I consider this property has merit and prospective value second to none in the State. I have watched its developments for the past 11 years, and predict a great future. Some English company will secure this property without a doubt, while Americans living at its portals will let it slip through their hands.

A number of smaller veins cut into the hanging-wall at intervals north and south, which have not been individually opened on, but they act as feeders to the veins and thus serving their true purpose. I know them to be rich. The two veins extend through the patented land some 4000 feet and for the entire distance along the line. I have prospected and had prospected; no place has been found without payable quartz apart from the regular workings and from the surface outcroppings. Furthermore, 500 feet from the base line of the spur vein is found another large, solid, compact lode of 12 feet in thickness running through the entire property, but only very partially explored. The rock I have tested, and it has been tried by other competent experts and its surface value proved to be $7 to $8 per ton.

The fact that a parallel vein of such great magnitude and value does exist is worthy of more than a passing notice. Besides, there are many other veins that I know of that show surface merit and value, yet to be developed in the near future. This property is a veritable bonanza, as time will prove, and Tuolumne county, now to a certain extent discarded or forgotten (probably for want of railroad communication), will surely shine forth as the brightest star or jewel in California's diadem.

There are suitable forests of yellow pine, for mining purposes for all time, surrounding the property and on it. The water supply is simply unlimited, having an altitude above the works of 1000 feet. This can be made available for hoisting, milling-power, etc., but must be paid for at the rate of six to eight cents per inch, or by special contract from the Tuolumne Water Co. There is the free water of Sullivan creek, which may be made available for overshot or turbine wheel, giving moderate power only. There is a ram that now throws the feed-water to the boilers from the creek. There are miners' cabins, boarding-house, office, blacksmith shop, etc., all well equipped, in good preservation, besides two 12 horse power steam engines, boilers, etc. One of these is for hoisting and pumping, with Cornish pumps; the other serves to run or drive a Huntington roller quartz-mill, rock-breaker, Hendy Challenge ore-feeder and Victor concentrators. There is a good, substantial, hard-finished two-story dwelling-house, with stables, barns, etc.

The hospitable and lucky owner, Moses Hyde, is always ready and pleased to entertain any one who wishes or desires to visit and inspect his property. A good bed and mountain fare in abundance is always at the visitor's disposal.

This magnificent estate is laid out in valuable orchards, grain-lands, etc. I almost forgot to mention a placer deposit of 1½ miles long, the major portion being unworked, but a goodly number of thousands of dollars have been washed out from this source alone, and many thousands left in bank in Mother Earth.

Picturesquely, it is one of the most beautiful places in the mountains. It is, so to speak, a sunken plateau surrounded by pine-clad mountains, traversed in the center by a sparkling trout stream (full of fish). On the banks may be seen in the season trees laden with ruby and golden fruit (apple, peach and pear), and green clover-fields spread their fragrant carpet over this beautiful oasis. ARGUS.

Safety Guards for Cable Roads.

Owing to several accidents which have occurred of late on our local cable roads, there is an imperative demand by the public for more efficient safety guards on the dummies. Some of the roads have no devices of any kind. Those on the more hilly portions of the city contend that devices which serve the purpose on level roads will not answer on theirs, owing to frequent and sudden change of grade.

The Board of Supervisors have taken the matter up and this week passed a resolution requiring all cable roads to adopt some safety device within 60 days. At a committee meeting a number of inventors submitted their safety appliances to the supervisors and representatives of the cable roads. Some very impracticable plans were submitted as well as others of merit. Among the inventors who showed models or drawings were: R. M. Elwards, Frank Loftus, C. P. Ware of San Rafael, J. K. Smedley, W. J. Watkins, J. Peterson, H. Montag, N. Beauregard, H. J. Baddeley of Napa, P. F. Dundon, W. P. Howland, Thos. Carter, D. L. Smith, F. McPherson, W. G. Hoffman, H. E. Pohlman, B. D. McEachern, Police Officer McLaughlin, Charles H. Ohm, William Hughes, William F. Eneign, William A. Holland, and Horace Ewing.

There is no doubt that the demand for a safety device will be met by one or more appliances which will be suited to the various conditions. Aside from the number already invented since the agitation commenced, numerous inventors have applied for patents through the MINING AND SCIENTIFIC PRESS Patent Agency, and many of these patents are still pending.

Chinamen Cannot Return.

The Supreme Court of the United States has affirmed the validity of the Scott Act by confirming the judgment of the Circuit Court in the case of Chae Chang Ping. This Chinaman went to China, taking with him a certificate of prior residence, similar in form to the certificates under which Chinamen had been returning for several years. Before he came back the Scott Act was passed, depriving such certificates of validity and absolutely closing the door against all Chinamen, whether they had been prior residents or not. The Chinaman rai ed the point that his certificate was a contract by which the United States were bound. The Supreme Court holds that it is not and that the United States have the power to exclude Chinamen at their will, notwithstanding the reservation in their favor contained in the Acts of 1882 and 1884.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

CORPORATIONS AND CITIZENS.—The U. S. Supreme Court has just made an important decision regarding the locating of mining claims. A point was made in a Colorado suit that the laws of the United States did not permit the entry of mining property by any but citizens of the United States; that a corporation was not a citizen. Judge Field, in his decision, holds that a corporation is a citizen within the meaning of the laws, and can enter mining property.

Mining Share Market.

Trading the past week in both Comstock and outside stocks was light, with a steady shading in values. The constant wear on the patience of outside holders of stocks has naturally caused many to let go, which has allowed the "pool" to concentrate to a better advantage the stocks desired for leaders in an upward move. When the move will be commenced is an open question which the outside public is at work to answer. The large majority do not look for much previous to fall, say about October, and in the meantime low prices will obtain so as to get the last share that is possible to be had from outsiders. In this, it is said, the pool will be assisted by assessments, and the work now going on in the leading mines not calculated to run into any important body of ore, or at least, the public will not know it if it should happen to be done. The brokers report very few stocks held on a margin by outside operators; this, in a measure, is confirmed by the banks reporting the brokers having balances to their credit. The news from the Comstock mines is of a meager, unsatisfactory nature, entirely different from what it was five months ago, when the pool was peddling stocks. Those who claim to be well informed on the situation in the mines, assert that the work now going on in Ophir, Mexican, Union, Potosi, Alpha, Challenge and Confidence is of a very important character. In Belcher and Crown Point as work on the lower level progresses, it is thought that they should deserve more careful watching, particularly when work is inaugurated on the Sutro tunnel level. Some of the Tuscarora stocks after being cut more than half in two by dividend talk, are now advancing on assessment points. The Quijotoas and Bodies remain idle and unattractive.

The stock market opened to-day (Thursday) weak under strong bear reports, but among the well informed it is claimed that an upward move is near at hand. Official advices received yesterday from the Gold Hill mines are of a bearish character. Advices from the middle mines are of a non-committal character. Yellow Jacket's ore assays $30 a ton. The bears think this is a mistake on the part of the pool; it should, they say, be lower.

Advices received to-day (Thursday) from Virginia City report that a drift has been started in Con. Virginia to run into Ophir so as to intersect the ore body run into in the latter mine some years ago by Patten. An improvement is reported in Alpha. The trench to drain the crescent in Union is finished, and work is to be resumed in the crescent.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

PACIFIC COAST SYRUP CO., May 11. Capital stock, $100 000. Directors—P. L. Wooster, R. S. Palastri, Fred Weeker, B. J. Hopacher and A. G. Hawes.

RIO BRAVO VINEYARD & RAISIN CO., May 11: Capital stock, $80,000. Directors R. E. Houghton, Chas. H. Bunn, J. W. Litchfield, Geo. C. Sweet and H. A. Blodgett.

GUARANTEE LOAN & TRUST CO., May 13. Capital stock, $500,000. Directors D. H. Jones, E. W. Wheeler, C. R. Slawson, S. P. Platt and J. C. Pinto.

NEVADA AND CALIFORNIA M. & TRADING CO., May 13. Capital stock, $200,000 Directors—P. J. White, N. C. Fassett, James W. Burlong, W. F. Lyon and Edmund Marks.

HARTERY CON. M. CO., May 14. Location, Grass Valley. Capital stock, $1 000 000. Directors—A. W. Stoddart, Chas. E. Uren, John M. Thomas, Geo. W. Whiteside and A. D. West, all residents of Grass Valley.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Nevada Queen, May 14, $15,000; Navajo, 15, $6000; Con. California and Virginia, 11, $72,207; Hale and Norcross (for April), $90,535; Mt. Diablo, 16, $10,650; Queen of the Hills, 9, $1300; Hanauer, 9, $3300; Savage (for April), $24 426; Hanauer, 10, $1850; Queen of the Hills, 12, $1400; Hanauer, 12, $1400; Alice, 11, $33,440; Moulton, 11, $12,432; Blue Bird, 11, $18,992; Lexington, 11, $21,632.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

A. F. JEWETT—Tulare Co.
F. B. LOGAN—Southern California.
H. G. PARSONS—Southern California.
GEO WILSON—Sacramento Co.
J. C. HOAG—San Francisco.
CHAS. F. BLACKBURN—Idaho.
FRANK S. CHAPIN—Colusa Co.
MRS. E. J STEPHENS—Sierra Co.
R. G. HUSTON—Montana.
E. H. SCHAEFFLE—Calaveras and Tuolumne Cos.
WM. WILKINSON—Amador and San Joaquin Cos.
CHAS DUGAN—Stanislaus Co.
R. G. BAILEY—San Francisco.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

WM. H. TAYLOR, President. R. S. MOORE, Superintendent.

Risdon Iron and Locomotive Works,

S. E. Corner HOWARD and BEALE STREETS, SAN FRANCISCO,

MANUFACTURERS OF ALL KINDS OF

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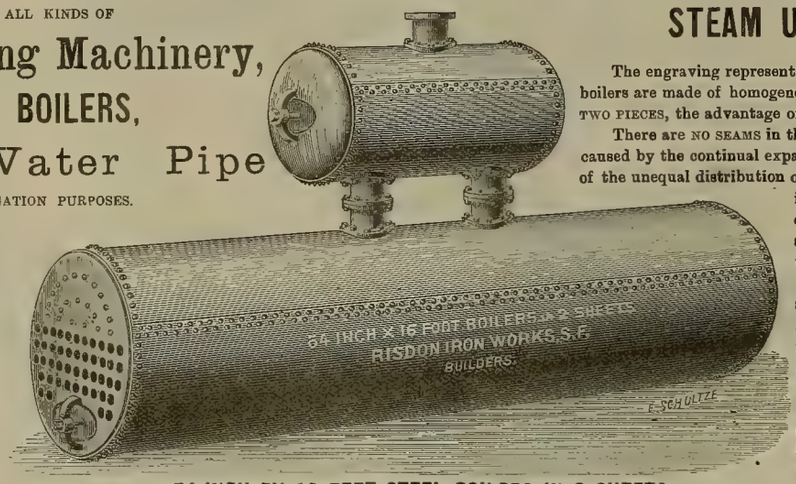
Bryan Roller Quartzmill,
Best in the World,
—AND—
SAWMILL MACHINERY.

Heine Patent Safety Boiler
—AND—
Macbeth Steel Pulley.



54-INCH BY 16 FEET STEEL BOILERS IN 2 SHEETS.

STEAM USERS, ATTENTION!

The engraving represents our standard 54 in. x 16 ft. Boiler. These boilers are made of homogeneous STEEL, and the shell, as shown, being in TWO PIECES, the advantage of this will be readily appreciated by steam users.

There are NO SEAMS in the fire to leak, nor loose rivets to contend with, caused by the continual expansion and contraction of the plate on account of the unequal distribution of the heat under the boiler, the bottom presenting a smooth, even surface which can be easily cleaned. We place a manhole at the back end above the tubes, and one in the front end under the tubes.

The FRONT MANHOLE gives free access to the sheet over the fire, THE VITAL PART OF EVERY BOILER. This point is often overlooked by purchasers, and boilers are supplied with a small hand hole, and the remaining space filled with tubes which allows absolutely no access for cleaning, and in a short time tubes and sediment are one solid mass, and instead of gain in efficiency by a few feet of tube surface, he result is a positive loss.

SPECIFICATION OF BOILER AND FIXTURES:

1 Boiler, 54 inches diameter by 16 feet, with 46 3½-inch tubes; Shell, 5-16; Heads, 7-16.
1 Steam Drum, 36 inches diameter by 72 inches long.
1 Breeching.
1 Smokestack, 30 inches by 60 feet, Nos. 12 and 14 Iron.
300 feet galvanized strand for Guys.
1 C. I. Front, complete.
1 Foundation Plate for front.
1 Set Grate Bars for coal or wood.
1 Back Bar Bearer.
1 Ash Cleaning Door and Frame.
1 Back Arch Plate.
1 Set Binder Braces and Bolts for Brickwork.
1 Stand for back end of Boiler.
1 Steam Gauge and Syphon.
1 Glass Water Gauge, complete, with column and 3 Gauge Cocks.
1 Safety Valve.
1 Stop Valve.
1 Feed Valve.
1 Blow-off Valve.
1 Check Valve.

These Boilers are tested to 150 pounds hydrostatic pressure and are intended for a working pressure of 100 pounds. Total weight of Boiler and fixtures, 17,000 pounds.

☞ BOILERS ON HAND READY FOR SHIPMENT. ☞ SEND FOR CIRCULARS.

FOR WATER WORKS
AND GAS PLANTS,
CONVERSE PATENT LOCK-JOINT PIPE.

Strength, Durability, Economy.

SEND FOR DESCRIPTIVE CATALOGUE.

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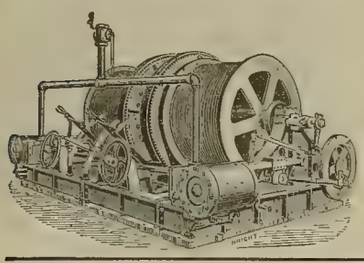
17 & 19 BEALE ST., and 18-24 MAIN ST., SAN FRANCISCO.

DEALERS IN ALL KINDS OF PIPE, TUBING, VALVES AND HYDRANTS.

HOISTING ENGINES
FOR MINES.



1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

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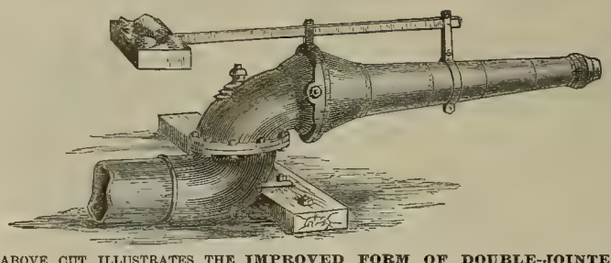
New Catalogue for 1889 now ready.

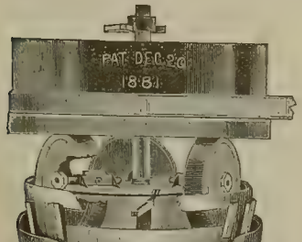
IMPROVED FORM OF HYDRAULIC GIANTS.



THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture. We guarantee purchasers of this form of Giants against all costs, expenses or damages which may arise from any adverse suits or actions at law. We are further prepared to furnish **Single-Jointed Giants** when required. Prices, discounts and Catalogues of our specialties of **Hydraulic Mining Machinery** sent on application.

JOSHUA HENDY MACHINE WORKS, 39 to 51 Fremont St., San Francisco.

GUTENBERGER'S ROLLER ORE CRUSHER.



Crush 8 to 10 Tons per Day.

PORTABLE and DURABLE.

WEIGHT, 4 TONS.

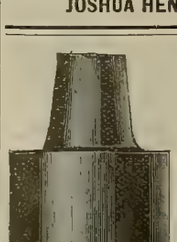
It is a Full Fledged Quartz Mill without Gearings, Cogs or Pulleys.

Power applied direct. Works Ore at Low Cost. More or less weight on Crushers as desired.

Very little friction. Beats other machines in reducing and amalgamating ore, and costs less. All who have used this mill recommend it highly. Splendid for low-grade ore on account of low cost of working. The first ore crusher used in Durango, Mexico, was built at my shop in Sacramento, and under my patent.

☞ Any Infringement on this Patent will be prosecuted to the full extent of the law.

WM. GUTENBERGER, Sacramento Foundry, corner N and Front Sts., Sacramento.



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SOLE AGENT FOR

Adamantine Shoes, Dies and CRUSHER PLATES,
—AND—
Chrome Cast Steel for Rock Drills, Etc.

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220 Fremont St., San Francisco,
MANUFACTURERS' and PURCHASING AGENT.

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MINE and MILL SUPPLIES.

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H. D. MORRIS.

AMALCAMATING MACHINERY.

Stamp Mills for Wet or Dry Crushing. Huntington Centrifugal Quartz Mill. Drying Cylinders. Amalgamating Pans, Settlers, Agitators and Concentrators. Retorts, Bullion and Ingot Moulds, Conveyors, Elevators, Bruckners and Howell's Improved White's Roasting Furnaces, Etc.

FRASER & CHALMERS, MINING MACHINERY

CONCENTRATING MACHINERY.

Blake, Dodge and Comet Crushers, Cornish Crushing and Finishing Rolls, Hartz Plunger and Collom Jigs. Frue Vanner & Embrey Concentrators, Evans', Calumet, Collom's and Rittenger's Slime Tables. Trommels, Wire Cloth and Punched Plates. Ore Sample Grinders and Heberle Mills.

IMPROVED CORLISS AND SLIDE VALVE STEAM ENGINES. ❋ BOILERS HORIZONTAL, VERTICAL ... AND SECTIONAL....

IMPROVED STEAM STAMPS

Hoisting Engines, Safety Cages, Safety Hooks,

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Air Compressors, Rock Drills, Etc.

GENERAL MILL AND MINING SUPPLIES, ETC.

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Blast Furnaces for Galena & Copper Ores,

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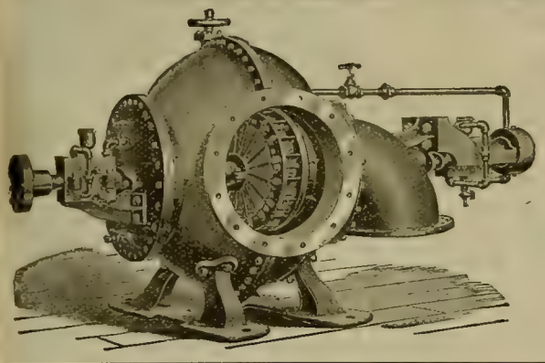


JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

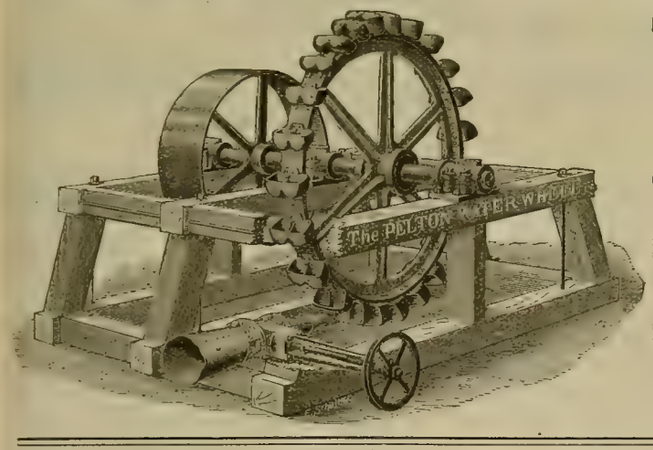
Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

JAMES LEFFEL & CO.,
Springfield, Ohio, or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents, Chicago, Ill., and Denver, Col.

PARKE & LACY, General Agents, San Francisco, Cal.



THE PELTON WATER WHEEL

GIVES THE

Highest Efficiency of any Wheel in the World.

A MARVEL OF ENERGY AND POWER.

Over 600 in use on the Pacific Coast alone, aggregating upwards of 50,000 Horse Power.

It is not only most economical of water, but the most simple and reliable power for Quartz Mills, Compressors, Hoisting, Pumping, or any other purpose where water power can be used.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long distances with small loss, and it is now being extensively used in this way in all parts of the country for producing both light and power.

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Gold Mining Properties Bought, Sold and Developed.
Propositions from principals only entertained.
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THE RUSSELL PROCESS COMP'Y.

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.
WORKING TESTS OF ORES BY ALL PROCESSES.
SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

Metallurgy and Ores.

SELBY SMELTING and LEAD CO.,
416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY And Assay Office.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

....MANUFACTURERS OF....

BLUESTONE,
LEAD PIPE,
SHEET LEAD,
SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,
Under Chamberlin Patent.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE AND MILL SUPPLIES,

ALSO CHEMICALS, AND PHYSICAL, SCHOOL AND CHEMICAL APPARATUS.

63 & 65 First St., cor. Mission, San Francisco.

We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock o Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we fee confident from our experience we can well suit the de mand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

☞ Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

JOHN TAYLOR & CO.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,
Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager. ESTABLISHED 1869

Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the most suitable Process for Working Ores.
Special attention paid to Examinations of Mines; Plans and Reports furnished.

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Ores Sampled and Assayed, and Tests made by my Process.
Assaying and Analysis of Ores, Minerals and Waters.
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Practical Instruction given in Treating Ores by improved processes.

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GREAT REDUCTION!

BATTERY SCREENS.

Best and Cheapest in America.

No imitation, no deception, no planished or rotten iron used. Only genuine Russia iron in Quartz Screens. Planished iron screens at nearly half my former rates.

I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

PERFORATED SHEET METAL

For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass Zinc and other metals punched for all uses.

Inventor and Manufacturer of the celebrated Slot Cut burred and Slot Punched Screens.

Mining Screens a specialty, from No. 1 to 15 (fine).

Orders promptly attended to.

San Francisco Pioneer Screen Works,
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JOHN W. QUICK, Proprietor.

QUICKSILVER

For Sale in Lots to Suit by
PARROTT & CO.,
306 California St., San Francisco, Cal.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, May 16, 1889.

General trade continues fair, but not large. The feeling which appears to control is of a conservative character, and therefore speaks well for the future. Our advices from the mining and also from the agricultural sections warrant the assertion that an unusually large trade will be enjoyed this fall; larger than ever before, and, what is more, buyers will be in better condition to pay their bills promptly, provided no unfavorable event takes place in the meantime. There is an abundance of water for mining, while the rains and cool weather in this month go far in assuring the largest crops, particularly of wheat, ever harvested either in this State, Oregon or Washington Territory. Replies received by the writer to confidential circulars sent out to all distributive points in California justify the assertion that the crop prospects are of such a character that farmers who are largely behind in their accounts will be able to pay in full soon after marketing their grain. This assertion is based on the price being in this city as low as $1.20 to $1.30 per ctl. for No. 1 white shipping. The yield will be so much more to the acre, that a low price will more than equal a fairly high price with a light yield. Among iron-workers there is a growing, hopeful feeling, based on large crop prospects, large water supply for the mines, and an abundance of capital. Much new work is being talked about.

The money market is very easy. There is no trouble in placing paper, even if not gilt-edged, at any of the commercial banks, while outside capital is offering in vain. On United States bonds a large loan was negotiated at 3½ per cent per annum, which is the lowest rate of interest accepted on this coast. Leading importing houses in want of funds to meet bills at the East, have no difficulty in borrowing where the debts are due, and at a low rate of interest, too. This is against the money market here. So far there is no speculative movement on this coast in anything calculated to invite operators. Wheat and barley futures can only be dealt in to a limited extent at prices which attract buyers, while local securities are rather too high, and besides, they do not fluctuate enough. Mining stocks are also too lifeless, not but prices are low enough, but there are no active, attractive moves up and down. Outside speculators like rapid fluctuations, and it is only these that attracts them to operate freely. The public appear to be dying of the dry-rot and sigh for some kind of speculation at which they can take a hand. It is generally conceded that an active stock deal will revive general business.

On April 29th there was in the United States subtreasury in this city in gold coin, $36,908 530; in standard silver dollars, $18,335,134; and in fractional silver, $6,805,171.

For the week ending May 11th, the bank clearings in this city were $13,904,128, against $15,452,645 for the previous week. This shows the inactivity of speculative feeling here.

The steamer Gaelic sailed for Hong Kong on last Saturday, taking out the following treasure: For Hiogo, silver bullion, $160,500; for Hong Kong, silver bullion, $130,000; Mexican dollars, 175,000; gold coin, $7872; gold dust, $25.

The foreign imports at this port in last month aggregated in value, $18,985,463.

Imports of coin by water the past week aggregated $13,826.

The amounts and descriptions of specie shipped from San Francisco in the first four months of the year compare as follows:

	1888.	1889.
Silver bars	$2,517,550	$2,857,200
Mexican dollars	1,077,965	2,359,820
South American dollars	2,208	41,131
Gold coin	1,586,642	3,220,277
Silver coin	14,800	65,700
Gold dust	345	800
Currency	269,980	531,301
Totals	$5,469,490	$9 076,229

Some time ago the MINING AND SCIENTIFIC PRESS stated that the Southern Pacific Railroad Co. had succeeded in purchasing a number of the small roads in this State, and therefore they would not push railroad building so fast after July next. The first confirmatory news of this statement is the official anouncement of the purchase of the California Northern railroad.

SILVER—The market has held to strong prices throughout the week. Sales are reported at 92⅜c, although 92½c is given as a basis for quotations. There is only one buyer in the market, but light offerings and also a strong market abroad cause the higher prices.

MEXICAN DOLLARS—The market is strong at 92⅜@92½c for old, and 92¾ to 92⅞c for new. The offerings are said to be light, necessitating buyers to bid up so as to have their wants met.

QUICKSILVER—The market is higher and strong at the advance. The demand is good. Receipts the past week were as follows: Thirty flasks to Bradford Q. M. Co.; 50 to Parrott & Co.; 41, Haas Bros. The shipments by water were 63 flasks to Mexico.

BORAX—The market is quiet, but steady. Receipts the past week aggregated 594 ctls. The exports were 66,997 lbs. to Chicago via C. P. R. R.

LIME—There is a good continued home demand at unchanged prices. Receipts aggregated the past week 4519 barrels.

TIN—Imports the past week were 2341 ingots of pig and 22,829 boxes plate. The exports by water aggregated 54,000 lbs. to Victoria, B. C. The market for pig is lower and weak, but for plate it is strong and higher. The plate received the past week were sold to arrive. Fruit-canners, since the reduction in overland freights, are more disposed to prepare for active canning.

LEAD—The market has a steady, firm tone pending the decision on duty upon imported ore. The consumption is fully up to this time last year.

COPPER—The market is still unsettled. The prevailing opinion is that lower prices will obtain, therefore the buying is confined to immediate wants.

LUMBER—A movement is on foot to curtail production so as to keep the market up. It is thought that this is the first step to higher prices.

COKE—The market is firm at unchanged quotations. Imports the past week aggregated 206 tons.

IRON—The market for pig is still reported to be quiet, but the tone is firmer, and continued advices abroad of a strong, active market. The East reports another decline, owing to the active competition of the Southern companies. Imports the past week aggregate 402 tons.

COAL—Imports the past week were as follows: Tacoma, 9450 tons; Coos bay, 800; Departure bay, 3485; Nanaimo, 2200; Australia, 4498; Glasgow, 1174; and Swansea, 1307. Total, 23,014 tons. Australian advices report a steady increase in tonnage on the way to and loading for this port. The local market is reported steady, with a free consumption of steam coal. Holders think prices will advance, while buyers hold to a contrary view on coast and Australian coals.

Eastern Metal Markets.

By Telegraph.

NEW YORK, May 16, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42¼	99⅞	$14 00	$3 90	$20 50
Friday	42 3-16	99¼	13 25	3 92½	20 50
Saturday	42 3-16	99¼	13 00	3 90	20 55
Monday	42 3-16	99¼	12 35	3 90	20 65
Tuesday	42 3-16	99¼	13 00	3 87½	20 70
Wednesday	42¼	99⅜	13 00	3 87½	20 75

NEW YORK, May 15.—Borax quotations unchanged. Trade steady. Quicksilver is quoted at 62c, following Rothschild's London advance to £8. The copper market remains in its undecided position. There has been no business of wholesale importance, and whatever tone is expressed is for low future rates. Pig lead obtains some support for late advance. Outside spot, $3.90@3.95 on 'Change; $3.90@3 94 for June; $3.92½@3.94 July; $4 August; $3.95 September, with sales.

Lumber.

Pine, Fir and Spruce.

	RETAIL.	WHOLESALE.
Rough Pine, merchantable, 40 ft	$19 00	$.....
41 to 50 ft	20 00	.....
51 to 60 ft	22 00	.....
61 to 70 ft	26 00	.....
1x3, fencing	21 00	.....
1x4, "	20 00	.....
1x3, 1x4 and 1x6, odd lengths	18 00	.....
Second quality	16 00	.....
Selected	23 00	.....
Clear, except for flooring	30 00	.....
Clear for flooring	1 00	.....
Clear V. G. No. 1 flooring	5 00	.....
Firewood	13 00	.....
Dressed Pine, flooring, No. 1, 1x6	31 00	.....
No. 1, 1x4	33 00	.....
No. 1, 1¼x4, 1¼x6, and odd sizes	36 00	.....
All sizes, No. 2	26 00	.....
Stepping, No. 1	43 00	.....
Stepping, No. 2	33 00	.....
Ship timber and plank, rough	26 00	.....
Selected, planed 1 side, add'l per 40 ft	28 00	.....
" " 2 " " "	30 00	.....
" " 3 " " "	32 00	.....
" " 4 " " "	34 00	.....
Deck plank, rough, average 35 ft	34 00	.....
Dressed, average 35 feet	39 00	.....
Pickets, rough, B M	19 00	.....
¾x1¼, 4 ft long, ₱ M	5 50	.....

Coal.

TO LOAD.

	Per Ton.		Per Ton.
Australian	$6 50 @ 7 00	Cardiff	9 50@10 00
Liverpool Steam	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	16 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	6 00
Scotch Splint	8 00	Seattle	6 00
West Hartley	10 00	Coos Bay	5 00
Greta	9 00	Cannel	10 00
Westminster Brymbo	8 00	Egg, hard	17 00
Nanaimo	9 00	Cumberland, in sacks	18 50
Sydney	$ 8 00	do, bulk	17 50

San Francisco Metal Market.

WHOLESALE.

THURSDAY May 16, 1889.

ANTIMONY	— @	14
BORAX—Refined	7½@	7⅝
Powdered	7¼@	7⅜
Concentrated	7 @	7⅛
COPPER—		
Bolt	26 @	27
Sheathing	26 @	—
Ingot	17½@	18¼
Fire Box Sheets	— @	26
LEAD—Pig	4¾@	—
Bar	6 @	—
Sheet	8 @	—
Pipe	7 @	—
Shot, discount 10% on 500 bags Drop, ₱ bag	1 45 @	—
Buck, ₱ bag	1 65 @	—
Chilled, do	1 85 @	—
STEEL—English, lb	16 @	20
Canton tool	9½@	—
Black Diamond tool	10 @	16
Pick and Hammer	8 @	10
Machinery	4 @	5
Ice Calk	4½@	—
TINPLATE—B. V., steel grade, 14x20, P. S	4 80 @	5 85
B. V., steel grade, 14x20, spot	— @	5 25
Charcoal, 14x20	6 50 @	7 00
do roofing, 14x20	5 37½@	5 50
Pig tin, spot, ₱ lb	22¾@	24½
do, do, prompt shipment	25 @	—
QUICKSILVER—By the flask	— @	45 00
Flasks, new	1 05 @	—
Flasks, old	85 @	—
COKE—English, ton, spot	20 00 @	—
Do, do, to load	13 50 @	13 75

	Spot.	To Load.
IRON—Glengarnock ton	27 00 @ —	27½@ —
Eglinton, ton	26 00 @ —	26½@ —
American Soft, No, 1, ton	— @31 00	31½@ —
Oregon Pig, ton	— @30 00	— @ —
Clay Lump White	— @24 50	25 @ —
Shotts, No. 1	28 50 @29 00	— @ —
Bar Iron (base price) ₱ lb	2¾@ 3	— @ —
Chrome iron ore, ₱ ton	— @10 00	— @ —

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, *or beyond the time he intends to pay for it*, let him not fail to write us *direct* to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or of some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

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ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS
Belle Isle M Co	Nevada	12	10	Apr 19	May 23	June 13	J W Pew	310 Pine St
Bodie Con M Co	California	10	50	Mar 25	Apr 30	June 4	B L Burling	309 Montgomery St
Buena Vista Petroleum Co	California	34	50	Apr 21	May 30	June 27	J Morizio	328 Montgomery St
Bulwer Con M Co	California	5	25	Apr 10	May 15	June 12	A Oheman	328 Montgomery St
Calaveras Blue Gravel M Co	Cal	2	05	Mar 28	Apr 30	May 27	B Burris	240 Montgomery St
Eureka Con M Co	Nevada	11	50	Mar 19	Apr 27	May 20	H P Bush	306 Pine St
Exchequer M Co	Nevada	27	25	Apr 2	May 7	May 28	C E Elliott	309 Montgomery St
Found Treasure M Co	Nevada	5	12½	Apr 10	May 16	June 6	J Stadfeld Jr	309 Montgomery St
Gould & Curry M Co	Nevada	62	30	May 1	June 5	June 27	A K Dustron	309 Montgomery St
Gray Eagle M Co	California	13	05	May 15	Jun 25	July 16	O H Bogart	327 Pine St
Inyo Marble Co	California	6	5	May 14	Jun 24	July 24	G W Luce	205 Front St
Kentuck M Co	Nevada	18	30	Apr 26	May 29	June 19	J W Pew	310 Pine St
Los Putos Coal, Iron & Mang Co	Cal	1	14	Mar 25	Apr 30	May 20	W C Stedfeld	309 Montgomery St
Locomovive M Co	Arizona	4	50	Apr 25	May 29	June 18	A H Fish	309 Montgomery St
Morgan M Co	California	13	15	May 9	Jun 17	July 8	O S Neal	230 Montgomery St
North Commonwealth M Co	Nevada	2	30	Apr 3	May 8	May 30	J W Pew	310 Pine St
Opuir M Co	Nevada	55	50	May 11	Jun 16	July 2	E B Holmes	309 Montgomery St
Occidental Cons M Co	Nevada	4	50	Apr 8	May 13	June 5	A K Dustron	309 Montgomery St
Oak Con M Co	California	2	3	Mar 29	May 25	June 20	E J Ryan	230 Montgomery St
Peerless M Co	Arizona	12	25	Mar 25	Apr 26	May 21	A Waterman	309 Montgomery St
Pinal Con M Co	Arizona	8	15	Apr 13	May 20	June 12	A Oheminant	328 Montgomery St
Potosi M Co	Nevada	32	50	Apr 10	May 15	June 5	C E Elliott	309 Montgomery St
San Francisco Copper Co	California	3	10	Mar 18	Apr 23	May 21	G Ruegg	405 California St
Silver Hill M Co	Nevada	24	20	Apr 20	May 23	June 13	D C Bates	309 Montgomery St
Sierra Union M Co	California	1	10	00	Apr 10	May 13	June 5	Wm V White	218 Sansome St
Trinity Riv Tun & M Co	California	1	7	12	Apr 11	May 24	June 13	E H Parkman	Cor Bush & Montgy Sts
Union Con M Co	Nevada	38	25	May 13	Jun 19	July 10	J M Buffington	303 California St
Weldon M Co	Arizona	13	10	May 13	Jun 18	July 9	A Waterman	309 Montgomery St
Yellow Jacket M Co	Nevada	46	50	Mar 28	May 1	June 1	W H Blauvelt	Gold Hill

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
California Slate Co	California	J O Hanscom	9 Mission St	Annual	May 21
Christy M Co	Utah	G E Spinney	310 Pine St	Annual	May 20
Live Oak Drift Gravel M Co	California	J Morizio	328 Montgomery St	Annual	May 20
Mohawe Gravel M Co		G E Spinney	310 Pine St	Annual	May 22
Seg Belcher & Midas Con M Co	Nevada	E B Holmes	309 Montgomery St	Annual	June 4
Silver Hill M Co	Nevada	D C Bates	310 Montgomery St	Annual	May 29

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	Apr 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Apr. 24.		WEEK ENDING Ma		WEEK ENDING May. 8.		WEEK ENDING May. 15	
Alpha	2.00	2.75	1.90	2.25	1.90	2 30	2.00	2.20
Alta	2.00	2.60	2.10	2.10	1.75	2.00	1.65	1.90
Andes	.85	1.10	.80	.90	.75	.80	.75	.85
Argenta	....	.05	....	....	....	....	....	....
Belcher	3.45	5.00	3.80	4.40	3.75	6.25	4.80	5½
Best & Belcher	4.25	6.00	3.90	4.40	3.75	4.20	3.80	4.30
Bullion	.80	1.30	.50	1.05	.90	.95	.90	1.00
Baltimore	.30	.35	.25	.30	....	....	....	....
Belle Isle	....	.20	....	.20	....	.20	....	.25
Bodie Con	1.10	1.45	1.60	1.90	1.75	2.00	1.65	1.80
Benton	....	3.00	....	....	....	....	....	3.50
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.30	.35	.30	.35	.30	.35	.30	.60
Commonwealth	....	....	5.00	5.50	5.25	5.50	4.80	5.50
Con. Va. & Cal	8.00	8.50	8.00	8.25	8.00	8.50	7.75	8.50
Challenge	3.80	6.00	3.80	4.00	3.25	4 25	3.50	3.65
Chollar	2.30	3.50	2.60	2.80	2 45	3.30	2.55	3.00
Confidence	10	11½	10	10¾	8.50	10.00	7	8¼
Con. Imperial	.65	.90	.65	.70	.60	.70	.60	.70
Caledonia	.35	.40	.35	.40	.35	.40	.30	.35
Con. Pacific	....	....	....	....	....	....	....	....
Crown Point	4.00	5.25	4 00	4.60	3.80	4.80	4.05	4.30
Crocker	.50	.60	.50	.65	....	.65	.45	.50
Central	....	....	....	....	....	....	.10	.15
Dudley	....	.20	.20	.30	.25	.30	....	.30
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	1.30	2.50	2.00	3.00	....	2.00	....	1.50
Exchequer	.70	1.10	.70	.8	.65	1.10	.90	1.00
Grand Prize	.80	1.00	.75	.80	.70	.80	.70	.75
Gould & Curry	2.60	3.80	2.55	2.90	2.35	2.65	2.40	2.65
Hale & Norcross	4.30	5.25	4.45	4.90	4.50	5.00	4.25	4.75
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	.30	.45	....	....	.25	.35	.30	.35
Justice	1.20	1.60	1.35	1.40	1.35	1.40	1.40	1.40
Kentuck	1.90	2.35	1.65	1.75	1.45	2.10	1.50	1.70
Lady Wash	....	.40	....	.40	.30	.35	.35	.40
Locomotive	....	.10	....	....	....	.10	....	.05
Martin White	....	....	....	....	....	....	....	....
Mono	1.40	1.55	1.60	1.75	1.75	1.95	1.60	1.70
Mexican	3.25	5	4.70	5	4.25	4.60	4.40	4½
Mt. Diablo	....	....	....	....	....	....	....	....
Navajo	.80	.95	.80	.90	.80	.85	.75	.80
North Belle Isle	2.25	2 50	1.75	2.15	1.55	1.75	1.20	1.55
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	1.95	2.55	1.70	2.15	1.60	1.70	1.20	1.45
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.10	1.50	1.10	1.35	1.10	1.20	1.50	1.75
Ophir	5.25	7¼	5½	5.75	4.95	5.50	4.90	5¼
Overman	1.35	1.70	....	1.35	1 30	1.50	1.35	1.50
Potosi	1.80	2.75	2.05	2.10	1.80	2.25	2.45	2.60
Peerless	.40	.55	.65	.75	.60	.65	....	.60
Pacr	.30	.35	....	.35	.25	.30	....	.25
P. Sheridan	....	.05	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.75	4 00	2.90	3.10	2.70	3.25	2.60	3.25
S. B. & M	2.60	3.60	2.70	3.00	2.90	3.90	3 00	3.20
Sierra Nevada	3.80	5.00	3.70	4.00	3.40	3.85	2.45	3.80
Silver Hill	.50	.65	.45	.55	.40	.45	....	.60
Silver King	.65	.70	1.05	1.10	....	1.05	....	....
Scorpion	.60	.85	.60	.65	....	.60	.55	.60
St. Louis	.30	.50	....	....	....	.50	....	.50
Syndicate	....	....	....	....	....	.10	....	....
Union Con	6.00	7.75	4.50	5½	4.05	4.60	4.50	5¼
Utah	1.35	1.90	1.30	1.50	1.30	1.50	1.30	1.40
Yellow Jacket	3.10	4.20	3.30	4.15	3.90	4.70	4.25	4.45

Sales at San Francisco Stock Exchange.

AFTERNOON SESSION.

THURSDAY, May 16, 9:30 A. M.

200	Alpha	2.05	
200	Andes	.75c	
425	Belcher	3.90	
150	B. & Belcher	3.90	
30	Bodie	1 70	
300	Bullion	.90c	
100	Bulwer	.50c	
400	Challenge	3.10	
100	Chollar	2.50	
50	Confidence	6.50	
100	Crocker	.45c	
360	Crown Point	4.15	
1200	Con. Imperial	.60c	
110	Con Va & Cal	7.87½	
200	Delmonte	1.35	
150	Exchequer	.90c	
200	Grand Prize	.80c	
180	Hale & Nor	4.30	
300	Justice	1.20	
300	Mexican	4.45	
200	N. Belle Is	1.50	
1200	New York	.15c	
100	N. Commonwealth	1.50	
90	Occident	1.55	
50	Overman	1.45	
100	Ophir	4 90	
250	Potosi	2.45	
50	Savage	2.70	
100	Scorpion	.55c	
200	S. B. & M	3.10	
50	Sierra Nevada	3.45	
250	Utah	1.30	
710	Union	4.45	
300	W Comstock	.45c	
220	Yellow Jacket	4.35	

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NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 15th day of May, 1889, an assessment, No 13, of Five Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, 327 Pine St., Room 9, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1889, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 16th day of July, 1889, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

O. H. BOGART, Secretary.

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THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No 1, 32 ft; No. 2, 94 ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

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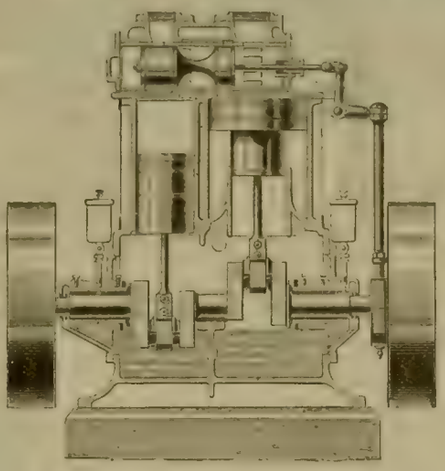

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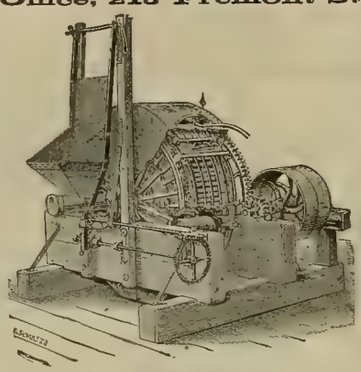

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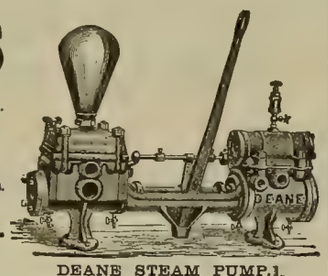

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COAL MINES OF THE WESTERN COAST.
A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for $2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, $900, f. o. b.
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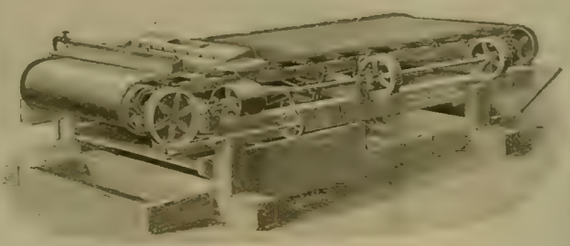


Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

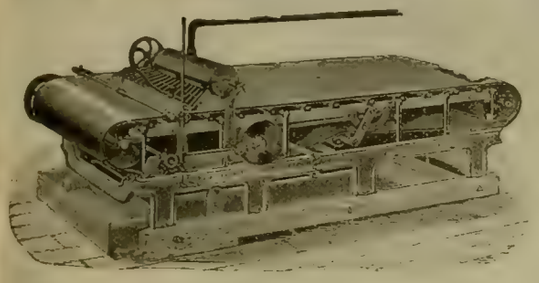
THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIRS:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., Room 15, No. 132 Market Street, San Francisco, Cal.

$1,000 CHALLENGE ACCEPTED,

PRICE, FIVE HUNDRED AND FIFTY DOLLARS ($550.00).



THE "TRIUMPH" ORE CONCENTRATOR.

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

JOSHUA HENDY MACHINE WORKS,
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PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of **LATEST DESIGN** and **MOST IMPROVED** construction. We offer our customers the **BEST RESULTS OF 38 YEARS' EXPERIENCE** in this **SPECIAL LINE** of work, and are **PREPARED** to furnish the **MOST APPROVED** character of **MINING AND REDUCTION MACHINERY**, adapted to all grades of ores and **SUPERIOR** to that of any other make, at the **LOWEST POSSIBLE PRICES.**

We are also prepared to **CONSTRUCT** and **DELIVER** in **COMPLETE RUNNING ORDER**, in any locality, **MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC.**, of any **DESIRED CAPACITY.**

THE GATES CRUSHER

Is beyond all question the most important improvement that has ever been made in this class of mining machinery. It will do more than twice the work with a given amount of wear than any other Crusher made, besides crushing so much finer that for mining uses, the capacity of the mill is greatly increased. It has the same relative superiority for macadamizing purposes, affording the cheapest and most reliable machine for this use.

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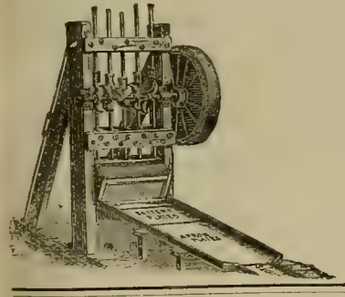

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IN QUARTZ, GRAVEL AND PLACER MINING.

PRICES GREATLY REDUCED.

Only Refined Silver and Best Copper used. Over 3000 Orders filled. Fifteen Medals Awarded. Old Mining Plates can be Replated. Old Plates Bought, or Gold Separated.

These Plates can also be purchased of **JOHN TAYLOR & CO.**, Corner First and Mission Sts.

San Francisco Gold, Silver and Nickel Plating Works, 653 & 655 Mission St., San Francisco, Cal., E. G. Denniston, Prop'r.

Our Plates have been used for 20 years. They have proved the best. We adhere strictly to contract in weight of Silver and Copper. SEND FOR CIRCULAR.

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For SAVING GOLD!

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AT REDUCED PRICES.

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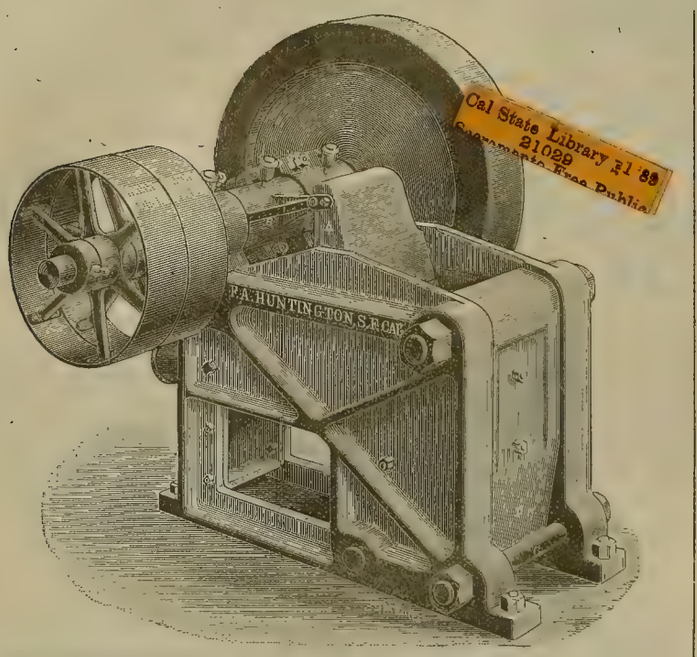

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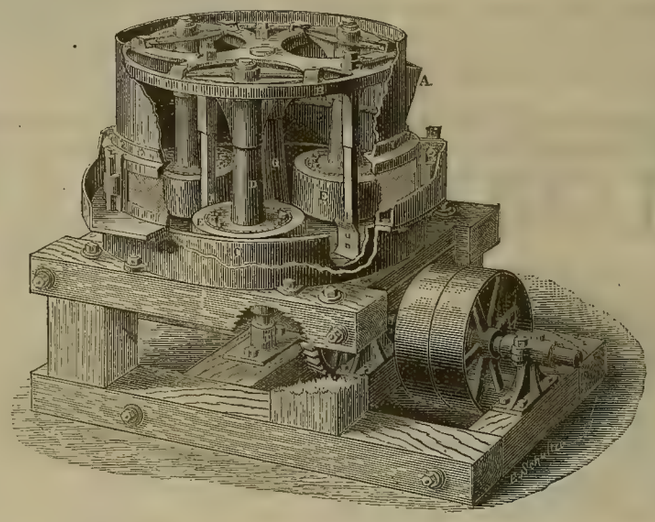
Huntington's Improved Rock-Breaker.

The main features of this machine are strength, ease of adjustment and simplicity of construction.

The movable jaw *A* is worked by the eccentric *B* and is pivoted at the bottom. The stationary jaw *D* is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt *C*. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt *C* and the jaw *D*. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



F. A. HUNTINGTON'S
Centrifugal Roller Quartz Mill.

The following will explain the above cut:

The ore and water being fed into the mill at the hopper *A*, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

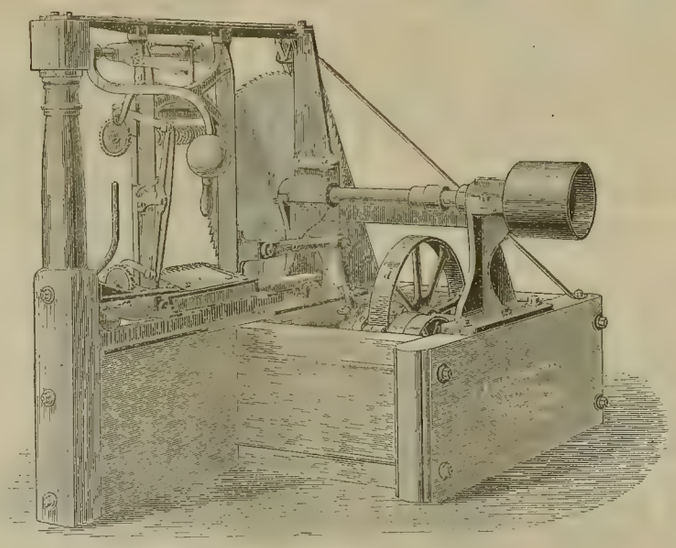
The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet crushing and gold saving it has no equal.

I claim especial merit in that feature of this system *which prevents* ALL FLOURING of gold and quicksilver, and the consequent loss of gold that attends stamp milling.

For the economical working of ore that contains sulphurets, I particularly claim the adaption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.

F. A. HUNTINGTON'S
PATENT SHINGLE MACHINE.

This Machine is so well and favorably known by all the principal Lumbermen on the Pacific Coast that it is useless to go into any detailed account of its merits; suffice it to say that recent improvements in a new, quick return feed-works has placed it far ahead of all competitors. This feed-works is positive and uniform in its action and obviates all the jar or tremor formerly given to the machine by the weight used in the old style feed.



For simplicity, durability and rapidity of action, these machines have no equal, cutting from 50,000 to 75,500 shingles per day.

Price, complete with Jointer and one 38-inch Saw, $475.00.

The new feed-works can be applied to any of the old machines.

Price $100.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

TWENTY-PAGE EDITION.

VOL. LVIII. Number 21. DEWEY & CO., Publishers. SAN FRANCISCO, SATURDAY, MAY 25, 1889. Three Dollars per Annum Single Copies, 10 Cts.

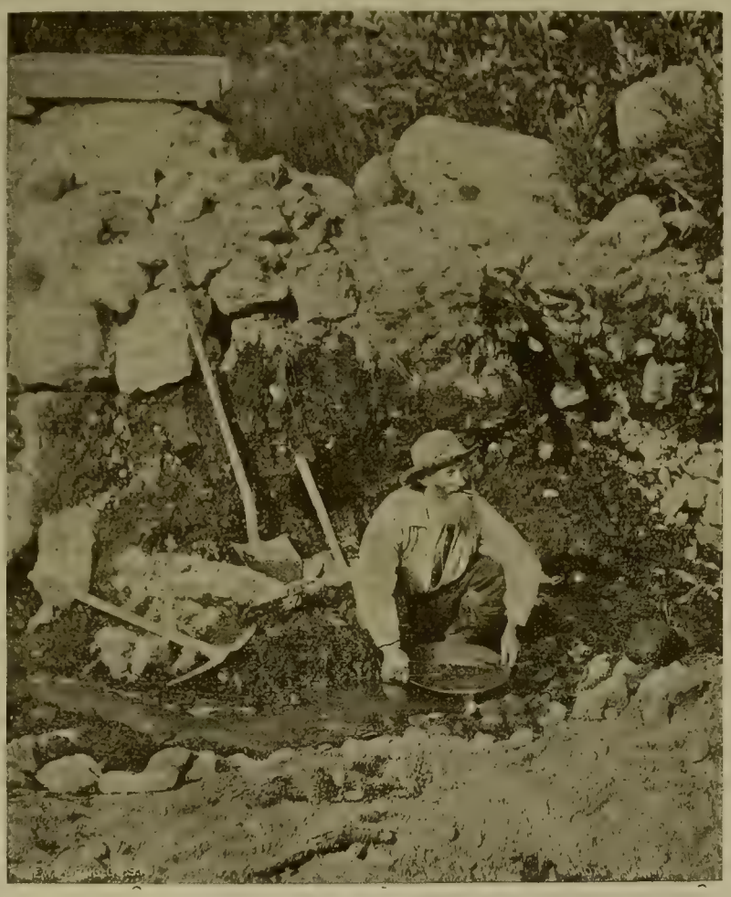
Hydrogen Amalgamators.

A recent invention to prevent sluggishness of mercury in amalgamation of gold is the hydrogen-amalgam process invented by B. C. Molloy of London. The principle involved in this process is the well-known one, that when gold is brought into absolute and maintained contact with clean or "quick" mercury the gold is retained in the mercury from which it is afterward retorted. In cases where refractory ores have to be dealt with, they cause the mercury to "sicken;" that is, to become coated with an oxide which lies like a sheet of paper on the surface of the body of the mercury, preventing contact between the particles of gold and the clean portion of the mercury. This sick mercury also "flours," so that the floured fluid metal is carried away and lost. The result is, therefore, that not only is the gold not captured, but mercury is lost or carried away in the refuse or tailings. The object of the hydrogen-amalgam process is to save this enormous loss of gold and mercury. The method pursued is, first, to maintain the "quickness" of the mercury, and second, to insure a continual contact between the particles of ore and the mercury.

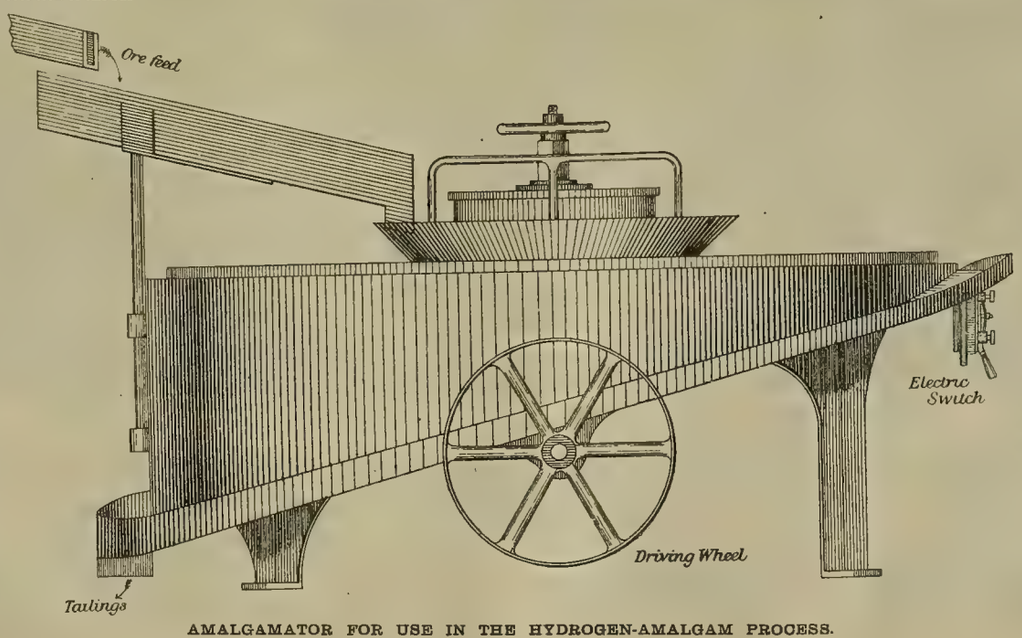
The apparatus for accomplishing this is shown on this page. It consists of a shallow pan about one inch in depth and 41½ inches in diameter, which contains mercury about half an inch in depth. In the center of this pan is a porous jar, so placed and fixed that the mercury cannot enter or move it. Within this jar is a cylinder of lead and a solution of sulphate of soda. This lead cylinder, which constitutes the anode, is connected with the positive pole of a small dynamo machine, while the mercury is connected with the negative pole of the same dynamo. When the current passes, oxygen is evolved from the surface of the lead anode, while hydrogen is evolved from the surface of the mercury. This action, which is apparent to the eye, is of course due to the decomposition of the electrolyte formed by the solution of the sulphate of soda. The mercury combines with a portion of the hydrogen and so forms a hydrogen-amalgam, while the excess of hydrogen so formed passes away. Now, while the mercury is thus charged with hydrogen it cannot oxidize, because of the presence of an excess of hydrogen. Thus, no matter what the character of the ore, the mercury under these conditions is always quick and greedily attacks and absorbs the gold.

So far, the ingenious but simple method of maintaining the mercury in a quick condition. We now have to describe the equally and simple means whereby the pulverized gold-ore is brought into absolute, and maintained, contact with the quick mercury. Floating upon the surface of the mercury is a disc 40 inches in diameter, which dimension leaves a narrow outside channel all round the edge of the pan where the mercury is uncovered. The center of the disc has a circular hole in it so as to clear the porous jar by about 2 inches. This central opening in the disc has a rim about 2 inches high, which forms a hopper. The disc, as it floats on the mercury, is slowly revolved by simple mechanism. The pulverized ore, as it leaves the stamps or other crusher, flows into the hopper, accompanied by a stream of water, and is then, by centrifugal action, carried under the revolving disc and rolled round in the mercury in ever-increasing circles until it reaches the periphery of the disc, and consequently the outward channel between the edge of the disc and that of the pan. Here, freed from the pressure of the disc, the pulverized ore floats up and over the edge of the pan and passes away, leaving behind it in the mercury the amalgamable gold it previously contained. This perfect extraction is due to the rolling action which separates each particle of the ore and rolls it for some ten seconds in the bright, quick mercury, which wrests every atom of amalgamable gold from it. The whole machine weighs only about five cwt., and its working capacity is ten tons per day.

Prof. Ricketts of the Columbia School of Mines, N. Y., has made a series of trials with this process, and in each case showed an increased quantity of gold extracted with these amalgamators over that extracted from the same ore by ordinary amalgamation. Each amalgamator will treat from six to ten tons in 24 hours, according to character of ore. No plates, blankets, or auxiliary apparatus are required. J. W. Higginbottom, M. E., Omaha, Neb., is agent in this country for the machines. He informed us, when in this city, some time since, that a 60-inch amalgamator, with dynamos, tools, etc., capacity 12 to 24 tons per day, will cost about $2000. A number of the machines are in use in Australia and Africa.



THE OLD PROSPECTOR.—See page 380.



AMALGAMATOR FOR USE IN THE HYDROGEN-AMALGAM PROCESS.

THE REFORMA MINE.—This mine in Mulege district, Lower California, is about eight hours' travel from Guaymas by line to steamers to Santa Rosalia. Attention was first called to it over 20 years ago by Dr. F. Von Lohr of the School of Mines of Freiberg, and by Mr. W. M. Gabb, of the State Geological Survey, in their report of the mineral wealth of Lower California. The property has not been worked for some time, owing to the indifference of its owners, but we are informed that men skilled in mining, backed by capital, are about to take the management, the mine having changed hands. This ought to be welcome news to the few who have retained their stock through all these years. The work already done on the mine has exposed a large ledge of ore which is said to assay $200 in silver and $85 in gold per ton.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

At Silver King.

EDITORS PRESS:—I want to say that a prospector in this part of Arizona gets but few favors, and is generally ridiculed by the people for entertaining the idea that there are other mines here besides the Silver King. I have had my share of this sort of thing like others, especially for advocating the theory that the King was an ore chute from an ore channel, running northeasterly and southwesterly from the Silver King; and that the Silver King would continue so far westerly from the surface, and would then turn and dip eastward. Also that the "Bilk" shaft, which is on the west, would not touch the King ore body. This was proved, however, by the Bilk shaft being sunk 1000 feet without ore.

My reasons for this argument are as follows: That there are three granite formations here, plain and distinct, which traverse the country for many miles; that each stratum is different in character, and in mineral and quartz; and each formation is the same in general character throughout its entire width and length; that each formation contains a separate deposit of ore which represents a geological epoch. As the two younger formations (on the top) have an eastward dip, and as the Silver King is in the central formation and near its western edge, that it was impossible for the King ore body to continue its westward trend and leave its own formation that it was deposited in; that the ore body must turn and dip eastward with the formation; and from the best information I can get, that is just what the ore body is doing now. The Bilk shaft is just outside of the King formation.

The Silver King Company are working about 30 miners now, and in time "old Comstockers" will have quietly experted the lower portion of that huge and peculiar silver vault, placing it in condition to become again a dividend-paying mine.

The Mineral King Company has made a good strike in the Crispin mine at a depth of 245 feet. The ore resembles the Silver King and some of it is very rich. The Crispin shaft is about 1000 feet southwesterly from the Silver King. There are several mining claims pooled and under bond, and are pending a sale to Boston, Mass., and Philadelphia, Penn., capitalists. This "pool" of claims is situated southeast of and are near the Silver King mine.

Major W. H. Lumker, Colonel P. C. Cumeford and Robert Wright, Esq., all of Silver King, are the owners of the mine referred to.

There are a number of good prospects in Pioneer district, within a radius of one mile of the Silver King, which merit the attention of capital, and some of them may prove as good as the Silver King. MINER.

Silver King, Arizona.

A Point in Leaching Ores.

EDITORS PRESS:—Referring to the communication of Mr. Dubois, in the PRESS of 4th instant, I wish to say that his observations accord with my own. Some years ago I noticed that the indicated solubility of the silver in a sample of roasted ore was considerably less when the ore was soaked all night in the hypo than when it was leached rapidly on a filter, and I abandoned the soaking process in consequence.

A few months ago I ascertained by experiment that copper and silver are quickly precipitated from their hypo solution by precipitated zinc sulphide. Silver is also precipitated by the same reagent from its solution in aqueous potassium cyanide; but if the latter be strong the silver sulphide soon redissolves. It seems quite likely, as suggested by Mr. Dubois, that Russell's solution acts practically in some cases by decomposing the sulphurets of zinc, etc., in raw or imperfectly roasted ores, forestalling and preventing the decomposing action of these substances on the silver thiosulphate, as well as redissolving any silver which they may at first precipitate as sulphide, though in the main, the copper of the extra solution would, of course, be precipitated first. The theory of silver leaching is not yet complete.

C. H. AARON.

A "Black Sand" Lode.

An Interesting Occurrence of Gold.

EDITORS PRESS:—There has recently been discovered on Rattlesnake creek, Tulare county, a vein carrying gold in a new and interesting combination. A letter from a gentleman owning a claim on this lead, says: "We have found the lead the gold came from found in the Sawyer Diggings. It differs from anything I have known. It seems to be composed almost entirely of black sand. It is readily picked and slacks in water after being brought to the surface."

This gold is perhaps as fine as any mined in the State. It is in the form of water-worn grains, and the most of the country rock in the vicinity of the lead is slate—probably of the Jurassic age—or corresponding with that found in the old placers further north. There is one variety of this slate, however, in perfect conformity with the others, which contains rounded pebbles. In some cases these pebbles are partially incorporated into the rock in which they are imbedded, by metamorphism, and have lost their shape. In other cases the water-worn polish of the surface still appears and is impressed upon the matrix, from which it can readily be separated. As I have said, this matrix has a slaty cleavage, and like the other slates stands nearly vertical. The disintegration of this slaty conglomerate reveals a very heavy percentage of black sand and a trace of gold, and I had been led to suppose that all the gold of the adjacent placers came from the wasting away of these rocks.

As to the exact relation of this so-called black sand lode to this pudding-stone slate (if I may be allowed the use of the term), I have been unable to ascertain. I shall visit the locality in a short time, and may be able to throw more light on the subject.

In the metamorphism which has taken place in this formation, there is a faint suspicion that all the rounded pebbles have been more or less flattened, and it is noticeable that they all stand on their edge. STEPHEN BARTON.

Kernville, Cal.

Northern Counties of California.

Topographical and Geological Features.

EDITORS PRESS:—The seven northern counties of the State of California are comprised and included in that area situated between the parallels of 40° and 42° north latitude and 120° and 124° 30′ west longitude. Del Norte, Siskiyou and Modoc, the northern tier, form the northern boundary of the State, while Humboldt, Trinity, Shasta and Lassen adjoin on the south. For facts concerning the topographical features of this broken and mountainous region, the writer is indebted to J. W. Powell, Director of the United States Geological Survey for the California Shasta Sheet of his official map made by members of his staff in 1883 and 1885.

In no other portion of California can be so well seen the stupendous effects and powerful influences of the pent-up force of dynamic agencies that have been generated in Nature's laboratory as in this region.

This whole section has been tossed, torn and dislocated by irresistible and invisible forces. The strike or trend of the stratified rocks, as well as their central core, has been changed from west of north to north 20 east as if swung on a pivot. The main axis of the mountain range with its central granitic core has not only been metamorphosed by chemical action, but as stated, changed its position and been thrown into confusion with no order or system.

From Mt. Shasta, which evidently was the focus of the disturbance, subordinate ranges and spurs of ranges radiate in every direction, with isolated peaks and buttes of greater or lesser proportions indiscriminately thrown up like bubbles of gas in a seething caldron. Old river channels were obliterated and new rivers formed. The eccentric course of the river now known as the Klamath, in its efforts to find an outlet to the sea, was due to this cause. Its tortuous and snake-like windings is a fair illustration of this chaotic confusion, this cataclysm of events.

The long-pent-up powerful gases that produced these effects finally found an outlet in Mt. Shasta and her subordinate volcanic vents which belched forth torrents of molten rocks, lava, scoria, etc., not only building for themselves isolated mountains of no mean proportions formed of eruptive matter, but covering the surrounding country to great depths, filling beds of extensive lakes and basin-shaped depressions forming plateaus or table-lands of immense extent. The overflowing molten current passing onward in a southerly direction followed the course of and filled the channels and troughs of the then existing system of Pliocene rivers and hermetically sealed their auriferous contents for the use of unborn nations, overflowing their banks and surrounding ridges, covering verdant plains teeming with the vegetation of the tropical clime, and destroying all animal life in the morasses, lagunas and rivers that had not been dried up or evaporated by the advancing flood of the fiery molten stream. Abundant evidence that this was the case is seen in the numerous remains of the mammoth, mastodon, the horse and other species which are found in the gravelly beds of these Pliocene channels and the surrounding bogs and morasses of this region. It is also possible that Pliocene man may have existed during this Tertiary or early Quaternary period and laved in these ancient streams.

This period was followed by oscillations of the earth's crust. Alternate elevations and depressions occurred, producing great changes in the physical geography of our continent—as well as climatic changes—from a tropical clime to the temperate, followed by the glacial period, when an icy sheet covered the whole Western Continent, of which there is abundant evidence in glacial marks that have scored and furrowed the surface of the rocky formation. Previous to this period, however, the Sierra Nevada range of mountains had assumed shape, form and proportions with its granite core, flanked by the metamorphic slates that form our present metalliferous omain.

At a still later period the coast range of mountains raised its head above the ocean (anterior, however, to the volcanic changes) with its sandstones, shales and slates of the cretacious and tertiary formation forming the easterly bank and shore line of an arm of an inland sea that extended at least as far north between the two ranges as Shasta Basin, and possibly into Oregon, the recipient of the waters of a river equal if not superior in size to the Columbia, possibly the Columbia itself. That this theory is tenable is evidenced by both the flora and fauna of this region, and by the remains of a system of ancient rivers that flowed from the north southerly through Washington Territory, Oregon and California. This system spanned a width of nearly 40 miles, situated on the high peaks and table-lands of these northern regions at elevations of from 4000 to 6000 feet. In places it is lava-capped; at others their trough or channel with inclosed gravel are exposed where cut by bisecting modern streams that course at right angles with the Pliocene system.

J. H. CROSSMAN.

Remarkable Railway Building.

The *Railway Age* of April 12 published a table of railways in this country under construction and projected in the first three months of the present year that is a source of surprise, and, at the same time, congratulation, so far as outlining a prospective prosperous future. It is a source of surprise from the fact that the table gives the names of nearly 700 railway undertakings scattered through 46 of the States and Territories, aggregating a total mileage of about 55,000 miles. That these roads indicate a prosperous future is witnessed in the fact that so many small lines (out of the nearly 700 only about 130 have each a mileage of from 100 miles and upward) are among the undertakings. These small roads are the pointers that go to prove that it is the necessities of localities that are calling them into being, and not speculation. They are the feeders for main lines made imperative by the growing demand of each section through which they pass. Another reassuring sign is that the smaller roads are not confined to new States and Territories, for the table gives the names of large numbers that are either being built or to be built at an early day in the older-settled States. Among the names of the roads given having a mileage of over 100 miles each, four are in California, two in Oregon and three in Washington Territory. A careful analysis of the new roads makes it certain that, notwithstanding they will have a mileage of about 55,000 miles, yet their building will not run counter to others to such an extent as to destroy their individual usefulness, so far as their incomes are concerned, by creating such an unjust competition that many will be short-lived. This examination cannot fail to impress one with the vastness of the country which affords room for so many separate lines without interfering with each other, and as the *Railway Age* suggests, "the almost unlimited possibilities of future railway construction, of which the enterprises made public during the last three months give only a glimpse."

FOUNDRY AT SAN BERNARDINO.—One of the worthy institutions of San Bernardino is Henderson's foundry and machine-shop. From 15 to 30 workmen are employed. All descriptions of machinery are manufactured, from special agricultural implements to stamp-mills for the mines. A plant of the latter description is now being constructed. All species of castings are made, lathe work is done, etc. Such an establishment is a great convenience to miners, builders, and others in the large territory tributary to San Bernardino.

THE Virginia *Chronicle* says: The widow of W. Drysdale, a miner killed about a year ago, while ascending the Consolidated Virginia shaft on a cage freighted with timbers, has received a check for $1000 from the Con. Cal. and Virginia Mining Company. The check was given the widow at the suggestion of J. W. Mackay.

CON. CALIFORNIA AND VIRGINIA produced last month 12,830 tons of ore, yielding bullion of the gross assay value of $295 832 55, of which $131,053.03 was gold and $164,779.52 was silver. The average yield in bullion per ton was $23.05, and the average assay value of the battery samples was $26.99 per ton.

FOR some months a Chinese miner worked at Kanaka Bar, in Sierra county, with a rocker. He had poor luck until last week, when he struck a $1500 nugget and three ounces of gold in one pocket. He was content with his luck and left for China.

CURIOSITIES.—Mr. E. A. Hornbeck of National City has a curiosity in the shape of an amethyst crystal with a drop of water in the center of it. He also has some shells taken from the oil well at a depth of 1050 feet from the surface.

MINING throughout New Mexico is booming, and news from all the camps is to the effect that the influx of miners from Colorado, Arizona and California is increasing.

A CABLE ROAD is being constructed at Spokane Falls, all the machinery for which is being built in this city by the Vulcan Iron Works.

THE last dividend—No. 235—of the Idaho gold mine of Grass Valley brings the total dividends nearly up to $5,500,000.

Growing Cities in the Great Valley.

The great interior valley of this State, owing to the building of railroads and the influence of irrigation systems, is being rapidly settled. At various points cities and towns are growing in size and importance The development of the country has made these communities prosperous. On this page are views of two of the more important cities in the valley.

Fresno.

Probably there is no city in California today which is having so great a proportional growth as Fresno. Its boom began almost as early as the greater boom in Los Angeles and Southern California. It was not characterized by the wild excitement of other real-estate crazes, but has seemed to show staying qualities not enjoyed by any other boom in the State. The appreciation of Fresno's advantages was slower in coming than appreciation in some places, but once it came it has remained a fixed factor.

The present population of the city is already 10,000. With the present moderate impetus continued for a few years, who can predict its population, say at the taking of the census in 1900?

Like other towns in Central California plotted by the railroad company, there is a reservation on either side of the track, and on one side of this reservation, for a distance of three blocks, the front is well lined with business houses, stores, factories, etc. The principal street of the city extends from the depot to the Court-house square—three blocks. This street is lined with stores the entire distance, some of them being very fine structures. The new First National Bank building—an elegant brick block—and the Grand Central hotel, are on this street. Parallel with this, on the south, is another street, which is beginning to rival the thoroughfare first noticed. On this street are the Hughes hotel, the Hughes block—both solid, fine structures—the Masonic block and two equally fine brick blocks now nearly completed. On the north, another parallel street is rapidly improving—thus making the better business port on of the city, between the depot and the court-house, nine blocks in extent. Within this radius nearly all the best buildings are located, and nine finer blocks, representing greater wealth, it would be hard to find in a half-dozen other cities in California.

Without doubt Fresno owes its late growth to the fact made known to the world that it is located in the midst of one of the most favored fruit regions in the United States. The fruit raised most successfully here is the grape, and from Fresno grapes the finest raisins in the world are made, and some of the best wine. But it is as a raisin-producer that Fresno county is chiefly celebrated.

It is needless to enumerate with particularity the various institutions of Fresno. She has all the characteristics of wide-awake sisters in other parts of the State, except that in many instances these features are intensified by her present activity. Water works, gas, electric light, street railway, fine hotels, concentration of capital in banks, growing wholesale houses, immense retail establishments, fine public schools, modest manufactories, etc., etc, are all here. A good court-house stands prominently in the center of a large reservation or park, which gives a pretty view to the eastern part of the city. At least 15 to 20 fine brick buildings are in course of construction at the present time. A few of these are outside of the limits mentioned in the former part of this letter, and indicate the speedy expansion of the business quarter of the city. The style of architecture adopted in many of the leading buildings is attractive in the extreme. Brick walls are relieved by trimmings of yellow sandstone or white granite, and pointed towers finish the upper stories of corner buildings. There is a commendable pride among the builders to erect handsome structures, and those now about completed are models of their kind.

Tulare City.

This pretty "City of the Plains," as its citizens like to term it, is in the almost exact center of what is locally known as Tulare valley, and very centrally located between San Francisco and Los Angeles, being 251 miles southerly from the former, and 231 miles northerly from the latter city. It is ten miles east of south from Goshen, the junction of the Visalia railroad and the Huron branch of the Southern Pacific railroad, with the great Southern Pacific Overland road.

Tulare City grew slowly during 1878 and 1879; 1881–82–83 were quite prosperous, its population June, 1883, numbering 1020. On the 25th of July, 1883, the first great conflagration reduced the town to ashes. The losses footed up $180,000. During the next six months, to January, 1884, there were 77 buildings erected at a cost of $131,274.

The building continued on into 1884, and in May of that year the population was 1293 During this year 60 buildings were erected, costing $100,000. It was at this time that the citizens voted a tax to build a $20,000 schoolhouse, which was immediately erected, and is one of the finest in the interior.

The year 1886 began very prosperously for Tulare City, and the census taken in May gave a population of 2257. Some very substantial improvements were made, and everything looked prosperous, when on the night of August 16th occurred the greatest conflagration ever known in Southern California. The fire broke out shortly after 11 o'clock P. M., and as a strong wind was blowing from the north, it was but a few moments before the fire was beyond control, and sweeping everything before it. The water-works were among the first things to burn, leaving the people powerless to fight the flames. Sixty-three business houses were burned, with nearly all their contents. Only two general merchandise stores and three small groceries were left. Every hotel and restaurant was consumed. The loss inflicted was not far from $350,000; insured for less than $200,000. Notwithstanding this great conflagration, the year 1886 was a remarkable year in the history of this prosperous town. Its present growth is a marvel. It has been rebuilt at a rapid rate, and the new buildings are generally of brick, and of a superior character. The present population of the city is doubtless 3500 to 4000.

Tulare City lies on both sides of the railroad, being about equally divided. The business portion, with some residences, lies on the east side, while the churches, schools and the main residence portion lie on the west side.

The city of Tulare lies in the midst of a great wheat-growing locality. The proceeds from the sales of this cereal shipped from Tulare are said to be fully $500,000 per year, and for a portion of the season the railroad company has a lucrative business in hauling the immense product to the mills at Stockton and Vallejo, or to tidewater at Port Costa. Besides this, $75,000 to $80,000 worth of wool are annually shipped from Tulare, showing that the sheep husbandry of this locality is extensive. Cordwood cut in the foothills to the east is also an important product of Tulare, and considerable is exported besides that consumed by the railroad company.

Tulare being the end of a division on the Southern Pacific railroad, the round-house and machine shops of the company are located here. This is an important element in the prosperity of the city, for the monthly payroll amounts to $12,000 or more. The shops are quite extensive, but are inadequate to the growing needs of the company at this point.

Connected with the management of railroad matters in Tulare is a fine free reading-room, which, besides containing excellent works of fiction and science, is kept supplied with the best current literature of the day. The building containing this library is in a central location, and is well patronized by the employes of the road and the citizens of the town.

The people of Tulare City are justly proud of their educational facilities, and especially of their public-school system. Their new public schoolhouse, an eight-class-room building, is a large, beautiful structure, built of brick, with a high tower, in which is set a clock. Six teachers are employed. The aggregate daily attendance is 375. The school is taught 8 to 10 months in the year. Besides the public school there is an institution known as Tulare Seminary, which is a preparatory branch of the University of Southern California.

Prominent among the industrial enterprises of the town are the Tulare Flouring-mills, with a capacity of 100 barrels of flour per day. They have the full roller process, and make all kinds of feed also. The water-works of the city are important. The supply is obtained from two artesian wells, over 400 feet deep, and is inexhaustible.

There are many solid and extensive mercantile institutions in Tulare, and without many exceptions they are housed in attractive and commodious brick stores. There is a thrifty and clean look to the city, which is not excelled by any interior town in the State. Its fine appearance was a pleasant surprise to our correspondent, and we think many others who visit the city have been or will be agreeably surprised in the same manner.

H. G. P.

A BIRD'S-EYE VIEW OF FRESNO AND ADJACENT COUNTRY.

A GENERAL VIEW OF TULARE CITY, WITH SIERRA NEVADA MOUNTAINS IN THE DISTANCE.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

COAL.—Livermore *Herald*, May 22: Sixteen men are still employed in the Livermore Coal Mining Company's incline, and a cutting-out station is now being established at a depth of 350 feet. From this point a tunnel will then be run back to the vein. Lateral drifts will then be run both ways, and the company will be ready to take out coal. This will be hauled by team for the present. Secretary Higgins estimates that the company will begin taking out coal in from six weeks to two months.

Amador.

AMADOR.—*Ledger*, May 18: The superintendent of the Amador gold mine, John I. Minear, showed us on Wednesday two small buttons of retorted gold, the product of the rock crushed in the one-stamp test-mill now in operation on that property. One was worth about $40 and the other $15 to $20. We cannot give any approximate estimate of the number of tons crushed in realizing this yield, but the result is chiefly significant as tending to show that the ore contains free gold in more liberal quantities than is generally supposed. This gold was obtained from the plates and batteries, independent of the sulphurets. A yield of $2 per ton in free gold, if the sulphurets run anything like those of the Zeile, would leave a fair margin of profit, operating with a 60-stamp mill, and with large ore bodies to draw from. New hoisting works are making satisfactory headway. The pump is to be put under ground next week, and by that time the blacksmiths will have finished the new skips.

NEW LONDON.—Preliminary steps are being taken toward the erection of a 40-stamp mill on this property. The site has been selected just north of the hoisting works. Men have been put to work clearing the site. The contract for the complete mill, we are informed, has been let to San Francisco parties.

MISCELLANEOUS.—Nearly all the men working at the Morley and Wetzlar mine in Hunt's gulch were discharged last Monday. About 20 were turned loose; six or seven are retained to do prospect work. The bunch of ore met with, as reported last week, does not amount to much as a mining proposition. It was merely a pocket, and a small pocket at that. Nothing of a very cheering character has been developed in the prospecting operations so far. Prospecting, however, will be prosecuted for some time to come. The Zeile Reduction Works are closed temporarily, owing to lack of sulphurets, and to enable the ovens to be thoroughly overhauled and repaired. By the time this work is completed, the shaft will likely be repaired, when the full 40 stamps of the mill will be started, which will keep the sulphurets works running full blast. The engine and boiler for the McKenzie mine has arrived, and will be placed in position as soon as possible. The Bunker Hill is short of timbers. A number of the men are laid off awaiting their arrival. A contract has been let at the North California to run a drift 300 feet.

REED & ASKEY.—*Dispatch*, May 18: A tunnel 600 feet in length has been run on the ledge in this mine. The average width of the ore body is four feet, and the yield is $8 per ton, besides rich deposits which are occasionally met with. The mill is kept running steadily, and nine men are employed.

KEYSTONE.—Twenty stamps are kept busy on picked rock; they have a vast body of ore in the mine which will mill about two dollars per ton, but as the cost of mining and milling is a trifle over this amount, this rock is left untouched, while the prospecting for a new vein goes on. The Co. are considering the advisability of running the entire works with electricity.

ACME.—Timothy Hanley Jr., the owner of this claim, which is situated in Hunt's Gulch, while doing his assessment work last week, encountered a fine body of ore, which gives promise of making this property a paying mine.

ALPI.—At the sale of delinquent stock of the Alpi Mining Co. last Monday 29,287 shares were sold. There were no bidders, and the entire lot was bought in by the company for the amount of assessment and costs.

Calaveras.

AT MURPHYS.—Cor. Angels *Record*, May 21: The abundant water supply has set in motion the great wheels of industry, and particularly in mining greater activity is noticeable than ever before everywhere within a radius of ten miles from this point. In this vicinity it is pleasing to note the sturdy stride in improvement. In the Norfolk an important strike has been made that bids fair to rival in extent and richness any that has been around here for years. Supt. Morse is in high glee with the good appearance of the mine. The Total Wreck, recently bonded by Mr. Campbell of San Francisco, have a shaft down on the lode 90 feet deep in excellent quartz; 20 tons of this quartz crushed recently in the Oro Plata pulverizers paid over $12 per ton. The Beatrice, in close proximity, has a large vein nearly covering the face of the tunnel which taps the vein at a depth of 200 feet. The lode where the miners are now at work is bold and well defined of good sulphurets variety and improving as progress is made.

KING SOLOMON MINE.—Calaveras *Chronicle*, May 18: A new Huntington mill has recently been constructed upon the King Solomon mine, located about midway between Valley Spring and Campo Seco, or about 1½ miles from either place. The mill was started last Saturday and we understand has been running steadily since starting up. The gold-bearing material put through the mill is a singular formation of a chalky nature, eight or nine feet in thickness, changing from whitish to yellowish and then a reddish color, with threads of quartz throughout. It rests beneath what is commonly called a lava formation and upon slate bedrock. It is known among miners as a "blanket mine." Strange to say, the quartz which threads the mass bears no gold, the precious metal being confined to the chalky substance. It is said to prospect well, and is very easily milled, and if the gold can be saved good results may be expected. The formation, we are informed, is quite extensive. A prospect tunnel has been run of about 200 feet in length and three crosscuts run. The location was discovered 20 years ago, and some prospecting done upon it, but nothing noteworthy came of it, and it lay untouched for many years until recently.

BONDED.—The placer ground formerly patented to the Hughes Bros. in the Chili Gulch Mining District, this county, and now owned by Chas. A. Werle, has been bonded to an Eastern company for a good sum. Work on the property will soon commence.

Contra Costa.

COAL MINES.—*Gazette*, May 22: After many delays and disappointments the machinery at the Independence shaft, Somersville, has been put in working order, and we are informed that last week work was commenced in hoisting out the immense body of water at present in the mine. Everything about the machinery worked smoothly and satisfactorily. A slight accident happened last week by one of the buckets becoming caught, which will delay the work several days in repairing the damage done, after which time pumping will be kept up steadily until the mine is drained. Mr. Jas. Rankin is giving most of his attention to the opening up of the Independent, and by his careful management, is bound to make a success of it. It is hoped with no further mishap and under fair conditions to get the mine pumped dry in a short time, when coal-cutting will be immediately commenced, and to this end the inhabitants of Somersville are anxiously looking forward. Employment will be given to a greater number of men, and should the opening up of the old shaft prove successful and come up to expectations, a new era will dawn upon Somersville as well as the county.

El Dorado.

GRAVEL.—Placerville *Observer*, May 21: At the Chili Ravine mine, which has been idle for a long time, gravel estimated to pay $40 per carload has recently been discovered, and there seems to be a large body of it, all hard, blue cement gravel. The Gignac mine, after being abandoned and considered worthless for many years, is now being successfully worked by a Bryan roller-mill, the cement being very hard. The old Granite mine at Smiths Flat, abandoned for many years, and even sold for taxes, is now yielding gravel that contains from $8 to $10 per ton in gold, the gravel bed being over 4 feet thick. Tunnels are being run further east, on a range with Damascus and Sunny South, which is a range east of Iowa Hill, the Mayflower, Forest Hill and Dardaoells, and promising prospects are being obtained. We have in this county miles in extent of these gravel beds yet undeveloped. Many places have been worked and fortunes made, but recent developments establish the fact that the bulk of gold is yet in the ground. The Bryan roller-mill at the Gignac mine has worked 56 carloads of cement, equal to 41 tons in eight hours. This is a small mill. The Bobby Burns quartz mine, seven miles east of town, was worked to some extent 27 years ago, and abandoned till within the last few months. The owners have sunk a shaft 70 feet deep, and run a level 40 feet, making development, 70 by 40 feet, of a ledge four feet wide of ore that will average $40 to the ton. This ledge shows bold croppings at intervals for several miles. We hear flattering reports from the Big Sandy and Kelsey. Parties who have visited the mine since the new 10-stamp mill was started, say that the mine is showing well, and the plates are anything but discouraging. Eight men are employed at this mine. The ledge is from 10 to 20 feet wide, and is of good grade.

Fresno.

WEST SIDE COAL MINES. — Fresno *Republican*, May 17: The operations of the San Joaquin Valley Coal Mining Co., in this county, are quite extensive. A. B. Symington is the mining engineer and J. E. Rawlins general manager. Indications above ground were in their favor, and in order to determine the regularity of the vein of coal below ground, three tunnels, aggregating 3080 feet in length, have been run one above the other into the side of the hill which contains the coal. Satisfactory results crowned their efforts; the vein was reached in three different places equidistant 125 feet one above the other. This was sufficient to satisfy the most skeptical that with the present openings coal was available to meet all possible demands for many years to come. To avoid accidents by gas explosions, a most perfect system of ventilation has been adopted. Each tunnel has an independent air shaft of some 200 feet in length. Another interesting feature in the plan of operations was the laying of tracks from the tunnels. Twenty-seven tons of rails have been used for the purpose. They are laid on grades cut on the side of the hill, all of them converging at a point a short distance from the bunker, where a single track again leads to the dumping-off place. The coal now passes over a screen, the screenings and coarse coal falling into separate compartments of an immense bunker. The merits of Fresno coal are known to some extent in Fresno, and there is nothing to hinder its rapid introduction. From what we have seen we are satisfied that no delays need be apprehended in filling all orders promptly.

THE MINARET MINES.—Fresno *Expositor*, May 15: We have upon several occasions within the past few months made reference to the rich mineral section lying in the northeastern corner of this county, in the rugged region surrounding Mt. Lyell and the Minaret Peaks. C. J. Beck, well known in this city, has spent most of the time for the past eight years quietly prospecting that region and developing the various discoveries that he has made. By private letter from Mr. Beck, bearing date of May 13, from San Francisco, we learn that a syndicate, composed in part of English operators, has been formed with a capital stock of $5,000,000 to open these mines. The first step necessary will be the construction of a road to reach the property, that mining supplies and milling machinery may be easily and cheaply transported to the place of operation. This will probably consume much of the present season, but besides men and material will be sent in to commence the work of development by packtrain.

RICH GOLD FINDS.—We alluded yesterday in the *Expositor* to some fine specimens of gold quartz left at the Board of Trade rooms as samples, but then could not give the names of the parties or the locality of the mine. The secretary informs us to-day that the owners of the property are H. Sherwood and A. B. Chambers, and it is known as the Bonanza mine. It is located in Auberry valley, at Temperance Flats, about 30 miles from Fresno. At present there is but a small force of men working the mine, taking out about 20 tons daily of good quartz from a well-defined lead, the ore averaging about $2000 to the ton. The shaft is now down about 100 feet. Mr. Sherwood is very confident that there is a wide gold-field in the vicinity, and invites prospectors to come out and prospect. He says he has enough in the mine they are working, and now desires others to come in and aid in developing the country.

Placer.

THE MAYFLOWER.—*Republican*, May 16: The Mayflower at Forest Hill has developed into a mine which promises to become as permanent and steady in its output as any of the famous quartz mines of Grass Valley. It will be remembered by miners that the new main tunnel which leads under the channel is 5585 feet long. From the end of this tunnel two gangways are run, one north and the other south under the old river channel in which the gold-bearing gravel is deposited. These gangways run through the bedrock and are a little smaller than the tunnel, being 6½ feet high and 5½ feet wide. The north gangway has now been run a distance of 440 feet, and the south gangway 525 feet. In the channel over the latter the breast of gravel now being worked is 75 feet wide and six feet thick. In the north gangway, the breast is 110 feet wide and six feet thick. At the north breast, which leads toward the shaft of the old works now filled with water, they have within a few days encountered a large stream of water which Supt. Chappellet thinks drains the old works and the whole mine. This breast is 920 feet from the old works, and the water is supposed to run down that distance through the gravel. When the mine is drained there will be little trouble in working northerly. Some prospecting has been done northeasterly from the junction of the tunnel and gangways, with the discovery of another channel as a result. It is probably the Orono which they found in the Breece and Wheeler. The Mayflower now employs 135 men, of whom 60 are miners. The others are engaged on outside improvements. The company is putting up a new boiler at the mill, and will also put in ten more stamps immediately. They are now averaging 150 tons of gravel a day, and also take 60 tons of bedrock from the gangways. The mill and compressor are being run by water-power, but steam must be used during the summer months, and the new boiler is for that purpose. Since the mine has been in operation through the new tunnel, the company has taken out $122,000. The first cleanup was made January 2d, and the last on the 2d inst. The average yield to the carload of 2250 pounds has been $10.50, and the cost of mining and milling is $2.50 a ton. The gold is 891 fine.

Shasta.

BULLYCHOOP ORE SHIPMENTS.—Anderson *Enterprise*, May 17: Three carloads of ore were shipped from here last week to the Hill smelter in Denver from the Foster mines at Bullychoop. The last shipment of ore from these mines to the smelter at Vallejo made an average of $168.98 per ton. Some high-grade samples of sulphurets which were shown us will assay more than $1000 per ton. This group of mines is destined to be one of the best paying in the State. There is now in sight 250,000 tons of ore that will average $150 to the ton. While there is not a great quantity of ore on the dump, sufficient force of men is kept working to keep a six-horse team hauling here steadily for shipment. The recent snowstorm made bad roads and hauling is now a little tedious, but sufficient time can be made to make shipments of four or five carloads a month.

IRON MOUNTAIN.—Shasta *Courier*, May 18: Go to L. Garrecht's saloon and see the specimens of Iron Mountain ore as put through the different processes until the bar of bullion on exhibition is produced. The specimens he has were taken from a ton of ore that produced $28 in gold, 525 ounces silver, and 27 per cent copper. This result was obtained by reduction on the ground, in small test works erected there. Heretofore the same character of ore shipped to reduction works a long distance away gave no gold return, at least none was reported back. It takes Frank Satterlee and Jim Sallee to get the mineral out of Shasta county quartz.

MIDDLE CREEK.—The roaster at the Calumet is now in operation, and the mill will start in a few days. John Kempton is now sinking a shaft for Deakin & Taylor on one of their mines in the Lower Springs district.

Siskiyou.

RIVER AND QUARTZ MINES.—Yreka *Journal*, May 22: The quartz from Abbott's ledge on Greenhorn, now being crushed at Warren's mill, on Yreka flats, promises to yield $30 to $50 a ton average, some of the quartz showing gold very plainly to the naked eye. The Schroeder & Werner quartz ledges on head of Deadwood still continue to yield handsomely, and the mill is kept running steadily, there being a great amount of quartz on the dump with a large force of men taking out more. The quartz in the ledge of the Gold Ball Mining Co., at Salmon river continues to improve in extent and richness, and bids fair to become one of the most permanent and best paying ledges on the coast. From Klamath river we learn that Pullen is getting on well with his work and hopes to be ready to pump out his claim in a short time. A Chinaman was killed at Pullen's claim Saturday evening by a bank of earth caving down on him. Jillson & Co. are hydraulicking every day, the recent rains, no doubt, having furnished a much better supply of water. Wm. Jillson has his dam completed, wheel built, and is almost ready to start the pump. Work at the Keweenaw mine progresses steadily; 200 feet of wing dam eight feet high are completed, and the whole 240 feet will be done this week. The head dam will be closed next week and the claim ready to pump out about June 10th. The company has a large force of men at work and will be taking out the yellow dust in about four weeks or less. Mr. Wm. Davis, who located a quartz ledge in Cottonwood mining district two weeks ago, christening it the Nest Egg, says his find is not for sale; that he knows when he has a good thing and might as well keep it as to sell and allow some other party to reap the benefit. He says it will take a year to open up his mine and get in shape to mill his rock. With the mines on Hungry creek, the quartz and placer claim around Cottonwood and the mines along the river near by, the northwestern part of the county is coming to the front as a mining section. There will no doubt be a large output of the precious metals from this quarter during the summer and fall. On Humbug creek there seems to be considerable activity, especially up the gulch, where the old Eliza mine is located. John Boyle has a force of 18 or 20 men at work in his new discovery near the summit of the mountain, and is extending the wagon-road above the Eliza quartz-mill site. The Thornton Thomas ledge, about which there was a dispute of ownership some time ago to stop operations, is now being worked with indications of striking big pay. The McCook mill is now running steadily in crushing quartz from Lawson's gulch, and the Hegler boys and Bruce Aldrich are also running their mill, with an abundance of rich quartz on hand, besides constantly getting out more.

San Diego.

AT JULIAN.—*Sentinel*, May 18: The Helvetia mine, about a mile east of town, has been purchased by Dr. Murray and E. C. Smith, who will at once put in machinery and develop the mine. They intend running a tunnel from the foot of the hill, to tap the main ledge at about 350 feet. Timbers for the tunnel are now being cut.

SOME exceedingly rich ore is being taken out of the San Diego mine.

THE mill at the Owens mine was started up yesterday.

NEVADA.

Washoe District.

ALTA.—Virginia *Enterprise*, May 18: The mill is running steadily and the ore reserves are looking as promising as ever—better, in fact, as the winze from the 950 has run through ore continuously.

HALE & NORCROSS.—On the 400 level the stopes in north drift from the west crosscut continue in good ore. The north drift was advanced 18 feet and shows the same character of ore as the stopes. The winze from the south drift from joint west crosscut is down 60 feet and connected on Thursday last with the north upraise from 500 level. The north and south upraise on this level continue in ore of good quality. On 600 level are extracting usual quantity and quality of ore from the several stopes. During the week have hoisted 1277 cars of ore, have shipped to Nevada mill 1020 tons, and have milled 1040 tons; average battery assay, $26.60. Have bullion on hand and previously shipped for this month amounting to $30,104.98.

OVERMAN.—Extracted 313 tons of ore, and shipped to the Vivian mill 244 tons. At a point 54 feet above west crosscut No. 3, have drifted 24 feet through quartz. At a point 60 feet south of west crosscut No. 3, and 63 feet above the track level, have made an incline upraise to the east 76 feet and to the south 33 feet. Formation, quartz and porphyry. On the 6th instant shipped a bar of bullion; value, $10,272 43.

SAVAGE.—On the 400 level the joint west crosscut has been advanced 25 feet. Face is in porphyry and clay. From Nos. 1 and 2 west crosscuts we are stoping ore of fair grade; are also extracting ore from the old stopes in the north and south drifts. During the week have hoisted 515 tons of ore. Have shipped to the Rock Point mill 468½ tons, and have milled 490 tons. Average battery assays, $21.

BELCHER.—Have been engaged most of the week in timbering loose ground in the 1105 west crosscut and in preparing to raise on the streak of ore uncovered in it. The raise was started on the 12th instant and is up 6 feet. Have completed repairs to the 1000 level incline station and chutes, and have started a south lateral drift from it. Are also engaged on the 1200 station with a similar object in view.

CROWN POINT.—Have opened the eighth floor in the south stope on the 400 level, and so far it shows a little improvement over the seventh floor for width. Are extracting some ore from the 160 west stope, and will soon start a west drift on the 250 level to strike the same body if it extends down that far. Have shipped to the mill 890 tons of ore during the week.

YELLOW JACKET.—Are extracting ore from the 1100 upward. The battery samples at the Brunswick mill average $30 a ton. Have started to crosscut west on the 500 level, to strike a ledge of gold-bearing quartz, calculated to be about 2000 feet distant. It will strike the ledge at a depth of 1500 feet.

SEG. BELCHER.—The west crosscut on the 1100 level is now out 387 feet. What is believed to be the footwall was encountered May 14th. Should this prove to be the case, will stop the drift and start a raise in the vein and on the ore streaks found in the crosscut, and follow them.

ALPHA.—The 500 level east crosscut, 50 feet south of Alpha shaft, is out 66 feet; face in porphyry. The east crosscut on the south line is out 110 feet; face in porphyry.

CONFIDENCE.—The joint Challenge-Confidence north drift on the 300 level is in 155 feet, 20 feet having been added during the week. The face shows porphyry.

POTOSI.—North lateral drift, 750 level, is out 216 feet; the face is in clay and porphyry. The north lateral drift, 285 level, is out 271 feet; face in hard porphyry.

JUSTICE.—Have been sinking from the 650 level since the new double-hoist engine has been put in place and running the mill steadily.

HAYWARD.—Are now working ore from below the tunnel level, near the hanging-wall, and keeping the Taylor mill stamping.

NEW YORK.—West crosscut, 240 feet north of shaft, 800 level, is out 174 feet; the last 5 feet is in quartz giving low assays.

EXCHEQUER.—On the 382 level the west crosscut on the north line is out 135 feet; face in porphyry.

CHOLLAR.—The south lateral drift, 750 level, is out 463 feet; face in quartz giving low assays.

BALTIMORE.—Still drifting on the 338 level and saving ore for reduction.

WEST CON. CAL. & VA.—No work is being done in this property at present.

ANDES.—Drifting west on the 350 and continuing repairs on the same level.

BULLION.—Drifting north on the ledge on the 760 level.

Eureka District.

FAULT OF OWNERS, NOT MINES.—Cor. Eureka

Sentinel, May 18: Eureka district has produced in round numbers, as near as can be ascertained from official sources, about $80,000,000 of gold, silver and lead bullion. Ore has been taken out of 235 mines of the district and sold to our furnaces. Two of our companies operating in the district have each declared dividends amounting practically to $4,000,000 and aggregating $8,000,000. Neither of these two companies has worked to a greater depth than 1200 feet, and no other company in the district has worked to a greater depth than 850 feet. Most of the work done on the 235 mines has been done by poor men—prospectors—who were financially unable to do expensive deadwork to open their mines properly, and may fairly be termed "surface scratching." Three principal tunnels have been driven into Prospect Mountain—the Eureka, Prospect Mountain, and the Ruby Hill. The Prospect Mountain tunnel is over 2000 feet in length, and its eastern end is under several very prominent mines. The depth from the tunnel level to the surface is about 1000 feet; the other two tunnels are about 1500 or 2000 feet in length, and each passes under mining claims that have yielded good ore. Good ore has been taken out of mines through the Eureka and Prospect Mountain tunnels, and good ore is now being taken out of each, as well as out of the mines of several companies and those of a large number of individuals. And yet there is an evident lack of energy, of vim, in nearly all mining enterprises in the district. With the above showing, why is this? Why are the 200 ore-producing mines of the district, owned by poor men, permitted to lie comparatively idle? Is it because the mines are not sufficiently promising to justify the necessary outlay to develop them? I will venture to say there are 50 mines in the district today that show better prospects at the surface than the Richmond (with about $4,000,000 dividends to its credit) did when it was located. It is fair to assume that the fault is that of the owners and not of the mines.

Pioche District.

RAYMOND AND ELY.—Cor. Salt Lake *Tribune*, May 18: A letter just received from Pioche states that the water level in the Raymond & Ely mine was reached last Friday evening and that the main shaft and the pump shaft are both repaired down to the 1200-foot level where the cage now descends. The Cornish pump column is now repaired to the 900-foot level, and in about a month or six weeks this big pump will be ready to start up. In addition to repairing the shaft, the Pioche Consolidated Co. has been prospecting the virgin ground of the R. & E. Some time ago a vein of ore was encountered in the 10th level that averages four feet thick of very fair smelting ore. A winze in it is now being sunk and as work progresses it improves greatly in quality; but the real bonanza is the famous black ledge. The machine shops are in full blast turning out the machinery for the concentrator and reduction works, now rapidly nearing completion. On the opposite side of the building adjoining the Bruckners to the southeast is the site selected for the smelting works. A 40-ton water-jacket smelting furnace has already been ordered, and work will commence putting it in place as soon as the machinery arrives. A prominent feature in the mines of Pioche is that the ore in all of them changes from free-milling to smelting ores as depth is attained, the Yuba mine being a fine example of this. The ore in the upper levels was chiefly free-milling, and as the lower levels were reached it changed to the very finest smelting ore, but base, as the old-timers would call it.

Siegel District.

GALENA ORE DISCOVERY.—Virginia *Chronicle*, May 21: A vein of galena ore three feet in width was exposed by a recent cloudburst or washout in Siegel district, about 20 miles northeast of the Comstock. There were no surface croppings to indicate the presence of the vein, the portion exposed by the washout being located in the bottom of a ravine. The ore is almost solid galena and assays $280 silver and $9 in gold per ton and carries about 38 per cent in lead. The discovery has led to the location of several claims in the district along the course of the vein, which has a southwest trend.

ARIZONA.

REDUCTION WORKS AT PRESCOTT.—*Courier*, May 13: The hope of miners and others is that works will soon be put up that will treat all valuable classes of ores, right at home. Our own people are scarcely able to carry the scheme to the point of success, but they propose to make a sturdy beginning. To this end, the *Courier* calls upon the people of the town and country to unite their ideas, might and means. The ores are here, sure, to keep a large plant going, but the plant must be of the right pattern, run honestly and intelligently, in order to accomplish purposes for which it is wanted. Taking out a few tons of very rich ore, each day, or hour, for that matter, having "it" sampled here, then shipped to Colorado or elsewhere, to have the metals taken from it, will never increase population here. Plain milling has been tried to the utter disgust of miners and others, and it gives us the blues to hear of people throwing away their money in mills and milling. Ores of this section are base, and cannot be profitably worked by common mill process. Concentration, chlorination, smelting, etc., will have to be resorted to before we shall be successful. This, people who are now laboring to erect and run general reduction works here, know for a fact, and we ask every person in this town and section to do everything they can to help along the enterprise.

HILLSIDE.—Arizona *Journal-Miner*, May 16: Robert Brown has some very rich specimens of ore from the Hillside mine. Wm. Dunlap has sold to Thomas Brown the Treadwell mine, Hassayampa district, for $500. Alex. Carlisle yesterday conveyed to Jos. Chambers one-half of Forest Queen mine, at Big Bug district, for $1000.

OCCIDENT.—W. A. Rowe is in town to-day, having just returned from a trip to the Peck mine. He says that a very rich strike was recently made in the Occident mine, the ore being similar to that taken out of the Peck. Samples assayed from it gave a value of $2000 per ton. Major C. P. Eagan, owner of the property, is expected here in a few days. The discovery has created considerable excitement in the old camp.

LYNX CREEK.—A gentleman just in from Lynx creek says the Dixie mill is a substantial and commodious looking structure. Copper Basin smelter continues to run, and regular shipments of bullion are made to Prescott every day. Alex. Harris returned last evening from Squaw Peak district, and says that work on the Wire Gold mill is progressing satisfactorily.

TURKEY CREEK.—W. J. Mulvenon yesterday purchased a whim, and has shipped it to Turkey creek, to be used in raising the water from the Mulvenon and Roach mine. The framework for the Congress mill is being erected. There are 100 names now on the company's pay roll, and they are prepared to ship 150 tons of ore per month.

BRITISH COLUMBIA.

DIFFERENT DISTRICTS.—Donald *Truth*, May 11: The mining business is beginning to take a little spurt upward in this section of Kootenay district. Work has been commenced in earnest on a smelter at Revelstoke; that it will be continued to completion is not altogether a conundrum, as it is said the syndicate has $57,000 to its credit at the Commercial Bank at Winnipeg. While the syndicate may not have enough ore of their own to continuously run the smelter should it be blown in, outside prospects and mines will undoubtedly help out. There is no hope of getting even a small fraction of the ore of the Toad mountain and Kootenay lake districts up the Columbia to Revelstoke this year, so the ore will all go south to the Northern Pacific. Development work is going on on both sides of Jubilee mountain. John McCrea has struck a good body of ore in the Maggie McCrea; Cham McKay has men on his claims, and Jones & Wells have tapped the Spilimichene ledge with a 50-foot tunnel. They will at once begin another tunnel so as to strike the ledge at a greater depth. A new trail has been cut into McMurdo, and the owners of claims in that promising district will at once begin operations. The wagon-road to the Corbin & Kennedy mines on the north fork of Illecillewaet will be completed by the middle of June, which will enable that firm to put in the machinery required to work their ground. A dozen or so men are prospecting the placers of Canyon creek near Golden. Little actual work will be done out on Porcupine creek before June 1st, Rosamond, Kirkpatrick & Co. have a trail cut in to their claims on Toby creek, and they hope to make a big showing before the summer is over. They have some very promising ground. Work is said to be progressing on Dr. Orton's claims on Arrow lake, and from the amount of supplies going up to the Big Bend country, that section's output of dust this year will figure up in the thousands.

COLORADO.

MINING ACTIVITY.—Denver *Republican*, May 16: It may not be generally known, but it is nevertheless a fact, that mining in Colorado is experiencing something that much resembles an excitement. Go where you will, and the discovery will be made that people everywhere are investing in what they are pleased to term "holes in the ground" in Colorado. If these people are using the same judgment that they would exercise in their various vocations or business in which they engage in life, they will, or can, in nine times out of ten, get their money back many times over. The hills and mountains of Colorado are filled with the precious metals. Where to look for a mine the geology of the country plainly teaches, and the wonderful discoveries that have lately been made at Ouray, about Aspen and Red Cliff and other places, fully bear out this statement. The prospecting fever is on. Scores of men have left Denver in the last few weeks for the hills, the majority of whom have been outfitted by the quiet, staid business men of the city. Hardly three of the number have the same objective point, but every one of them is after a mine and many will make a location which, if properly developed, will in years to come produce for them a competency—such a thing as they could never have by toiling in the city at so much per diem. Judicious mining pays a better profit than any other business in which people generally engage.

ORE SHIPMENTS.—The Aspen ore shipments for the week ending with Friday last amounted to 2785 tons. This was a decided gain over the weekly shipments shortly after the railroads reached Aspen. Of the ore shipped, Denver obtained 1303 tons, nearly one-half. Leadville ranked next, Pueblo third and Kansas City fourth. The comparison of the Pueblo and Denver receipts is interesting in view of the prediction that, after Mr. Holden blew in his smelter in Pueblo, that town would become as great an ore market as Denver. It has certainly not become so, in so far as Aspen ores are concerned. The truth about the smelting business in Colorado appears to be that Denver, having better railroad connections and more wealth than any other place in the State, is likely to hold the lead always in the reduction of ore as well as in nearly every other industry.

DAKOTA.

NEW PLACER DIGGINGS CAMP.—Cor. Deadwood *Pioneer*, May 16: Arriving here yesterday, I found the main gulch, Gold Run, to be an undulating bottom, bare of timber and underbrush, and bisected by a rapid watercourse, wonderfully clear and carrying about 300 miner's inches, and walled in by a series of low hills, timbered with heavy pine, and rimmed with croppings of limestone. The main divide, or cement body, lies on the left bank of this stream and prospects all along the ridge, which is about seven miles in length. The prospecting work at present has been limited to a few of the hundreds of little feeders which come from the cement body. They are all dry diggings and so far the outlook is very cheering. A couple of the boys, Ole Lee and Ole Larson, commenced yesterday sluicing their dirt, which they had to haul about a quarter of a mile and are making about $6 or $7 a day. A nugget which they took out last week is valued at $13. No work on bedrock on Gold Run or Blacktail, which empties into it about two miles from its mouth, has yet been done, as it will have to be drained, but the probability is that they will prove very rich, as all the feeders from the cement body empty into them. The present headquarters of the district is at Garvey's ranch, at which place a meeting of the miners was held last night, some 25 being present, at which the district was legally organized. The district is to be called the Limestone Placer Mining District, beginning at George Williamson's discovery location on Cement hill, and extending therefrom four miles north, east, south and west, thus forming a parallelogram. No miner is to be allowed more than one claim in each gulch, such claim to be 600 feet up and down the gulch from rimrock to rimrock.

IDAHO.

MINES AROUND WARDNER.—Wardner *News*, May 11: The only mines closed at or about Wardner were the Bunker Hill and Sullivan, and development work still progresses on them and will so continue until the completion of the company's new Mammoth mill. The group of mines surrounding Wardner have no equal in the Northwest, and when they are all worked thousands of men will be employed, and the biggest and most prosperous mining camp in America will be the result. Besides the Bunker Hill and Sullivan mines, which have a world-wide reputation, the following named have all been surveyed for patents: The Fairview, Rolling Stone, Forest Belle, Reed Fraction, Mammoth, Lackawanna, Phil Sheridan, Stemwinder, Emma, Skookum, Last Chance, Tyler, Viola, Oakland, Sierra Nevada and Ontario, all within one-half hour's walk of Wardner, besides an innumerable amount of locations reaching to Government gulch, a distance of four miles, on which claims are situated that give every indication of great wealth, and which only wait the momentous hour when development will prove them to be mines worthy of comparison with their peerless neighbors.

ALMA AND NELLIE WOOD CON. G. M. AND M. CO.—Since the 1st of April operations on the Alma and Nellie Wood Consolidated Co.'s mines on Elk creek have been entirely confined to development work. The mill being shut down on the 3d of last month, the number of men employed in the mine was reduced to 20.

SIERRA NEVADA.—The Sierra Nevada mine is gaining a widespread reputation as one of the veritable bonanzas of the Northwest, while the frequent rich discoveries made in its various workings excite the wonder and delight of all connected with it.

THE ALTURAS-SENATE MINING CO.—Ketchum *Keystone*, May 18: The Alturas-Senate Con. M. Co., whose property is situated at Galena, have commenced work, and the old camp shows signs of life and activity once more after its long period of inaction. The company owns 14 claims, but only three will be worked to any extent this season. These three are the Senate, Gladiator and Little Chief. Frederic F. Chisolm, M. E. of Denver, is manager and consulting engineer, but will only spend a portion of his time at Galena. The work will be prosecuted under the direct supervision of assistant superintendent George Philbrick of Ketchum. Between 30 and 40 men will be employed, the largest force being put on the Senate mine.

LOWER CALIFORNIA.

ALAMO QUARTZ.—Cor. *Lower Californian*, May 21: Some very rich specimens of gold-bearing rock have been found about seven miles from Alamo. In two instances the ledges have been found, which shows that the Alamo mineral belt is much larger than was at first supposed. A party of prospectors left Alamo Saturday to look at some new finds about 40 miles southeast on the mineral belt toward Valledares. Some good work is being done by prospectors on the borders of the Alamo mineral belt. The International Co. is crowding the work on the Telemaco, Penelope, Cleopatra, Ulises, Lopez, Cocinero, Princesa, Grande, Grandota, Grandisima, Red Cloud, Jupiter, Chispa and Jesse G. On five of the company's mines the men are working day and night. The company had 56 men at work on Monday at Alamo. Other mines will be opened as soon as supplies of tools, steel, powder, etc., reach the mines. As a whole these mines look exceedingly well. Capt. Ramsdell & Co. will have finished the work on the possession shaft of the Telemaco mine by the last of the week. They will also sink the new shaft on the Princesa, which will be put down west of the work already done. The vein has been uncovered for a distance of 600 feet west of the old shaft. The vein is looking splendidly and the ore holds up its reputation for exceeding richness. Miller & Co. are putting down the new shaft on the Ulises. The vein is looking well and shows free gold. Rosa & Co. are doing the work on the Cocinero and Lopez mines. The vein has been opened in four different places west of the old shaft. Gibbons & Co. struck good ore at the depth of 18 feet in the Jupiter. The ore on top at the point where the shaft was sunk was not very rich, but improved as the vein went down. On Saturday last very rich ore was struck at the depth of 11 feet in the Grande mine. The vein was badly broken on the surface and seemed to narrow down to almost nothing, but at 11 feet Col. Chase struck a large rich vein of ore. Free gold shows in the face of the drift on the Telemaco at the depth of 20 feet. The vein is fully five feet in width and rich in gold. The Telemaco is believed by many practical miners in camp to be the great mother vein. The Quinota mine was the first mine at Alamo to apply for possession, and the Messrs. Castillo have done well. They struck a very rich body of ore last week in the possession shaft.

MONTANA.

A PROMISING STRIKE.—*Montana Mining Review*, May 15: A barber named Bradley, at Wickes, is said to have struck the banner claim, about eight miles west of that place, and some excitement in that vicinity has been created thereby. The ledge is a big strong one, showing considerable quantities of very high-grade ore at the grass-roots, some of which shows native silver. Assays made from this new discovery run as high as 300 ounces in silver and 10 per cent copper, though some of the ore will undoubtedly run much higher than this. From developments being made in the locality of this find and other sections tributary to Wickes, it would seem as if the extent of the wonderful mineral resources of that section has, until a recent date, been only partially realized, but it is now attracting the attention of mining men from all over the county.

BONDING MARYSVILLE MINES.—The mining properties around Marysville are attracting the attention of outside capital, and from present indications it looks as though New York capital will be extensively represented. For some time past a party claiming to represent New York capitalists has been looking over the field and has succeeded in securing bonds on several of the properties adjoining the famous Drumlummon mine, among them being the Empire, Little Giant and Last Hope. It looks now as though Marysville will have a boom in mining this summer, and we shall watch diligently the developments made by this syndicate.

SOUTHERN CROSS.—Phillipsburg *Mail*, May 18: Reports from the Southern Cross mine from parties who have visited it from here are remarkably good. The shaft is now down 260 feet and the ore is of unusual richness for so a large a body. They are unable to continue sinking any further with the present facilities and will at once put an engine to work, when the sinking will be resumed.

GRANITE MOUNTAIN.—The output for the week ending May 16th was 58 bars of bullion, containing 90,500.40 ounces silver and 148.95 ounces gold.

NEW MEXICO.

ORE SHIPMENTS.—Rio Grande *Republican*, May 18: A car-load of ore from the Comstock was shipped to Pueblo this week. Lead went bounding up to four cents last week, but has gone down to 3.90. A deed has been placed in escrow for the property at Morenci, A. T., in which Dessauer & Smith of this city recently became interested. The deed calls for $35,000, and an interest in a mill which is to be built. The delay in the construction of the new Deming smelter is caused by the decision of Mr. Waring to put in extensive machinery for an improved and successful method of handling refractory ore. The new machinery is now being made and will be put in as soon as possible. Zinc ores are being shipped from Grant county to Joplin, Mo. The silver that is in the ore averages $12 and pays the freight. One property at Hanover is now in shape to ship two car-loads per day. These zinc mines have been thought to be of little value, but like the low-grade properties of New Mexico, it is gradually being demonstrated that they can be worked at a profit. H. N. Castle, who has been in charge of the lixiviation process at Chloride, in the Black Range, spent several days of last week in Silver City. According to the *Enterprise*, he claims that the lixiviation process has been a complete success on ores of that section, but states that it requires some experience with ore to know how to handle it. It has been determined by the owners of the Lady Franklin, Bullion, Superior, and other mines at Kingston, to adopt the lease system, and according to the *Shaft*, 30 men are now at work. This method of development has been carried on at Lake Valley for two years, resulting in a profit for the company, and also for the miners, quite a number making small fortunes from their leases.

OREGON.

CRACKER CREEK MINES.—Bedrock *Democrat*, May 13: Yesterday morning's west-bound train, arriving at 10:45, brought to our city by special car a party of prominent St. Louis and Memphis capitalists en route for the Cracker Creek district to examine the Columbia mine, which property they are negotiating a purchase of, based upon the report of their mining expert preceding them, Mr. John B. Farish of Denver. If Mr. Farish's report is favorable the purchase of the property will undoubtedly be consummated. The persons composing the party are Col. R. F. Looney, W. P. Dunavant, Abe C. Looney, Martin Kelly and Sam Tate, Jr. of Memphis, Tennessee, E. P. Cowin of St. Louis and Wm. Buchanan of Texarkana, Texas. All are wealthy and prominently identified with the railroad and mining interests of the United States. The mining property which is expected to fall into their hands is a most valuable one and is an extension of the celebrated Eureka and Excelsior mines owned by the Oregon G. & S. M. Co., composed of St. Louis capitalists. The property has been under rigid development for a year past and from all accounts it is showing up in a manner excelled by no other mine in the country.

STARTED UP.—Jacksonville *Times*, May 16: Stanley & Howell of the Homestake mine in Woodville precinct have started up their arastra, with good prospects. The Waldo hydraulic company has invested in a drifting machine, which arrived recently. It is said to work well. The rains of the past month have afforded enough water to enable the placer miners to do some work. Those who have good water privileges will be able to make a short run.

UTAH.

BINGHAM MINING SALE.—Salt Lake *Tribune*, May 18: The Stalwart and Talisman group of mines, owned by W. S. Martin, has been sold to some California and Seattle men, and the money paid over through McCornick's bank. The amount, while being kept private, is known to have been a handsome sum, as the consideration for these excellent mines. This sale means extensive operations on this valuable property, which Mr. Martin has been working for so many years.

MINERALS ON THE RESERVATION.—The Indian reservation in Uintah county appears to be the richest country in minerals in all the West. It is a great field for gilsonite, which alone can be mined because of a special Act of Congress in the interest of the company. Coal, iron, copper, lead, silver, gold and a number of other minerals are known to exist there, but cannot be mined, while ozocerite, petroleum, and other hydrocarbons are abundant. It is estimated that about 200 prospectors are scenting around on the reservation, dodging the military, since they have no rights there as prospectors. It is understood that an order will soon be issued warning all trespassers off the reservation, and that the order will be enforced by the military. It is a pity that this reservation cannot be thrown open to civilization.

MINES IN THE SOUTH.—Parties over from Marysvale say that the Antelope mine there is opening up bigger and bigger. They have gotten down on their vein now where the ore assays from $100 to $400 per ton. A miner who has been working at Silver Reef, says Woolley, Lund & Judd, in one of the Christy Co. mines, has struck it richer than it ever was. The camp has had a pretty black outlook for the last year, but the miners think it will soon be equal to what it ever was at its best.

MECHANICAL PROGRESS.

The Strong Locomotive.

Quite a delegation of New York newspaper men, occupying a special car, came to this city on train 1 on the Erie. The reason of the visit was the trial of the new Strong locomotive, which is being tested on the Erie. This engine involves an entirely new principle of construction, and if it continues to give the results it has already done it will revolutionize locomotive building in the construction of the boiler and valve gear. The boiler of the Strong locomotive is bifurcated at the fire-box end, forming two fire chambers, and contains two grates, the fire-boxes being joined to a single combustion chamber, which forms the next division of the boiler. These parts are made of corrugated steel plates, with welded longitudinal seams. The combustion chamber abuts against the tube sheet, and forward of this comes the main body of the boilers, which is traversed by 236 tubes. The boiler shell, itself bifurcated, incloses the two fire-boxes and the combustion chamber. A man can have access to every part of the interior around the fire-boxes. The two fires cooperate in burning the fuel. On one grate a very hot, thin fire is kept, while a new fire is kept burning on the other, thus burning the imperfectly oxidized gases. The absence of stays and crown bars adapts the boiler to withstand strains and jarring.

By the peculiar valve, however, the engine is expected to do away with the compounding of the cylinders. There is no steam-chest, but each cylinder is fitted with four valves, two exhaust and two steam valves. The steam valve has ten parallel openings, each 4⅜ inches long. The whole valve motion is worked by one eccentric, so that the usual link motion is not used. The general action is slow at the beginning of the movement until the cushioning of the exhaust end of the cylinder relieves the pressure, when the valve quickly completes its travel. When the engine is working at 250 revolutions a minute, it is claimed that the initial pressure cylinder is within two pounds of the boiler pressure.

The engine is capable of running at the rate of 70 miles an hour, and has made a mile in 47 seconds.—*Buffalo News.*

Opposed to Steam Machinery.

It is a somewhat singular fact that the Bureau of Engraving and Printing at Washington objects to the use of steam as a motive-power in a large portion of the work in that department. As to the full extent and character of the work which is directed to be done by hand, we are not informed, beyond the fact that all the paper money issued by the Government is so done. The *American Machinist*, in commenting upon this rule, speaks very properly as follows:

The opposition to the use of steam presses in the Bureau of Engraving and Printing at Washington seems to be based not so much upon a question of the comparative quality of the work done as upon the supposed injury to working people resulting from the introduction of steam presses. We think that opposition to improved machinery and methods for such a reason is very short-sighted, and that those who think machinery is responsible for our present industrial evils do not look very deeply into such matters.

History informs us that working people have been very successfully oppressed—for a time—in most, if not all, of the older civilizations, even those which existed before machinery was thought of. In ancient Rome the working people were very sorely oppressed without any assistance from machinery whatever, and those who are inclined to think machinery of itself oppressive would do well to look up the condition of the working people during the latter part of the existence of the Roman Empire, and notice what it was that made their oppression possible and sapped the manhood of the people to such an extent that the destruction of the Empire was made easy. Machinery did not do it. And look at the nations in existence today. Are those in which labor is most oppressed the ones in which the use of machinery is most common? Is it because machinery is so much more generally used in Ireland than in this country that Irish labor is so much worse off than American labor? We think not.

The opposition to machinery is without a reasonable basis, and the time and energy spent in that opposition is worse than wasted.

Industrial Progress in Asia.

The ancient and populous continent of Asia is being invaded on all sides by the modern spirit of progress. England has long held possession of its great southern peninsula, into which she is now rapidly introducing railroads, steam engines and manufacturing machinery of various kinds. Burmah has recently come into her possession, which will soon open the door to that most secluded of all nationalities, the Kingdom of Thibet. England is already projecting a great continental railroad to connect her Indian Empire with the frontier of Eastern China. With progressive Englishmen on the east, south and west, and the Russian on the north, that immense Empire must soon open wide its doors to European progress. Russia has spread herself all along the northern border of Asia from the Urals to the Pacific ocean, and even the Chinese wall cannot prevent her from an early inroad into the northern portion of that Empire.

Persia has already opened her doors to the European, and the steam whistle is already heard along her vast and fertile plains. And now comes the report through the *Times of India* that Mr. T. S. Pine, C. E., who is the engineer to the Ameer of Afghanistan, is taking to Cabul this spring a lot of machinery for extensive iron works which he is constructing close to that city. Mr. Pine has already imported large steam boilers, engines, driving gear, an immense steam hammer, and machinery to be put up as soon as the buildings and workshops he has designed for them are finished. The site of these new iron works is on the north side of the Cabul river opposite the city, and not far from the village of Deh Afghan. When work begins, the presence of these new works, with their tall chimney, the noise from the steam engine and steam hammer to be heard throughout the city, will probably astonish the people in that part of the world, while the sight of the machinery in motion doing the work of hundreds of men is calculated to surprise them still more.

If manufactures be an indication of peace and civilization, then a new order of things has begun in the capital of the Afghans. Unfortunately, however, manufactures, especially in the iron trade, are being more and more utilized for the construction of destructive weapons, and it is anticipated that guns and rifles and bayonets will claim the first attention of the Ameer's workmen.

Iron has long been worked, to a limited extent, after native methods in all the provinces and in many districts in India. Modern works are now going up, or are already in operation in several localities. At the Barrakur Iron Works, which have, within a radius of five miles, excellent coal, iron and lime, the stock of pig iron produced the past year rose from 677 to 3683 tons. English iron, however, is still in common use, and generally undersells the local product. But all this will soon be changed, and both iron and cotton goods will, in a short time, be produced in sufficient quantities for local consumption, if not for export.

We may also mention in this connection that, according to the *Indian Engineer*, the manufacture of the Denham-and-Oliphert cast-iron sleepers is being briskly carried on in the East Indian railway workshops at Jamalpur, the daily output being from 400 to 500 complete sleepers. This gives employment to a large number of natives, and is the means of utilizing a large quantity of Burrakur iron monthly, the use of imported iron being entirely suspended meantime.

AN ADJUSTABLE COUNTERSHAFT.—Every machinist knows that it is best to keep driving belts just as loose as the nature of the work will admit, for by so doing the friction and wear upon the journals is much reduced, the life of the belt is very greatly increased, and it is much more easily handled and shifted from step to step of the cone pulleys when changing speed. Where only one thing is done upon a machine, it is, of course, possible to keep the belt about as loose as the work it has to do will permit; but in the case of a lathe, milling machine, or, in fact, most machine tools upon which a variety of work is done, there are times when it is necessary to have the belt as tight as possible, and yet, perhaps, most of the time it could be quite loose. Mr. Frank R. Hynes of Rochester, N. Y., has devised and patented an improved countershaft to enable a belt to be instantly adjusted to the degree of tension desirable for the work in hand. It is claimed that in the use of such a countershaft no greater tension need be upon the belt at any time than is absolutely necessary to make it pull the out, and thereby, as every machinist will know, a great deal of destructive wear and tear upon belts, machine, and countershaft journals may be avoided, besides effecting a saving of power, time (otherwise spent in lacing and unlacing belts) and of patience.

AMERICAN AND EUROPEAN IRON WORKERS.—We see, from a report just published on the production of steel in Great Britain and the United States, that 1048 hands in the latter country produced 4500 tons of Bessemer rails in a week, which would average 4.3 tons per man. In Great Britain, on the other hand, 600 workmen produced 1500 tons in the same time, or only 2½ tons per man. The average wages in America were, however, fully 35 per cent higher than in Great Britain, which nearly equalized the cost of labor per ton in both cases. The difference in the actual cost of production in the two countries must, then, principally be attributed to the great distances from which the American works have to obtain their supplies of raw material for the manufacture of Bessemer steel.—*London Practical Engineer.*

STEEL CHEAPER THAN IRON IN SHIPBUILDING.—It is generally estimated among English builders that if an iron vessel costs $48.60 per ton, a steel vessel would cost $46 56 a ton of her dead weight of carrying capacity. There is not at present any very great difference in the price of steel and iron ships; but the superior quality of steel ship plates gives them decided advantages over those built of the old metal.

SPEED IN WORK.—Cultivate a quick motion in all your work, tempered with sufficient care to avoid slighting, for true speed is that which needs no after-mending.

SCIENTIFIC PROGRESS.

Magnitude of Star Movements.

The elder Struve made the movement of the sun through space to be about five miles a second; but on the supposition of the brightest stars being between two and three times nearer to us than they seem really to be. We can now see that the actual speed of the solar system can scarcely fall short of 12 or exceed 20 miles a second. By a moderate estimate, then, our position in space is changing to the extent of 500,000,000 miles annually, and a collision between our sun and the nearest fixed star would be inevitable (were our course directed in a straight line toward it) after the lapse of fifty thousand years!

The old problem of "how the heavens move," successfully attacked in the solar system, has retreated to a stronghold among the stars, from which it will be difficult to dislodge it. In the stupendous mechanism of the sidereal universe, the acting forces can only betray themselves to us by the varying time configurations of its parts. But as yet our knowledge of stellar movements is miserably scanty. They are apparently so minute as to become perceptible, in general, only through observations of great precision extending over a number of years. Even the quickest moving star would spend 257 years in crossing an arc of the heavens equal to the disk of the full moon. Yet all the time (owing to the inconceivable distances of the objects in motion) these almost evanescent displacements represent velocities in many cases so enormous as to baffle any attempt to account for them.

"Runaway stars" are no longer of extreme rarity. One in the Great Bear, known as "Groombridge 1830," invisible to the naked eye, but sweeping over at least 200 miles each second, long led the van of stellar speed. Prof. Pritchard's photographic determination of the parallax of Cassiopeia shows, however, that inconspicuous object not only to be a sun about 40 times as luminous as our own, but to be traveling at the prodigious rate of 300 miles—while Dr. Elkin's result for Arcturus gives it a velocity of less than 400 miles—a second! The "express" star of the southern hemisphere, so far, is one of the fourth magnitude situated in Toucan. Its speed of about 200 miles a second may, however, soon turn out to be surpassed by some of the rapidly moving stars picked out for measurement at the Cape. Among them are some pairs "drifting" together, and presumed, therefore, to be connected by a special bond and to lie at nearly the same distance from ourselves. This presumption will now be brought to the test.—*Contemporary Review.*

Origin of the Great Lakes.

Mr. A. T. Drummond, a Canadian geologist, has recently published an interesting paper on the origin of the great lakes of North America. It has been the opinion of most geologists that these lakes were formed by glacial action, a view which seemed to find corroboration in the fact that a very large amount of debris apparently worn from the basins occupied by these sheets of water lies on the country to the south of their borders in positions where it could only have been brought by ice action. Mr. Drummond holds that glaciers had not much effect in eroding the lake basins proper, or in shaping their present outline. He furthermore holds to the conclusions that Lake Superior is the most ancient basin of this chain, and that it was formed in the Cambrian and Huronian times, *i. e.*, in the earliest stages of the earth's history. He regards it in part due to a downfolding of the rocks, as in the trough of a mountain valley, but that much of the detail of its shape was due to long-continued volcanic action, which has clearly occurred about its borders.

Michigan, Huron and Ontario he considers to have been low areas on the path of an ancient river, which existed before the glacial period, the basin-like character of the country having been given by the relatively recent warpings in the surface of the country. Erie and St. Clair he regards as the last formed of the lakes, these basins also being due to warpings in the rocks about them, which created barriers across the original outlets of the valleys.

There is no question that Mr. Drummond's explanation of the lakes shows that the circumstances of their formation were more complicated than is commonly supposed by geologists. It does not appear, however, that he has given quite sufficient weight to glacial action or to the processes of solution by which the waters of such great lakes extend their shore lines. A large part of the rocks about these basins other than Lake Superior are of a limy nature, and in parts more or less charged with saline materials, all of which readily pass into solution and go away to the sea. This dissolving process is of more importance in fresh-water basins than in the seas. The sea-water is already so far charged with mineral matter held in solution that it cannot readily dissolve the rocks with which it comes in contact. Where, however, fresh-water basins have their shores in contact with rocks containing a considerable quantity of lime, they readily and rapidly extend their margins by this process of decay.

SOMETHING NEW IN TELEPHONY.—M. Leon Esquille, a Mexican, it is stated, has perfected a marvelous invention in electricity and photography. By speaking in a photophone transmitter, which consists of a highly polished diaphragm, reflecting a ray of light, this ray of light is set into vibrations, and a photograph is made of it on a traveling band of sensitized paper. Now comes the wonderful part. If the image of this photographic tracing is projected by means of an electric arc or oxyhydrogen light upon a solenium receiver, the original speech is then heard. It is evident that there is no limit to the development of this peculiar combination of methods.

The Unconquerable Ocean.

We have bridled the elements and made the earth our storehouse. We have electricity, magnetism, steam and gravity for our servants, but the sea eludes us. We cannot master it nor foretell it. We trust ourselves blindly to it when we must, and escape from it thankfully when we may.

It is the last realm of romance left in the world. We put up our little futile safeguards about its edge—lights that reach out a mile or two, and life-boats that reach across the breakers, but these are nothing. A storm comes and all we can do is to wait and count the dead that are cast on the shore when the waves are through with them. The sea is a standing rebuke to our Aryan egotism, and until we conquer it our work will not be done.

Expert physical geographers have claimed that there is a close connection between the relative extent of coast line and civilization. They have found that commerce and good harbors go together, and that laws, learning and literature follow in their train. There are many facts which may be marshaled to support this theory, and yet there is nowhere that civilization and progress have proved themselves such arrant failures as on the seaboard. The history of the last few weeks vindicates the statement.

Fifty vessels are known to have been wrecked in a recent storm, and the loss of life was almost beyond belief. All along the Atlantic Coast, from Hatteras to Fundy, the wreckage of ships and men is to-day coming ashore to bear mute testimony to our failure. The ocean has foiled our art. It is as dangerous to-day as it was when Paul was wrecked on Malta. It defies us, and in its solemn ebb and flow, it is beyond us and above us.

COMPRESSED GAS AS A CAUTERY.—Dr. Benj. W. Richardson, ever foremost in practical scientific medicine, has made a suggestion in the last number of his English quarterly periodical, the *Asclepiad*, which is as interesting as it is novel. It is to use a jet of highly compressed gas as a cautery. It is known that accidents occur to workmen sometimes in factories where compressed gases are prepared or employed from such a jet impinging on any part of the body, and causing an injury of the same nature as a burn. Dr. Richardson turns this property to account, and suggests its employment for the removal of warts or small pendulous growths. It does not appear that he has carried out the idea in practice, but there is little doubt that we shall shortly hear of his doing so. He points out its advantages over the cautery, heated wire, or knife, in that it is less alarming and for the moment painless, as cold as an anæsthetic. He enumerates the gases which might be used, and specifies chlorine as no doubt most effective. He, however, gives the palm to carbonic anhydride (CO_2) as most manageable, cheap, almost inodorous, not unwholesome, and not inflammable, so that it can be used with artificial light. It is now a little over 20 years since Dr. Richardson introduced ether spray as a means of producing local anæsthesia. It remains to be seen whether the present suggestion may not lead to an equally important weapon in the armory of the surgeon.

EFFECT OF ELECTRICITY ON STEAM.—The condensing effect of electricity upon steam has just been demonstrated by Prof. Sorket, the electrician, at Genoa. In a darkened room he heated some water in a platina basin which was connected with an electric machine. Just above the surface of the water was fixed the other pole of the electric stream which passed through the platina and the water. An arc lamp made the steam visible as it rose from the heated water. As soon as the machine was set to work, the steam was observed to fall down upon the edge of the platina basin and there condense itself, instead of rising as usual. When the point was brought quite close to the surface of the water, the generation of steam was completely stopped, although the water continued to boil.

WILL ELECTRICITY SUPPLANT THE MARINER'S COMPASS?—The London *Electrician* reports a rumor from Berlin to the effect that a means has been discovered of using electricity for ascertaining the true north, instead of the magnetic needle; that, in short, the new means will be superior to the compass and is likely to supersede it. This will be welcome news to the sailing-masters of iron and steel ships, where the variation of the needle is often erratic. This discovery, if it is what it is represented to be, will also obviate the danger to which vessels are now subjected by the changed condition of their magnetism by induction during a lengthy voyage, to which may be attributed the loss of more vessels than is usually thought to be the case among maritime men.

GOOD HEALTH.

Health Condition of the State.

The report of the State Board of Health for the month of April contains reports from 75 different localities, with an estimated population of 701,950, which gives a mortality of 835, which is a percentage of 1.18 per 1000 in the month, or an annual mortality of 14.16, the lowest annual percentage at which we have yet arrived, indicating a remarkably good condition of the public health throughout the State.

Consumption, as usual, heads the list of decedents with 138, which, however, is a decrease from the number reported last month.

Pneumonia shows how rapidly its frequency is abating by recording only 45 deaths in April as against 76 in March. This rapid decrease in fatality is in a great measure due to the favorable weather during the month, which was warm and pleasant, without any extremes of temperature.

Bronchitis caused 21 deaths, the majority occurring in the very young or the very old. Congestion of the lungs is reported as having caused seven deaths.

Diarrhea and dysentery, although increasing very much in frequency, are not increasing in fatality in the same ratio. Cholera infantum again claims attention by its death-rate, 15 deaths being ascribed to it during the month.

Diphtheria was fatal in 19 instances, which is a decrease from last report.

Typhoid fever was fatal in 23 instances, a slight increase over last month's fatality from this cause.

Remittent and intermittent fevers are reported to have occasioned four deaths.

Cerebro-spinal fever—Nine deaths were reported from this disease—one in Chico, one in Ione, one in Sacramento, one in San Diego, two in San Francisco and three in San Bernardino.

Cancer has caused 32 deaths, a slight excess over the usual mortality.

No Prevailing Diseases.

Reports of sickness received from 80 different localities indicate a minimum amount of disease in the various towns heard from, many of them reporting no sickness whatever. These reports of an absence of any prevailing disease at this season of the year are gratifying to the sanitarian as an indication of the progress that sanitary science is making in the State. We believe that it is rapidly becoming a settled conviction in the public mind that without cleanly homes and surroundings, good health cannot be maintained. With the advent of the new law compelling the organization of a Board of Health or the appointment of a health officer in every town of 500 or more inhabitants, we expect a sanitary movement throughout the State that will not permit any town to abide in filth and take its chances of Providence averting an epidemic that its own sanitary condition has invited. Through these officers we hope to find many diseases entirely prevented from passing beyond their original place of development, and no disease allowed to attain to any epidemic proportions if sanitation can prevent it.

Malarial Fevers.

Malarial fevers are noticed in our reports with increasing frequency as the warm weather approaches. To the present time they offer no evidence of malignancy, the mortality being exceedingly limited. Many of these cases of fever can be prevented by a little attention to the surroundings of our dwellings; in seeing that no garbage or decomposing vegetable matter be allowed to decay in the cellar or outhouses; that the sewers are kept clear; to allow the surface water to be freely drained from our doors; by having cellars and outhouses thoroughly cleaned and whitewashed, and by being a little particular as to the source of water supply.

Bolted Flour Bad for the Teeth.

EDITORS PRESS:—I saw in a late number of the PRESS an article, under "Good Health," on the causes of bad teeth, ascribing them to bacteria. There is no doubt that bacteria will have an effect on teeth when in the right condition, but I think we must go beyond them for the prime cause. Probably there have been some bad teeth always, but the first place where they became common was in the manufacturing villages of New England from 1835 to 1845.

Here bad teeth were unknown before the mines were found. Now if we look for a cause we must find something that is common to all. Alcohol is not a cause, for teetotalers have bad teeth as well as drinkers; that climate is not the cause we know, for the natives and Spaniards here before the mines were found were not troubled with them.

In looking for the principal cause of bad teeth, I would name our bolted-flour bread. The first people to use white bread as a common food were the residents of factory villages in the Eastern States, and bad teeth followed the use of fine-flour bread to the West, finally jumping over the mountains to this State, where we have the worst teeth of all. After the mines were found, we, for a long time, had nothing to eat but bolted-flour (starch) bread, sugar and lard. Chemists say none of these will make bone, and as the teeth are mainly bone, of course, that being the case, our teeth were in a good condition for the bacteria to act on them. We got our first flour from Chili and afterward from New York.

The things (food) I have named all act in concert, not by hurting the teeth directly, but by failing to build them up, and the principal of these is bolted-flour bread. If this had been right, the others would have done but little harm; if this had been wrong and the others right, we would have been some better off, but the combination has been too much. Not only are our teeth nearly gone, but every other organ in the body has been injured by the same cause. We have more sickness and insanity among our people than any other, and all caused by too much bolted-flour bread (starch), sugar and lard. JOHN MARSHALL.

Sebastopol, May 7, 1889.

THE CHILDREN'S FEET.—Wise mothers see that the children have dry feet. Shoes should be loose enough to be comfortable always—half an inch longer than the foot, but not loose enough to slip round. Never let a child wear a shoe that is run over on the side or heel, and constantly discourage the habit of standing on the outer edge of the shoe, turning in the toes, or rubbing one foot over the other. Have the child taught from the earliest hours of understanding that the moment his feet are wet he must change shoes and stockings. Some children's feet perspire so as to keep the feet damp and cold; let such wear woolen hose. If mothers will make it a rule that the child's hose must be hung up when taken off, and the feet warmed before going to bed, they will save themselves much trouble. Too many mothers tie up the child's throat, a most pernicious habit, and allow the child to wear thin shoes or sit with rubbers on for hours.

DIED IN HIS COFFIN.—A man in Rothchild, Neb., dressed himself in a shroud and laid himself carefully into a coffin which he had purchased. In this position he went to sleep. When his friends discovered him a few hours later, he was dead. Any person who will lie down in an air-tight box, even with the cover off, will soon become asphyxiated from breathing over and over again the air in the box. Such air soon becomes overloaded with carbonic acid gas, which is heavier than common air and will not rise up and run over the sides of a close box, but will cause death in a very short time. The custom of using box cradles for infants is for this reason a very dangerous practice. Even when it does not kill, it often works permanent injury to the infant. Wickerwork or cradles open at the sides and bottom are the only ones which should be used. No doubt many deaths of infants have been caused by the use of close-jointed box cradles.

USEFUL INFORMATION.

Rattlesnakes.

One of the younger scholars of the Russ school, in San Diego, named Sadie Marigold, recently distinguished herself by killing a rattlesnake, which she very nearly stepped on, in the school-yard. The reptile was already coiled and ready to strike when the child discovered it. Her presence of mind in putting an end to its poisonous existence in all probability saved some of the numerous children at play in the yard at the time from being bitten. One of the boys of the same school killed one of the same species only a few days previously.

Another "rattler" was killed about the same time by a laborer on the Cajon Valley ranch. He had opened a gopher-hole which happened to be occupied by the snake. Unknown to himself he cut the reptile in two with the point of his shovel. Finding a rock in his way, the man reached his hand into the excavation and was bitten just below the knuckles by the forward half of the reptile. Immediate doses of whisky were taken, and though the hand and arm swelled to twice their natural size, the remedy was efficacious.

Apropos to the above, it is stated that a fine pointer on Hennagin's ranch, near Woodland, stirred up a large rattlesnake about two weeks since. He attacked and killed it after a savage fight. As soon as the snake was dead, the dog ran to a shallow mud-hole, buried himself for several hours and came out all right. Perhaps the instinct of the dog may be a good "pointer" to man. It is possible that a mud bath may be better than whisky in such cases, but then the latter is more convenient and tasteful—to some.

THE CUBAN FIRE FLY.—A most interesting experiment has recently been made in taking a photograph by the light of the Cuban fire-fly. The species of this insect belonging to the United States are well known, but its light-producing powers are very feeble compared with those of its relatives, the lantern-flies or cucuyos of Cuba, Brazil and Mexico. It is said that persons traveling by night in the tropical forest are accustomed to place these fire beetles on their boats to light the way, and that Cuban ladies mount the cucuyos as gems for their hair and clothing. A living specimen of these tropical insects was recently presented to the Bridgeport Scientific Society. It is about an inch and a half long and bears upon each side of its body oval spots resembling eyes. In the dark these spots emit a greenish light resembling that of tiny electric lamps in full glow. If the cucuyo is placed on a watch dial its light will enable one to tell the time of night, and it also clearly illuminates a small printed page. Its radiance seems to be in a measure under the control of the will, for, when a gas jet is rapidly turned on and off, the insect, whether from rivalry or some other motive, is sure to do his best. After various trials of the insect's power, the experiment of photographing by its light was successfully carried out. A copy of a family portrait was made, the insect being held within an inch of the original and in such a way that the rays fell perpendicularly on the negative. The time of exposure to bug light was about 30 seconds.—*Scientific American.*

WOOL COTTON.—A vegetable product that can scarcely be distinguished from wool, it is said, has been found in Arkansas. A gentleman named B. F. O'Kelly, who arrived in this city from Jefferson county, Ark., has recently presented to the Board of Trade of Fresno a sample of what he terms "wool-cotton," grown in the State and county named above. He knows little of its origin, except that the seed was obtained from the Patent Office at Washington, and during the past two years planters have been experimenting very successfully with it. It has the appearance of wool, and the fiber would be taken for wool by those not acquainted with its origin. When woven, the texture bears every resemblance of wool cloth and wears a gloss that even exceeds woolen goods. Mr. O'Kelly is largely interested as a planter in Arkansas, and although his wool-cotton is an experiment at present, he is firmly of the opinion that the fabric made from it will be a great favorite upon the market, and the demand constantly increase. The specimen of the crude wool-cotton can be seen at the Board of Trade rooms by applying to Secretary Smith. Some of the experimental cotton-growers of Fresno county examined it yesterday, and pronounced it a phenomenon in cotton growth.—*Fresno Expositor.*

FOOD FOR SHIPWRECKED SEAMEN.—At the French Academy of Sciences the Prince of Monaco read an interesting paper, showing that shipwrecked seamen who have to take to the boats without provisions on the high seas can obtain food from the ocean itself by trailing a dragnet made of any light stuff along the surface during the night. The net will in the morning be found to contain small shellfish available for food. In the sea to the west of the Azores the vegetable matter on the surface teems with animal life and fish which are capable of affording substantial nutriment.

CODFISH ON THE COAST OF SAN DIEGO.—It is said that D. Schuyler of San Diego City has about organized a party to explore the codfishing banks reported off that coast by the Fish Commission steamer Albatross. Twelve well-known San Diegans have been recruited for the voyage, which will take place in a steam-schooner. Several Gloucester fishermen will accompany the party, which will be further equipped with one of the Albatross charts. Black and blue cod are reported on the banks in vast quantities.

COLONIAL DAYS.—In the pioneer days of New Hampshire, articles of ornamentation were almost unknown, and most articles of use were rare. In 1768 there were in the town of Sanbornton, N. H., but three horses, three great-coats, and two men each owned a pair of boots. It is said that the first person who had shoes upon his horse gave great offense to a neighbor, who was about to go on a journey, by refusing to lend his horseshoes to be used on the occasion.

THE GOAT.—Col. Daniel of Talbotton, Ga., says that goats are spunky animals. He says that his father had a flock of goats, and that the goats while grazing came to a pond of clear water. They went to the pond to drink, and when they lowered their heads they saw their shadows in the water. They began to butt at the goats in the water, and failing to drive them away they continued to butt until the entire flock was drowned.

A NEW DEPARTURE IN LEGISLATION.—A recently enacted law in the State of Maine provides that "whoever by intimidation or force, alone or in combination with others, prevents a person, journeyman, or apprentice from continuing or entering into the employment of a person, firm, or corporation, shall be punished by imprisonment not more than two years, or by a fine not to exceed $500."

OBJECTS TO ELECTRICITY.—William Kemmler, who has been sentenced to die by electricity, for killing a woman, is in mortal fear of "death by battery," as he calls it. He says he would rather be hanged 40,000 times than suffer the electric death. The execution will take place at the Auburn State Prison soon after June 10th.

AMERICA publishes more papers than all the rest of the world combined. Last year its 17,107 periodicals printed the enormous number of 2,959,566,500 copies—enough to supply every soul on earth with two newspapers.

NATURAL COLOGNE WATER.—A spring of natural cologne, whose liquid has been analyzed but has the odor of patchouly, is a new wonder said to have been discovered in Algiers.

ELECTRICITY.

Progress of Electricity.

The progress of electricity in the United States is most remarkable, and bids fair, before many years roll by, with continued improvements in its use, to rank both gas and steam. Its growth is well illustrated by a large array of tabulated figures presented at the last meeting of the National Electric-Light Association, held at Chicago, by the president of the association, S. A. Duncan. In his carefully prepared table he gave the number of central stations and isolated plants in use in the United States at 4000 in the month of February, 1888, which one year later had increased to 5747, showing a gain of nearly 45 per cent. In the same month in 1888 there were 157,000 arc lamps in use in this country, which had increased within the following 12 months to 219,924. In February, 1888, there were in daily use 1,760,000 incandescent lamps, which had increased one year from that time to 2,504,490.

The capitalization of the electric-light companies in the United States shows an equally remarkable gain, for the returns as given in February, 1889, showed an increase for the year of $69,397,744. In August, 1888, there were 53 electric street railways in operation, with 44 being built. In February, 1889, there were 42 electric street railways incorporated but not contracted for. In the same month there were 378 electric cars in operation, with 329 under contract for roads not yet finished. The single-track electric roads in operation in February, 1889, extended 294 miles, with 273 miles under contract but not finished.

Economic Progress.

Great progress has not only been made in the general introduction of electricity, but the economy and efficiency of its use has also been largely improved during the last few years. A. R. Foote of Cincinnati has prepared some interesting figures in this connection. His showing, which covers a period of five years, is as follows: Dynamos, increased efficiency, 25 per cent; decreased cost, 40 per cent; incandescent lamps, increased efficiency, 100 per cent; increased life, 100 per cent; decreased cost, 66 per cent; carbons, decreased cost, 75 per cent; wire, decreased cost, 20 per cent; line construction, decreased cost, 20 per cent.

FELLING TREES BY ELECTRICITY.—Hitherto machines for felling trees have been driven by steam-power, but this is sometimes inconvenient, especially in thick woods, and electric power has recently been adopted in the Galician forests. Usually in such machines the trunk is *sawn*, but in this case it is *drilled*. When the wood is of a soft nature, the drill has a sweeping motion, and cuts into the trunk by means of cutting edges on its sides. The drill is actuated by an electric motor mounted on a carriage, which is brought up close to the tree and shackled to it. The motor is capable of turning around its vertical axis, and the drill is geared to it in such a manner that it can turn through an arc of a circle and make a sweeping cut into the trunk. The first cut made, the drill is advanced a few inches, and another section of wood removed in the same way until the trunk is half severed. It is then clamped to keep the cut from closing, and the operation continued until it would be unsafe to go on. The remainder is finished by a hand-saw or an ax. The current is conveyed to the motor by insulated leads brought through the forest from a generator placed in some convenient site.—*London Times.*

AN ELECTRICAL FIRE ENGINE.—Prof. S. S. Wheeler is the inventor of an electrical fire engine, which gives promise of good results. Some of the advantages claimed for this new apparatus are: It can be instantaneously started up at full speed; it is much lighter than a steam fire engine of equal power; it costs one-third less; it is safer and easier of control; it is noiseless in its operations, and it is economical.—*World's Progress.*

THE DYNAMO AS A SURGEON.—A peculiar and successful application of electricity to a new use was recently made. Charles Nier ran a needle into his foot, and after the surgeons had searched for it for a week, he was taken to the dynamo-room of the Suburban Electric Railway Co., and his foot held near one of the dynamos. In 15 minutes the needle was drawn out.

A NEW USE FOR THE ELECTRIC LIGHT.—The body of a boy drowned at Winchenden, Mass., recently, was found through the use of the electric light, a bulb being fastened to a pole and submerged, illuminating the water for a considerable distance in the neighborhood. The electric light promises to become an important aid in all manner of submarine operations.

ELECTRICITY AS A RAILROAD BRAKE.—The method of stopping the electric cars on the English road where the series system is used is not done by the ordinary brake, but by momentarily short-circuiting the motor and immediately reversing the current through the field magnets.

THE ELECTRIC LIGHT IN JAPAN.—The rapid adoption of electric light in Japan has caused a proposal to increase the capital of the Tokio Electric Light Company from $250,000 to $500,000.

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A. T. DEWEY. W. B. EWER. G. H. STRONG.

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Saturday Morning May 25, 1889.

TABLE OF CONTENTS.

EDITORIALS.—Hydrogen Amalgamators; The Reforma Mine, 373. Passing Events; The Recent Earthquake; The Prospector; Protection or Indemnity Needed, 380. The Tail-Rope System, 381.
ILLUSTRATIONS.—The Old Prospector; Amalgamator for Use in the Hydrogen-Amalgam Process, 373. Applications of the Tail-Rope System of Mine Haulage, 381.
CORRESPONDENCE.—At Silver King; A Point in Leaching Ores; A "Black Sand" Lode; Northern Counties of California, 374.
MISCELLANEOUS.—Remarkable Railway Building; Foundry at San Bernardino; Growing Cities in the Great Valley, 374.
MECHANICAL PROGRESS.—The Strong Locomotive; Opposed to Steam Machinery; Industrial Progress in Asia; An Adjustable Countershaft; American and European Iron Workers; Steel Cheaper than Iron in Shipbuilding; Speed in Work, 378.
SCIENTIFIC PROGRESS. — Magnitude of Star Movements; Origin of the Great Lakes; Something New in Telephony; The Unconquerable Ocean; Compressed Gas as a Cautery; Effect of Electricity on Steam; Will Electricity Supplant the Mariner's Compass, 378.
GOOD HEALTH.—Health Condition of the State; Bolted Flour Bad for the Teeth; The Children's Feet; Diet in His Coffin, 379.
USEFUL INFORMATION.—Rattlesnakes; The Cuban Fire-fly; Wool Cotton; Food for Shipwrecked Seamen; Codfish on the Coast of San Diego; Colonial Days; The Goat; A New Departure in Legislation; Objects to Electricity, 379.
ELECTRICITY.—Progress of Electricity; Felling Trees by Electricity; An Electrical Fire Engine; The Dynamo as a Surgeon; A New Use for the Electric Light; Electricity as a Railroad Brake, 379.
MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 376-7.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 388.

Business Announcements.

[NEW THIS ISSUE.]

Machinery—W. T. Garratt & Co.
Corrugated Iron—W. W. Montague & Co.

See Advertising Columns.

Passing Events.

The Keystone Mining Co. of Amador county proposes shortly to run its entire works by electricity. Where the conditions are favorable this system can be adopted with great convenience and economy. Before many years it is probable that many mining works will be run by electricity in this State, where water is available as the original source of power.

The Chinese Six Companies are reported to have purchased large interests in Lower California mines, and will ship 1000 laborers to work them.

The subject of the free importation of lead ore is being thoroughly investigated in Washington. It is probable that the existing condition of affairs will be changed, as it is injurious to the lead-mining interests of this country.

English capitalists are getting possession of leading quartz mines in Alaska, having purchased from American locators. What mines have been successful there are mainly low-grade propositions, but the ore bodies are very large and have paid well.

In this number of the PRESS we illustrate and describe the largest steel boilers ever made on this coast. Marine work is largely increasing with our local foundries.

The Recent Earthquake.

Shortly after 3 o'clock on Sunday morning an earthquake of unusually great duration occurred in this State which was felt from Santa Cruz on the south to Calistoga, and eastward to Nevada City. The shock was not a sharp one, the movement being slow, but the vibrations were prolonged. Prof. Holden of the Lick Observatory, Mt. Hamilton, says: "Our earthquake machine shows the up-and-down movement lasted 84 seconds. The period of each wave was about 1.7 seconds, which is very gentle and slow, and the double amplitude of the vertical waves was never more than .08 of an inch. The east and west movement consisted of strong tremors for nearly four seconds, when the waves began and lasted as strong decided movements for 29 seconds, after which the tremors continued until their trace was lost. Ninety seconds after the beginning, the periods of these waves is .8 of a second (very slow) and the double amplitude is about .03 of an inch. The most remarkable motions were in the north and south direction. The tremor was felt for 3 seconds, 10 large waves for 45 seconds succeeded by tremors until 132 seconds from the beginning. Their period was .6 of a second. The double amplitude is .05 of an inch. The duplex machine shows results agreeing with the above and indicates the very complex nature of the motion of the ground."

Through the politeness of Mr. Blinn, of Highland Park, East Oakland, and Mr. Burkhalter, of the Chabot Observatory, Oakland, we are enabled to reproduce the registers made by their respective seismographs. It will be seen by reference to these that the movements were a series of ellipses. In the diagram made by Mr. Burkhalter's instrument, the first of these were north and south, and the last from southeast to northwest, while the final mark was a swerve to the northwest before the pen came to rest.

Blinn Observatory. Chabot Observatory.

SEISMOGRAPH RECORDS OF SUNDAY'S EARTHQUAKE.

The marks made by Mr. Blinn's seismograph are northeast and southeast, and the register is double the size of that of the Chabot Observatory. In fact, this is ten times longer than any other record ever made since the instruments have been in position. The diagram represents the motions of the earth, but amplified four times. The motion was thus just one quarter of that indicated. We had a very sharp shock on the 18th of last November, but there was ten times more motion in this case.

The time as given at the Chabot Observatory was 3 h. 10 m. 44 sec., when the mean time clock was stopped. At the Davidson observatory in this city there was a difference of only two seconds, Prof. Davidson timing it as 3 h. 10 m. 42 sec. Clocks were stopped in many places in this city and Oakland. The peculiar feature was the length of the vibrations. It was the most severe in that respect felt here for many years, but its slowness was such that no damage was done anywhere within the area affected.

MINING COMPANIES' STATEMENTS. — Nine separate suits, commenced by Emanuel Eyre against the directors of as many mining companies, to recover $1000 in each case, for failure to post monthly statements of receipts and disbursements in the offices of the respective companies, as required by the law of March, 1880, are on trial before Judge Hunt. It is admitted that statements were posted by the officers of the companies in the form as advised by the attorneys of the corporations; but Eyre claims that they were not complete enough to conform with the requirements of law. Since the above was written, judgment has been entered for defendants.

THE work of photographing the stars of the Northern Hemisphere has been commenced at Mount Wilson with the Harvard 13-inch photographic telescope.

The Prospector.

The photo-facsimile on page 373 of an old prospector is a photograph from life made not long since in one of the mountain counties. The "Judge" who is handling the pan is a veritable "'49er," who still sticks to prospecting as an occupation. The scene is a characteristic one in the California mining counties. The old man was digging away on the edge of the bank of the river with perfect contentment, while the photographer who was immortalizing him was nearly melted by the fierce rays of the sun which were beating down with 106-degree power at the time. He seemed surprised that any one wanted to photograph him, but was pleased as well when one of the "pictures was promised him.

This particular prospector, it is remembered by the writer, had not been "in the city" for 20 years. He had been digging away in the creeks, canyons, rivers and on the mountains and hills for so long that he cared for no other life. But his is by no means an isolated case. There are hundreds of others as well contented to remain away from the centers of civilization, and who are wedded to the nomadic but free life they have led so many years. They are perfectly contented, being constantly buoyed up by the hope of striking it rich some day.

SUCCESS WITH LOW-GRADE ORES.—F. S. Chapin writes us as follows: "At the Manzanita mines, Sulphur Creek, Cal., your correspondent was greatly interested by the account of Superintendent Geo. V. Northey touching his experience with low-grade ores. After several years of poor success with many appliances and changes of machinery, he has discovered a plan of working that enables him to surprise the company with a dividend. His report of last run shows cost of mining and milling the ore of $1.29 per ton, and yield a little over $3 50. By increasing the plant and adding some better machinery, he hopes to still further reduce cost of working not less than 25 per cent. I am sorry not to be enough of a mining man to give a definite report of Mr. Northey's experience, and hope that he may be induced to place such items as he is willing to make public before your readers."

THE COAL MINERS' STRIKE at Gallup, N. M., was declared off on Monday, after lasting two months and causing untold misery to families in hard circumstances. The strike first originated from the talk of professional agitators, and when they saw that the companies did not intend to back down and were importing negro miners from Kansas, a meeting was held and the strike came to an end. The superintendents of the various mines consulted together and agreed to re-employ the good miners and drive the agitators from camp, which was done. The strike closed up for the time three big mines, making coal for railroad purposes scarce, and throwing out of employment over 3000 miners.

AN explosion of a small casting-box, into which molten metal was being run, occurred in the molding-shop of the Union Iron Works at the Potrero last week. Eleven men were injured, but only one seriously, and he was removed to St. Mary's hospital for treatment. The others were able to go to their homes, where they will be treated by the surgeon in the employ of the works.

POCKET MINES. — The little cut in Mr. Schaeffle's correspondence, in last week's PRESS, page 354, referred specially to the mines on Bald Mountain, though it appears in the paragraph concerning the "Bonanza claim." By reading the description of the "Bald Mountain Pocket Mines," it will be seen that the cut refers to them.

Protection or Indemnity Needed.

The following letter received by the publishers of the PRESS this week is one which shows the condition of one class of miners in this State who are unable to prosecute work on their claims under the present conditions of law:

I send you my note and will pay at maturity, or before if possible. We will have the debris commissioners here this month to see us miners; but I tell you we have a hard show to make a living out of the mines, for we are harassed from all sides, and even accused on some points. It is hard, I tell you, but when a man has a large family and no chance to run, he has got to stand and take it and do the best he can. Hoping that you will do the best you can for us, I remain Yours, — ——.

This is only a sample of the condition of many an honest miner who is in no wise to blame for his present predicament. The situation appeals to the sympathy of fellow-citizens everywhere. The Government and State should do the best that can be done to compromise the conflicting interest between the miners and farmers, in order that the innocent men in each calling should be protected, or indemnified for their losses as far as possible.

The debris controversy has been carried on very acrimoniously for some years, certain partisans on each side being unwilling or unable to see any rights of the other. Of late this feeling has been to some extent abated, but there is still more than there should be. The Government Commission now engaged in the practical study of the question will doubtless endeavor, as far as possible, to eliminate from the statements of both parties to the controversy prejudice and personal animosity, and bring to the solution of the problem unbiased judgment based on personal observation and a thorough professional knowledge from an engineering point of view.

If it be possible in their judgment to again permit the hydraulic mines of the State, under proper restrictions, and in certain localities, to be worked without detriment to other interests, the plans proposed should be submitted to the test of practice. And if they shall decide that only special mines may be worked, and others prevented from so doing, those who consider themselves aggrieved should obey the mandate.

It should be remembered that the miners do not consider that the so-called debris dams have been given a fair trial; and that they think the judgment that condemned them was given by an expert in law rather than an expert in engineering. The other side do not agree with this reasoning, and insist that the debris dams do not remedy matters.

But now skilled and experienced engineers of the Government, specially appointed, are investigating the subject, and, having no personal interests at stake, should be better fitted to decide than either of the parties to the controversy. Before many more months their report will be made, and it is greatly to be hoped that it will be of such a character as to put an end to the controversy and offer an acceptable solution. It is not alone the parties locally interested who suffer from the long delay of settlement, but the business and progress of the whole State is retarded.

MINES NEAR MAYBERT.—A correspondent at Maybert, Nevada county, informs us that all the mines in that section are working in full blast and paying well. "The Diamond Co. are making a new road so as to get their supplies from Emigrant Gap instead of by way of Nevada City, which will be a great saving. The Yuba mine is grading for a new air compressor so as to run more machine drills. The mine is paying better than it ever did before under the able and efficient management of George A. Hare, and his foreman, James Gribble. The Blue Jay Co. are packing rock to the mill for a test run."

MINERALS AND THE STATE FAIR.—The State Agricultural Society have not offered any very liberal premiums for mineral collections at the State Fair. An examination of the premium list which has been issued by the society, discloses the fact the best that is offered in this department is a premium of $35 or a silver medal. Offering a silver medal for an exhibit of gold ores seems rather sarcastic. The State Fair management does not seem to care much for the mineral resources of the State.

LYMAN BRIDGES of this city has been appointed by the President one of the engineers of the Irrigation Survey.

The Tail-Rope System.

In the tail-rope system of wire-rope haulage in mining, the hauling engine is located at a convenient point, generally the adit, and the *main* and *tail* ropes are attached to two rope-drums seated on the engine shaft. The end of the main rope leading from the drum is attached to the forward end of a train of cars, while the tail-rope, running along the side of the entry to the end of the line of tracks, passes around a sheave or wheel, so located that the rope is brought midway between the rails. The rope continuing between the rails is fastened to the rear of the train. In connection with each drum there is a friction clutch, by means of which one drum may be driven by the engine, while the other runs freely on the shaft. Thus, when a number of cars are drawn to the adit, the *main* rope is wound on its drum while the *tail* rope is paid out. To take the empties back into the mine, the ropes are attached to each end of the train as above, the engine is reversed, and the tail-rope, now acting as the hauling rope, draws the cars back into the workings.

In application, this system naturally divides into two sub-systems: 1st, that in which the main entry only is operated by wire rope, the mining product being transported from the side workings or entries to the haulage track by mules or gravity; and, 2d, that in which the side entries also are operated by wire rope, the haulage system in this case extending to all parts of the mine. One of the best systems of the former class is illustrated in Fig. 27, and is in use in one of the coal mines on the Monongahela river. This, with the other, we take from the paper of F. C. Roberts, read before the American Institute of Mining Engineers. The circumstances of location are such that it is necessary to place the engine and drums at a point intermediate between the two terminals, and not, as is usual, at one or the other end. This makes it necessary to employ two tail-sheaves, one at the parting *A*, and another at the parting *B*. The main rope is fastened to the drum *M*, and passing off is led around the tail-sheave at *B*, and attached to the forward end of the train at *C*. The tail-rope, on the other hand, is fastened to the drum *T*, and is led thence around the tail-sheave *A* and attached to the rear of the train. The main rope is supported between the rails by six-inch rollers, about 18 feet apart, and the tail-rope is supported overhead along the side-walls by rollers supported from the hanging-wall or roof of the pit. The rope is guided around curves by 12-inch wooden sheaves, arranged as in Fig. 28.

At the sharp bends, guide-sheaves, four feet in diameter, are placed, and guard-rails are introduced at the sides of the track to prevent the derailing of the cars, due to the angular pull of the rope at this point. The engine is double-acting, with 10-inch by 12-inch cylinders, and four-feet diameter drums, geared one to five and a half. The road is, approximately, 3300 feet long, and its daily capacity is about 750 to 900 tons. In this instance, the coal is hauled by mules from the side-entries and branches to the general parting. When a sufficient number of cars have accumulated, the main-rope is attached to the forward end of the train and the tail-rope to the rear end, and the train is hauled to the tipple. This is the simplest form of the tail-rope system.

When it is necessary to haul a set of cars into any particular one of the side entries, the connections of the rope in the main entry opposite the side workings to be operated are detached, and the engine end of the main rope is attached to the extremities of the side-rope which, as before mentioned, extends into the side work-

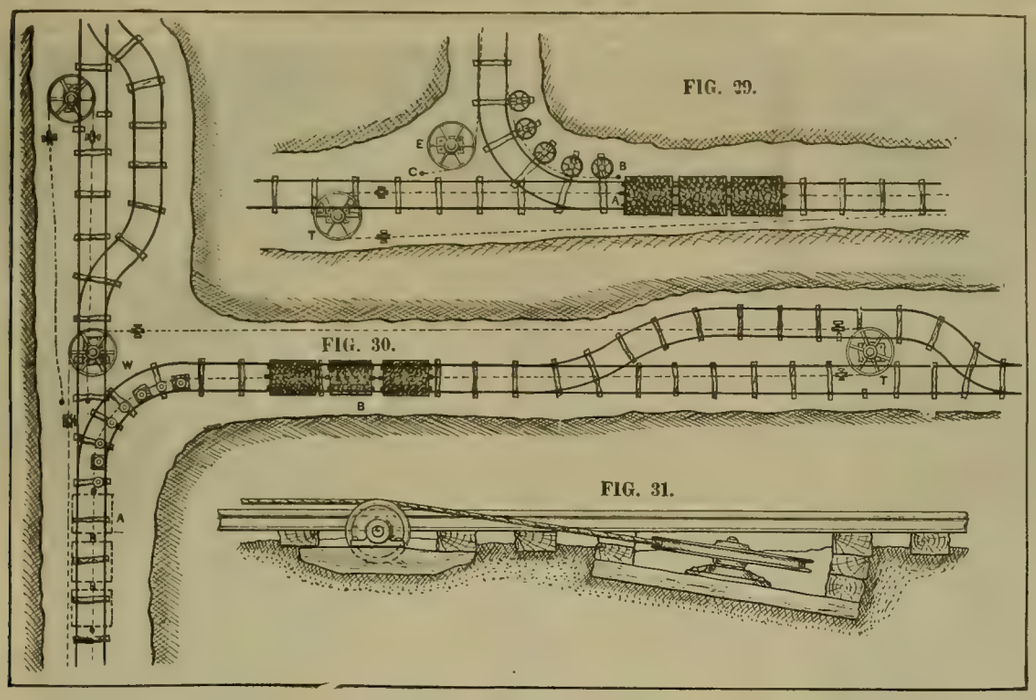


FIG. 29.

FIG. 30.

FIG. 31.

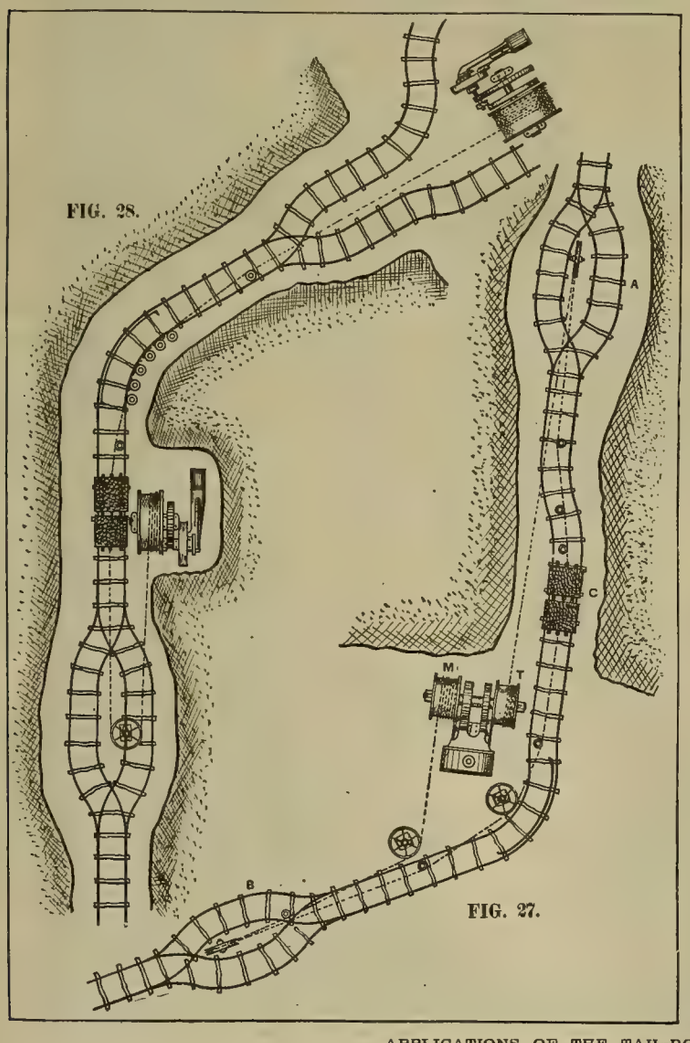


FIG. 28.

FIG. 27.

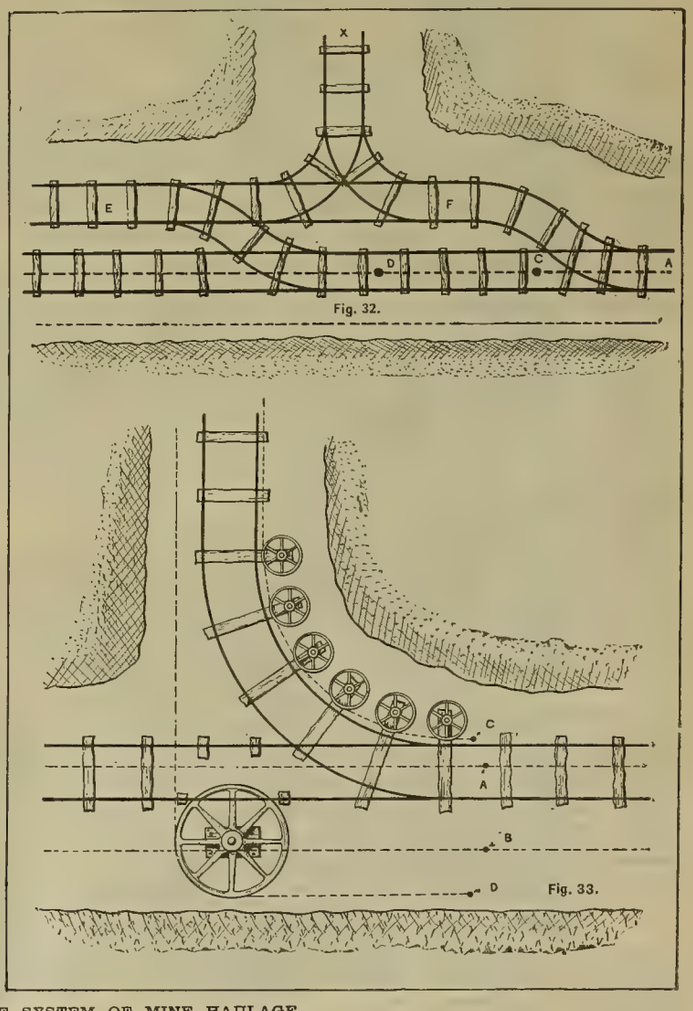


Fig. 32.

Fig. 33.

APPLICATIONS OF THE TAIL-ROPE SYSTEM OF MINE HAULAGE.

ing. When the connections have thus been made, we have what corresponds to the original continuous rope, but, in this case, the tail sheave for the rope is located on the side entry. Figs. 29, 30, and 33 illustrate the usual methods of arranging the side-entry ropes. Fig. 33 shows the arrangements permitting the changing of the ropes when the cars are at the adit. In this case, when it is desired to hau

set of cars into the side entry the main rope is detached at *A* and *B*, while the entry rope ends *C* and *D* are connected to *A* and *B*, thus forming a continuous rope passing into the entry.

Figs. 29 and 30 illustrate other arrangements, both of which are based upon changing the rope connection when the cars are near the side entry, and not, as in the former case, at the terminus of the system. In Fig. 30 the guide-wheel *W* is placed *under* the main track to permit the free passage of the rope, and the connections being severed, as before, one end of the entry-rope is attached to the train and the other to the main rope; and in this manner the side entry is operated as shown. The dotted lines at *A* show the position of the cars while the disconnection is made, *B* showing the train after passing into the entry. Fig. 29 shows an arrangement whereby but one disconnection is made in the main entry-rope, namely, at *A*, the head of train. The end *B* of the entry-rope is here attached to the car, and the end *A* of the main rope, being free, is drawn a little farther by the engine and attached to the end *C* of the entry-rope. In both of these latter arrangements, where the road is not level, the disconnection is of necessity made while the rope is under a severe stress, thus rendering disconnection a difficult matter. This is not true of the method illustrated in Fig. 33, as the ropes are here disconnected while the cars are at the end of the system, and the rope is consequently free from stress. The usual method of locating the tail-sheave is illustrated in Fig. 31.

When it is found necessary to locate intermediate loading points in the main or side entry between two terminals, the arrangement illustrated in Fig. 32 will be found convenient. Suppose a branch to a side entry at *X* and it is found necessary to have a switch station for loaded and empty cars at *X*. The empty cars coming from the direction *A*, the rope ends *C* and *D* are knocked off at these points, and the empties run on siding *E*. The rope extremities are now about opposite the front and rear cars of the loaded train at *F*, and can be attached at the forward and rear ends and hauled to the adit. Other dispositions of tracks and switches are sometimes employed, but none that have proved themselves so efficient.

Mexican Silver Mines.

The following additional information concerning Mexican mines we obtain from Mr. A. H. Dubois:

Los Cuates.

Returning to Copalquin, we strike westward across the spurs and gulches carved by erosion and atmospheric agencies out of the border of the mesas of the Sierra Madre range, and two days' travel through Alpine scenery and mineral ground bring us to Cuates.

Here is a mine called San Jose de Ledesma, discovered only three years ago, although rumors of old tradition point to the Indians having obtained silver from it, doubtless washed out of the weathered outcrops.

This mine has produced several

Bunches of Massive Native Silver.

The vein which carries these rich deposits is often very irregular, and runs into a precipitous bluff, oftener pinched up into a mere seam, then opening out into a narrow vein of barren quartz.

In the proximity of a bunch of native silver or sometimes of argentite, or of ruby silver, the vein usually widens out somewhat, showing some evidences of either of these minerals sparsely distributed in the quartz, and all of a sudden the miner, who often has toiled in vain for weeks or months, is rewarded by a bonanza.

Two years ago I saw one such bonanza, consisting of a mass of native silver, intermingled with but little veinstuff, about nine inches in thickness, and six or eight feet long by about four feet in breadth, and was detached from the wall by a couple of blasts, a gouge having been previously cut.

The whole neighborhood flocked to view the sight, and also with the hope of smuggling away, unnoticed, some stray pieces of the precious metal.

This mass was with considerable labor broken and cut up into manageable pieces, and subsequently melted down in native rude refining furnaces termed vasos, and produced to the owners proximately 40,000 ounces of silver; moreover, a considerable quantity, claimed to amount to one-fifth or one-sixth of the mass, was given away or mostly pilfered.

I am informed that several considerable bunches have been struck since, aggregating as much or more than the one referred to.

Half-way up on the ridge on the opposite side of the gulch is a large lode,

The San Antonio,

Carrying copper and iron pyrites. Old caved-in workings are visible, but when I saw it an open cut and a drift some 20 feet in length had been opened on the lode at some distance from the old workings, and thereby exposed a vein seemingly six feet in breadth. I found an assay value of 42 ounces in silver, besides considerable gold in the worst grades of the ores broken, consisting of dark quartz, much intermingled with porphyry, and carrying some 15 per cent of iron pyrites, and as high as 200 ounces silver in the massive copper pyrites.

Los Cuates is deficient in water supply; in fact, water for drinking purposes is barely available in the dry season, and probably it would be necessary to carry the San Antonio ores over the ridge, a distance of three or four miles, to the Refugio river, which would furnish water-power, with abundant fuel available. About one day's journey, northeast of Cuates, are the two camps of Galeana and Cuervo, held by American parties, who claim that their mines carry considerable bodies of silver ores with much gold.

Northwest from Cuates, about half a day's journey, on a hillside about 600 feet above the Refugio river, we come to large, open cuts or rather quarries. These are the remains of

The Once Famous Refugio Mine,

Discovered about the beginning of this century. At the surface it was a large deposit of rich, free milling, oxidized ores, carrying horn silver, argentite, and native silver. These were gouged out and quarried. Now a strong vein, carrying much very base and poor sulphurets, is in sight, and some development has been done on it, but only occasional spots of better ores are met with. These, when reached, show considerable ruby silver, intermingled with low-grade sulphurets.

Some 15 or 20 years ago about $70,000 was squandered here by an agent of Mr. Vidaureta's, the former owner of La Bajada mines. Buildings were erected, and but little money was spent on actual mining. Nothing was achieved and the enterprise abandoned. Some few chloriders here, styled gambusinos, are eking out a scant existence by gophering.

On visiting this mine a couple of years ago I was struck on finding the country rock, consisting of light-colored, friable shale, to be uniformly impregnated with oxidized silver compounds showing occasional flakes of native silver, and here and there small seams and spots of rich stuff permeate the deposit.

The dump of the mine, extending all the way down to the banks of the river and a couple of hundred yards in breadth, is claimed to amount to half a million of tons. A great amount of this (at least on the surface of the halvan) consists of the yellowish shale above referred to and the rest hard quartz showing a sparse sprinkling of sulphurets. As a matter of course, the lower part of the dump is claimed to be quite rich. There may be some truth in this; nevertheless none of the rich stuff is in sight.

On sampling the entire surface of this immense harvan, I found it to show by assay 10 troy ounces of silver per ton and no gold, and tests showed me that practically 90 per cent of this amount could be saved by leaching the unroasted ore by hypo after a previous treatment with salt and bluestone. Here crushing by rollers and raw leaching on a large scale at the very foot of the dump might prove a success. A considerable expenditure would be incurred to render water-power available from the Refugio river.

Some 15 miles up a branch of the Refugio river is the little town of Dolores, one day's journey west of which lies the important

Yedras

(Poison oak, not ivy) property, on which large leaching works are being successfully operated. Great trouble was formerly experienced in treating these highly arsenical ores bearing much calkspar as gangue. Said ores balled in the Bruckner furnaces and yielded a waterproof cement mass in the leaching tubs. Favorable results seem to be actually obtained mainly by the roasting in the Stetefeldt furnace, and some extra amount of silver is being saved by the use of the Russell process. North of Dolores, one day's climb over rugged ground brings us up into the southwest corner of the State of Chihuahua and we reach

Guadalupe y Calvo,

A small well-built mining town with some 5000 or 6000 inhabitants. It is in a gulch of the Sierra Madre mountains 8500 feet above the sea level in quite a cold climate.

The deposit seems to consist of a large body of quartz. Native mining men, who seem to be well posted, claim that two or more bodies of ore exist in close proximity to one another—carrying silver sulphurets (with some intermixture of base ores) and free gold.

It was discovered about 1840, and people flocked from all parts of the country, leading to the abandonment of many mining camps, among others of Refugio above alluded to. The ore was very rich in gold and shortly the desolate mountain gulch was studded with huts and arastras.

An English company soon obtained a lease of the property and took out in a few years a very considerable amount of bullion, mainly gold, by working the ores by Patio process with fair results. The grinding of the ores and amalgamation of the gold was accomplished in arastras in a deep canyon below the town, water from the considerable creek, being carried by a wooden flume to the head of the string of arastras (moved by water-power) placed stepwise one above another on the slope of the mountain. This company produced until 1848 the considerable sum of $31,000,000, which was coined in the Mint erected in this same town.

Subsequently the mine was again leased to a New York company, who put up a 20-stamp steam mill with pans and hoisting works, but seem to have attained very indifferent results.

On visiting this camp a couple of years ago I found that the mining operations were suspended and the mine "drowned" at a depth of 600 feet. I was informed by native miners, who are evidently well posted, that this last company had been working on a body of indifferent ores, but that the good body of rich quartz had not been touched by them in all the lower workings, and that it was intact.

The mill was working on the dump claimed to assay or yield $15 to $25 per ton, but the extraction was not close. They were also roasting tailings which were said to assay $20 to $30 per ton, but obtained very bad results, turning out very base bullion much charged with lead, and a low percentage of fine was extracted from these tailings.

On the whole, it would seem that this last enterprise made a complete failure, and from very late information received from this camp, it would seem that a company, consisting of the merchants of Guadalupe (among others the owners of the mines), have registered the mines as abandoned for non-fulfillment of the mining laws. I have but little doubt that henceforth they will be energetically and economically worked and the ores fairly beneficiated, and that Guadalupe y Calvo will shortly again be a prosperous mining camp.

Heavy Steam Boilers.

The Largest Ever Built on the Pacific Coast.

The screw steamship Australia, of which Messrs. J. D. Spreckels Bros. are the managing owners, has for the past two months been laid up for the purpose of converting her old machinery, which was on the compound principle, and using steam of 75 pounds pressure, into the modern system of triple expansion, using steam at 160 pounds above atmospheric pressure. The contract for the conversion was intrusted to the Risdon Iron and Locomotive Works, and is now rapidly approaching completion. Although it cannot be said that Messrs. J. D. Spreckels are the pioneers of triple expansion on the Pacific Coast, it is gratifying to note the spirit which animates the firm in desiring to place themselves in the front rank as steamship owners by keeping pace with the times as regards modern improvements, especially in such a locality where the cost of fuel is one of great importance to steamship owners. It has been proved beyond doubt that a well designed and constructed triple engine and boiler, using steam of 140 to 160 pounds pressure, produces a clear saving in fuel to the owner of at least 25 per cent over the ordinary compound system.

It will at once be acknowledged that this in itself is of vital importance to the shipowner, especially when keen competition and low freights have to be contended with, for in many cases it means on a long voyage the difference between a dividend and no dividend, and when it is borne in mind that the cost of maintenance in the triple machine is no more than that of the ordinary compound, due to the fact that in the engine we have practically a balanced engine with strains of more uniform nature, while the first cost amounts to but a slight percentage more, we do not hesitate to say that for deep-sea purposes the compound engine will soon become a thing of the past. The triple engine and boiler is a far more delicate machine, especially in the boilers, than its predecessor, and requires more careful attention on the part of the attendants, but as this is only a matter of educating the men to the higher pressure, all difficulty soon vanishes. It will be self-evident that more attention must be paid to the matter of cleanliness, for in dealing with the high pressure, any carelessness on the part of engineers in allowing accumulation of salts or grease over the more vital heating surfaces will be productive of failure, but seeing that every facility is given for thorough examination of the boilers, no excuse is permissible where such disasters arise.

We have much pleasure in presenting herewith illustrations of the boilers of the Australia. They are two in number, 14 feet 4 inches mean diameter, 16 feet 4½ inches long. Each boiler is fitted with six of Fox's corrugated furnaces three feet four inches mean diameter, 17-32 thick, having one fire-box common to each pair of through furnaces. It will be observed that the furnace fronts are flanged outward, thereby affording the means (which is highly essential) of hydraulic riveting. The back end of the furnace is flanged upward to take the tube sheet (the latter is 29-32 thick), so that in the event of a furnace crown collapsing, no difficulty arises in replacing the furnace, seeing that the furnace mouth is larger in diameter than the outside corrugation, and cutting at the back ends affords attachment for new furnace.

With the exception of tubes and braces, the boilers are constructed entirely of steel manufactured under the Siemens-Martin process. The shell plating, which is 1¼ inches thick, having tensile strength of 62,720 pounds, is built up of three courses, having two plates in each course. The longitudinal seams are fitted with butt straps inside and out, and are treble riveted, with the exception of end courses, which are double riveted; the circular seams are also treble riveted.

With the exception of the forward end circumferential seam, the whole of the riveting on shell and ends is hydraulic riveting. The machine used for this purpose was built in San Francisco, and exerts a pressure upon the rivet of 150 tons to the *square inch*. Where practicable, the riveting of the fire-boxes is also hydraulic.

The fire-box plating is composed of one-half-inch plates, excepting bottom, which is 11-16, and is single riveted to tube sheets. The plates forming the tops and sides of each fire-box are in one piece, so that only two plates form the outside of the box. The roof is efficiently supported by crossbars having braces screwed through the plate with nuts and washers inside. The sides are supported with braces screwed through the shell and also to each other. Each brace is protected with iron ferrules, in conformity with the U. S. Government requirements.

The flat part of the ends in the steam space are supported with wrought-iron braces 2¾ inches in diameter, having plate-washers 10 inches in diameter outside, with nuts inside and outside. The tubes are 3½ external diameter, No. 8 thick; the number in each boiler, 616. Every alternate tube, vertically and fourth horizontally, is fitted as a stay screwed through the front and back tube plates and beaded over at both ends, this plan having proved more efficient than that of fitting nuts which are liable to burn away. These tubes are three-eighths thick, and together with the plain tubes were expended by roller mandril. The whole of the plating is calked inside and out on the most approved principle.

The boilers have been constructed to conform to United States, Lloyd's Registry and British Board of Trade requirements for a working pressure of 160 lbs. above the atmosphere. With this pressure it is estimated, with the ample grate and heating surfaces provided, that the Australia, in ordinary work, and with coal of average quality, will develop 2300 indicated horse-power—and this upon a coal consumption of 39½ tons per diem. The previous horse-power of the ship was 1800, with a consumption of 50 tons per diem. With the new machinery, the ship is estimated to attain 13½ knots per hour.

The heating surfaces are as follows:

Tubes	6814 2
Furnaces	482 5
Fire-boxes	316 4
Tube plates	283 1
Total in two boilers	7896.2
Total fire-grate area in two boilers	234 sq. ft.
Ratio of heating surface to grate area	33.7:1

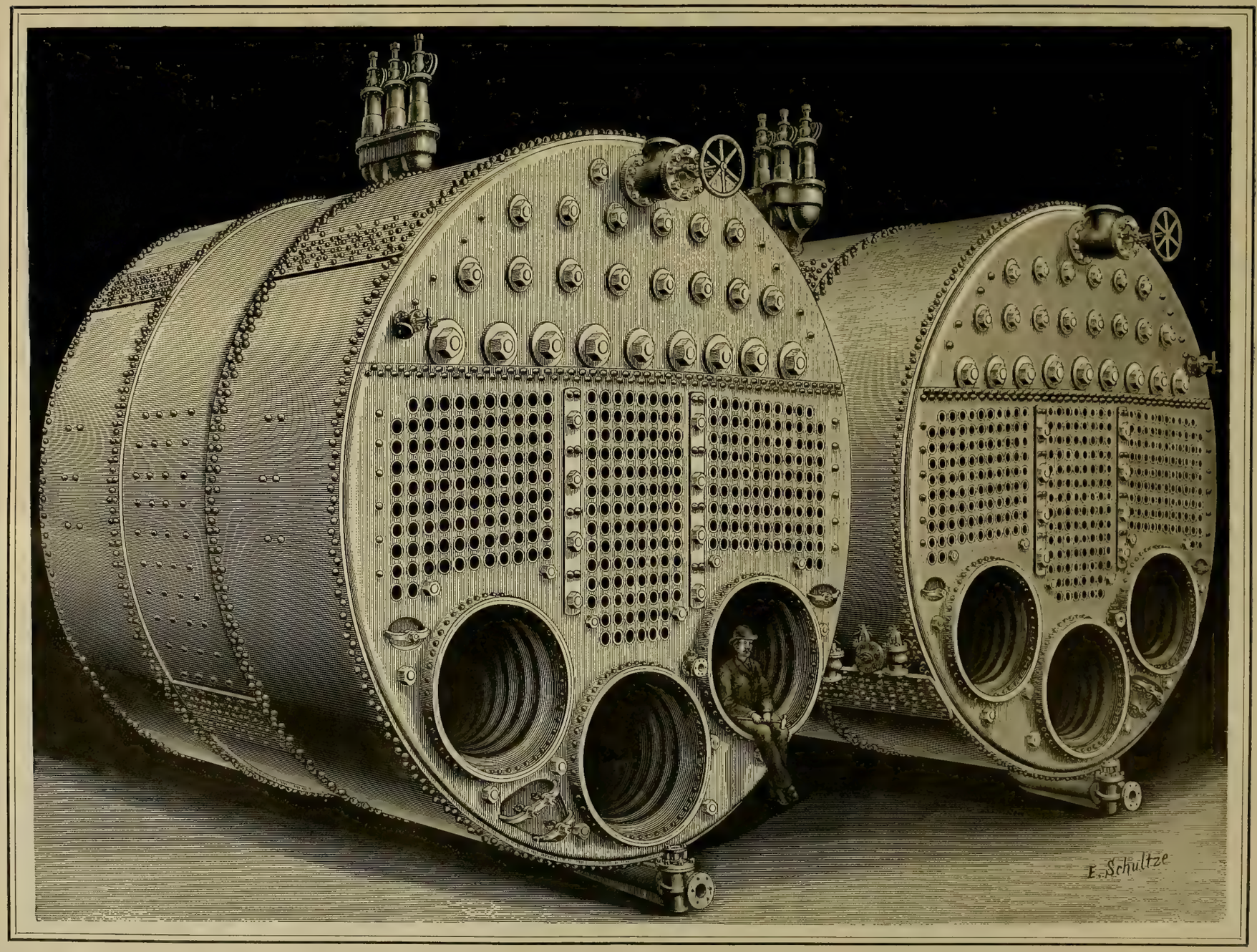
Each boiler is fitted with Cockburn's spring-loaded safety-valves—three to a set—and are 4 5 16 diameter. The advantage this type of valve possesses in a heavy sea-way over the common dead-weight or lever safety-valve, is well known to all practical engineers. All the valves can be eased from stokehold platform, and can be turned round while under steam.

Main stop-valves, with brass internal steam pipes, are provided on both boilers 7 inches diameter shutting off steam from engines and from each other. Surface, bottom, blow-off and drain cocks are also fitted together with a double set of water gauges and test cocks, having cocks at extremities of pipes on boilers. The main and donkey feeds enter at the after end of the boilers and are so fitted that either valve can be overhauled while under steam. Internal pipes carrying the feed away from the furnaces over the tubes are also fitted. There is connection with non-return valves on both boilers providing steam of reduced pressure into winch range.

As too much care cannot be exercised in raising steam in these high-pressure boilers, in order to reduce the possibility of leakage at bottoms to a minimum, Clarke's patent circulators, with steam connection from winch boilers, are supplied. Steam jets for blowing tubes at sea or in port are fitted. The fire-doors are constructed on Martin's principle and to the firemen are a great boon. They are perfectly balanced and open upward, so that a touch with the firing shovel is all that is required to open or close them, while in cleaning or slicing a fire they can be opened to the required hight and so prevent the intense heat from attacking the fireman, as is the case with the common swing-back door, which is a decided nuisance in a heavy sea. Ash-pit dampers and pricker-bars are fitted as usual. The fire-bars are of the ordinary type, in two lengths, supported on the ordinary dead-plate in front and on Tucker's patent bridge walls at back end.

The smokestack is also fitted with a damper worked from stoke-hold platform. All the steam and feed pipes are of hammered copper, having spigoted flanges on the locomotive principle, and the flanges of steam pipes are brazed and further secured with rivets. The boilers with their mountings in place have been subjected by hydrostatic test to a pressure of 320 pounds to the square inch (twice the working pressure) before leaving the works, and no evidence of weakness was discernible. The whole work proved to be perfectly stanch and watertight. Within two months from date it is expected the Australia will be ready for sea and will resume her place on the Honolulu route.

LA TRINIDAD.—One of our subscribers, who has just returned from La Trinidad mines, Mexico, where a number of Comstock miners went some months ago, informs us that everything is in a most deplorable condition at these mines. There is no money to pay the men, and some 12 or 15 miners, who came here recently, had difficulty in getting bullion to get away with. There are no less than four caves in the mines, the good ore being covered up. There is not a spot where metal can be found, and it will take some weeks to clear off the rubbish from the caves. The mine is said to be good, but the management poor. It costs about $2 to get out $1 in silver. The Comstock miners who went there have mostly come back, and those who have been paid got their wages in Mexican money. It is no place for miners from here to go to.



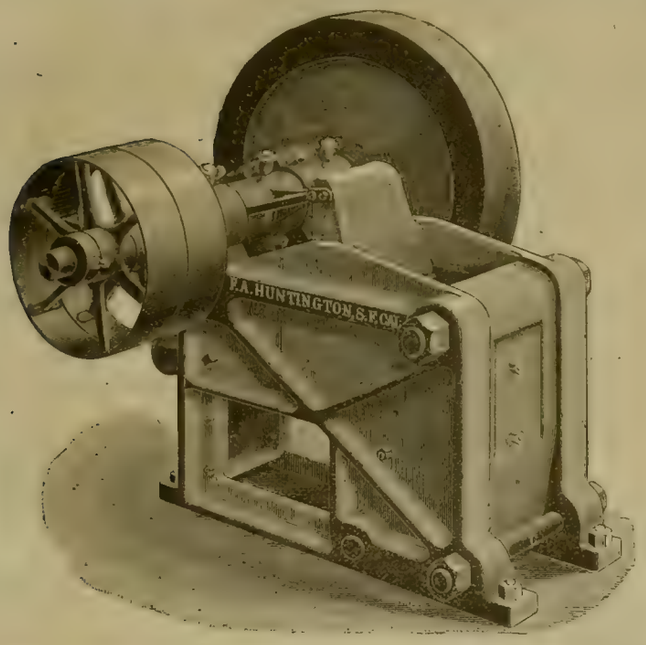
BOILERS OF OCEANIC STEAMSHIP CO'S STEAMER "AUSTRALIA," BUILT BY THE RISDON IRON AND LOCOMOTIVE WORKS.

F. A. HUNTINGTON,

MANUFACTURER AND DEALER IN

STEAM ENGINES AND MINING MACHINERY OF EVERY DESCRIPTION.

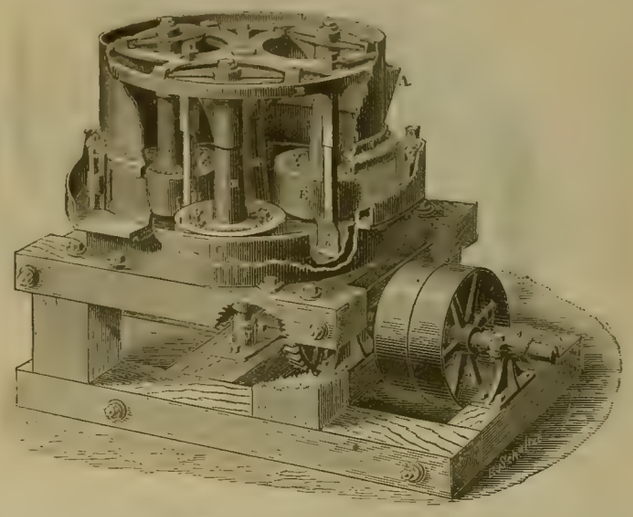
PRINCIPAL OFFICE, 45 FREMONT STREET, SAN FRANCISCO.



Huntington's Improved Rock-Breaker.

The main features of this machine are strength, ease of adjustment and simplicity of construction.

The movable jaw *A* is worked by the eccentric *B* and is pivoted at the bottom. The stationary jaw *D* is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt *C*. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt *C* and the jaw *D*. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



F. A. HUNTINGTON'S
Centrifugal Roller Quartz Mill.

The following will explain the above cut:

The ore and water being fed into the mill at the hopper *A*, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet crushing and gold saving it has no equal.

I claim especial merit in that feature of this system *which prevents* ALL FLOURING of gold and quicksilver, and the consequent loss of gold that attends stamp milling.

For the economical working of ore that contains sulphurets, I particularly claim the adaption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.

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22 and 24 N. LOS ANGELES STREET, LOS ANGELES.

1889. CATALOGUE OF 200 PAGES. 1889.

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The undersigned, having seven new 3-inch Sargeant Drills, complete with clamps and columns and three extra tripods, more than they can make use of, will sell all or any one, delivered in San Francisco at much below cost, the price depending on the number ordered.

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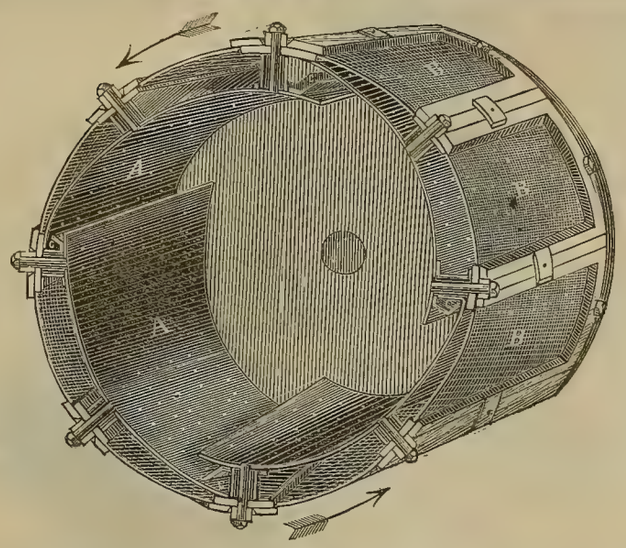
THE ORIGINAL!



BEST and CHEAPEST!

The cut represents a half section of the barrel, and shows both the interior arrangement, with the perforated plates and guards, and also the exterior or sieves, through which the pulverized ore passes, and mode of securing same to the periphery of the cylinder.

The feed of the barrel is simple, continuous and automatic.

The barrels are made of various sizes, and to reduce from 5 to 20 tons per 24 hours.

These barrels are no experiment; on the contrary they have been severely and practically worked, and are now in active operation, and can be seen at the Calumet Gold Mining Co.'s mines at Middle Creek, Shasta Co., Cal.

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DEALER IN MINING MACHINERY AND SUPPLIES,

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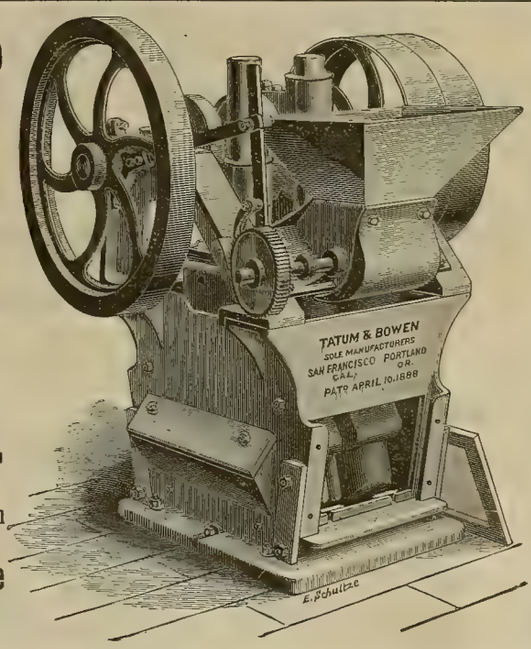
PERFECTED DOUBLE Economic Quartz Mill.



Attached to each Mill is an effective

Automatic Ore Feeder.

THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

IMPROVED ROCK BREAKER.

Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address:

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Monarch Belting.

The Plies of this Belt are

UNITED by COTTON RIVETS

Which hold them firmly together.

Each Rivet is Independent

And Follows the Stretch.

THERE ARE NO STITCHES TO BREAK, and

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Woolen Manufacture.

[Written for the Press by J. R. F.]

The history of the development of woolen manufacture in the United States is of great interest to all, but for a newspaper article only a brief outline can be given.

Virtually the manufacture of woolen goods in this country began with the erection of fulling-mills in Massachusetts in 1648 by a society of Yorkshire people, who brought from England their looms and implements of trade. This claim of being the first to manufacture woolen goods can rightly be maintained, for the history of that period states that the "woolen webs of the hand looms of the private families were carried to the fulling-mills to undergo a process which gave them greater body and thickness, adapted them to a better finish, and besides increased their durability." This naturally led to each community throughout the colonies having a fulling-mill, while every family had its loom and every woman was a weaver. Aside from this, there were weavers who traveled with their looms from family to family to ply their trade at a stipulated price. The fulling-mills of the present day are, by connection, a part of the woolen manufactories, with probably the remote and isolated localities of the South and Central States excepted.

The first record of the building of a woolen factory in this country was in 1788, when Jeremiah Wadsworth and others erected one at Hartford, Conn. In this mill there was only one loom. The capacity of the factory was 5000 yards of cassimeres or broadcloth per annum. So important was this move looked upon by Americans that special mention was made of a visit to the factory by General Washington, who afterward wore a suit of clothes made from the broadcloth manufactured there when he made his inaugural address to Congress. Special mention was also made of the factory and its important bearing on the industries of this country, in an address to Congress by Alexander Hamilton in 1791. In this address he urged the importance of improving the breed of sheep. In 1789 another woolen-mill of about the same capacity was erected at Stockbridge, which was followed in 1790 by the erection at Watertown of another factory, having the same capacity. This gave in the latter year three woolen-mills in operation in this country, having a combined capacity of 15,000 yards of broadcloth a year.

The first incorporated woolen company organized in the United States was formed at Byfield, Mass., in the year 1794. The company built a factory and used the latest improved machinery that could be imported from Europe. They also employed skilled laborers brought over from England under charge of Arthur Schofield. In this factory, it is recorded, was made in 1804 the first fine broadcloth manufactured from merino wool. The success met with by the Byfield company led to the forming of another company in 1809 at Pittsfield, Mass., for the purpose of manufacturing fine cloth. So far as any record can be found, there were only five woolen-mills in the United States in the year 1810 that manufactured fine cloth, but there were nine others running upon coarser cloth averaging about 10,000 yards a year each. Aside from the above there were ten small factories. The statistics of that period report that the product of cloth in 1810 by the factories aggregated 200,000 yards, having a market value of from $1 to $10 a yard. It is also stated that in the same year there was manufactured in the private families woolen cloth to the extent of 9,500,000 yards, so that the factories cut a small figure in the total number of yards turned out. The value of the 9,700 000 yards was placed at the time at $25,608,788. Each State had its woolen factory, the principal or largest being located as follows: Byfield, Mass.; New Ipswich, N. H.; Warwick and Portsmouth, R. I.; Derby and Hartford, Conn.; Watertown and Poughkeepsie, N. Y.; Philadelphia, Pa.; Wilmington, Del., and Baltimore, Elkton and Frederick, Md.

In 1812 steam as a motor was first introduced into the woolens. The first application was at Providence and Middletown. The first power loom was used in 1825, when it was used by the Pontoosac Manufacturing Co. for making broadcloth, also superior all wool, cotton-warp, drab and fancy cloths. It is stated that the first large factory in the United States was erected by L. Pomeroy, who used hand-looms only. Great impetus was given to the industry by the war of 1812, owing to the large demand for military and naval cloths, blankets and negro cloths. This increased call for woolen goods was met by the erection of many more factories, whose growth was of a mushroom nature, for after peace in 1815 the superior goods, of English manufacture, were imported, for at that early day our manufacturers had neither the skill, labor, machinery nor fine wools to successfully compete against England. Heavy importation of foreign woolen goods sent prices to such low figures as to compel many of the home factories to suspend operations. The foreign imports in one year aggregated a value of nearly $155,000,000. The depression in the industry in this country is better illustrated by the following comparison of values of woolen goods manufactured in the United States: In 1810, $25,608,788; in 1820, $4.413.060; in 1830, $14,528,166; and in 1840, $20,696,699. Urgent appeals were made to Congress for greater protection, which resulted in several changes in the tariff. In 1816 an ad valorem duty of 25 per cent was levied on all imported goods, which was to run for a period of three years, after which time it should be reduced to 20 per cent. In 1824 Congress again raised the duty on woolen goods, making the tariff 25 per cent ad valorem on all imported goods costing 33½ cents or less a yard, and 33½ per cent ad valorem on all going above 33½ cents a yard; but unfortunately for manufacturers, Congress at the same time levied a duty on raw wool of 30 per cent ad valorem on wools costing 10 cents and over a pound and 15 per cent ad valorem on all wools costing less than 10 cents a pound. England, in order to offset the changed duty, in 1825 reduced her import duty on foreign wools so as to enable her manufacturers to turn out woolen goods cheaper, by which they would be able to furnish woolen goods to America notwithstanding the higher tariff laws, which they did most successfully. In 1828 Congress increased the duties on woolen goods to 45 per cent ad valorem on all goods costing $4 and under a yard and 50 per cent ad valorem on all costing over $4 a yard; but at the same time the duty on raw wool was increased to fully 100 per cent ad valorem on all wools costing 8 cents or over a pound. This law, owing to the high duty on the raw material, gave only temporary relief. In 1832, Congress, to meet the demand of manufacturers for cheaper coarse wools so as to compete against foreign woolen goods, allowed all wools costing 8 cents or under a pound to be imported free of duty, but kept the duty on all going above 8 cents a pound at 4 cents a pound and 40 per cent ad valorem—the same as it was made in 1828. In 1846 the tariff was again changed, by which all raw wool costing 20 cents or less a pound should be admitted free of duty, and only 30 per cent ad valorem should be imposed on all wools costing over 20 cents a pound. The tariff on woolen goods was also reduced to 30 per cent ad valorem. This law gave more general satisfaction and caused quite an expansion in the manufacture of woolen goods. This rate of duty was kept in force until 1861, when the exigencies of the civil war caused a higher duty to be levied.

Before extending this article further for this issue it may be appropriate to refer to the improvements in the manufacture of woolen goods, and this cannot be better done than by giving the following from the business experience of the late Thomas R. Hazard, one of the earliest woolen manufacturers of the country: In 1816 and later I used to employ scores of women to spin at their homes at 4 cents a skein, by which they earned 12 cents a day at most. Inferior cotton shirting *sold then at 50 cents a yard*, thus requiring four days' work of the woman to pay for one yard of cloth, she boarding herself. The wool was carded into rolls at Peacedale and transported to and from on the backs of horses. Some time ago I stood in the manufactory in the same village and took note of a stripling who tended two highly-improved jennies, from which he was turning off daily as much yarn as *six or seven hundred* formerly spun on wheels in the same time. In the meantime the introduction of labor-saving machinery and perfected skill had so reduced the cost of goods that a superior article of cotton cloth was then sold in the village stores for 15 cents a yard, for what formerly cost 50 cents a yard. So that had this boy spinner been paid the same price per skein that was formerly paid to a woman for an equal amount of work, he would have received as much as could formerly have been earned by about *two thousand hand-spinners* in the same time.

Land-Distribution Humbugs.

A correspondent and old subscriber asks us to give the public information regarding a certain "Land-Distribution" concern advertised by circulars, with some sort of a lottery attachment.

We have no knowledge as to the particular "enterprise" which he refers to, but we do know that there have been a number of swindles in the way of "colony" and otherwise entitled schemes—some of which have been exposed in the columns of the Pacific Rural Press within the past year—lately worked in this State to the fleecing of the unwary, and we can advise him and all other honest people who have no money to throw away on sharpers to let all such projects severely alone.

A Query.

EDITORS PRESS:—Will any of the readers of your valuable journal kindly inform the subscriber through your columns where, within a reasonable distance of San Francisco, a "Victor" concentrator can be seen in successful operation? VERITAS.

THE Kingsland M. & M. Co. own property in the Silver Mountain district, San Bernardino county, and intend developing it by the erection of both smelters and mills. It is a Los Angeles company, with P. H. Lemmert, president; A. A. Kingsland, of New York City, vice-president; Richard Garvey, treasurer, and William H. Burns secretary.

AT the regular meeting of the Academy of Sciences on Monday, Dr. Behr read a paper on "The Duration of Life in Insects," which gave much interesting information regarding the great vitality which some insects possess.

A CAVE occurred in the copper mine at Copperopolis last week, doing some damage.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING MAY 14, 1889.

403,409.—PILE-PROTECTOR — G. M. Baronidis, S. F.

403,452.—HYDROSTATIC SCALE — Frank Batter, Slide, Cal.

403,411.—GRAIN-DRIER—Lewis Borland, S. F.

403,412.—GRAIN-DRIER—Lewis Borland, S. F.

403,475.—GAUGE FOR GRINDING DRILLS—A. F. Brewer, S. F.

403,476.—SAFETY GATES FOR R. R. CARS — W. M. Brown, Jr., Sacramento, Cal.

403,459. SEWER TRAP—Cohn & Merrill, S. F.

403,095.—SCRAPER—Denehy & Childs, Acampo, Cal.

403,333.—WOODEN BOXES—E. Densmore, Coronado, Cal.

403,421.—GRINDING-MILL—E. Derbec, S. F.

403,184.—PINCH BAR—P. C. Forrester, Wilkeson, W. T.

403,187.—STEAM VALVE—J. W. Gheen, Astoria, Ogn.

403,430.—WATER-MOTOR—Chas. R. Hunt, Redding, Cal.

403,114.—PLOW AND SEEDER—H. M. Kingsbury, Middletown, Cal.

403 432.—SPRING GUN—Edward Y. Knapp, Blue Lake, Cal.

403,284.—BED LOUNGE—C. Newhouse, Los Angeles, Cal.

403,370.—RAILWAY SIGNAL—G. Provost, S. F.

403,392.—FEATHERING PADDLE-WHEEL—Henry F. W. Sohse, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SPRING GUN.—E. Y. Knapp, Blue Lake, Humboldt Co., Cal. No. 403,432. Dated May 14, 1889. This toy gun consists of a barrel, a magazine, a vertically moving carrier by which the bolts or darts are transferred from the magazine to the barrel, and a mechanism whereby the carrier is lifted in the act of cocking the gun, and is retracted when the trigger is pulled, leaving the bolt to be struck by the hammer and ejected from the gun-barrel.

GRAIN-DRIER.—Lewis Borland, S. F. No. 403,412. Dated May 14, 1889. This invention relates to that class of grain-driers in which the body of grain passes down between the perforated walls of a vertical column or passage through which, from side to side, the heated air is passed. The object of the invention is to provide for subjecting the grain at the beginning and end of the operation to a high degree of heat, and at the middle of the operation to a lower degree of heat.

HYDROSTATIC WEIGHING MACHINE.—Frank Batter, Slide, Humboldt Co., Cal., assignor of one-half to W. S. Vanderburg, Marshfield, Oregon. No. 403,452. Dated May 14, 1889. This improved weighing scale consists of a chamber with a rising and falling float fitted therein, said float having a pan for the support of the article to be weighed, and in connection with the chamber of a scale consisting of a series of diagonally arranged pipes connected with the chamber and having graduations marked from end to end.

GRAIN-DRIER.—Lewis Borland, S. F. No. 403,411. Dated May 14, 1889. This is one of that class of grain-driers in which the grain is advanced throughout its course in a series of perforated casings by rotating augers therein, being subjected to an uprising body of heated air which passes through the perforated casings and the grain contained therein. The invention consists in certain constructions and combinations. The heat is under perfect control and the grain can be subjected to the proper drying at different stages of the operation.

FEATHERING PADDLE-WHEEL.—H. F. W. Sohst, S. F. No. 403,392. Dated May 14, 1889. This is one of those feathering wheels in which the wings or blades are adapted to be turned so as to alternately present their faces and their edges to the water, whereby they apply their powers and then clear themselves. The invention consists in axially pivoted blades or wings mounted in radial planes of the wheel and the novel cam mechanism whereby said blades or wings are turned at right angles to the plane of the wheel's rotation and back again into line therewith. It further consists in the novel arrangement of the cam mechanism and the devices for operating it.

SAFETY DEVICE FOR ELEVATORS.—Philip B. Sullivan, Tuscarora, Nev. No. 402,780. Dated May 7, 1889. This safety-hook is for elevators or cages for mines or buildings, and is designed to prevent the cage from running up into the cable-sheave, by releasing it before it reaches that point. The safety clutches act to hold the cage and prevent it from falling. The invention consists of a hinged plate by which the clevis to which the rope is attached is connected with the suspending bar at the top of the cage, and in connection with this of an eccentric which locks the hinged plate, and has an arm or lever projecting from it, so that it may engage a projection upon the framework or guides and release the holding-plate, so as to let the clevis and the cable go free, while the clutches on the cage will set and stop it.

STEAM AND WATER MOTOR.—Chas. R. Hunt, Redding, Shasta Co., assignor of one-half to C. K. McElwee, Auburn, Placer Co. No. 403,430. Dated May 14, 1889. This steam and water motor consists of a chamber submerged in a tank of water, above which is journaled a wheel having buckets upon its periphery, a jet-pipe or tube extending from said chamber upwardly, so as to discharge into the buckets on the wheel, a suction tube or pipe in line with the first and opening rearwardly through the side of the chamber into the water in the tank, and a steam pipe opening into the chamber so as to discharge from the first-named nozzle in such a manner as to draw water through the suction pipe and discharge it with the steam into the buckets on the wheel. The reactionary force of the water assists to impel the wheel and it also returns the water instantly to the tank as soon as its work is done, so that it may be used over and over.

Government Irrigation Work

Interest is rife in the proposed irrigation work by the General Government. The leading topics under which present information arranges itself are two: The plans of the special Senate committee and the effort of California to adequately impress them with the results attained here by irrigation enterprises and the desirability of giving California a generous share of the work under charge of the U. S. Geological Survey. It is telegraphed from Washington that the Senate Committee expect to spend three weeks in the field, and will visit Northern Dakota, Montana, Idaho as far as the Snake-river basin, Utah, Nevada, California and Arizona, Southwestern Texas along the valley of the Rio Grande from El Paso to San Antonio, and thence by the Fort Worth, Santa Fe & Colorado railway across the Staked Plains, the Pan Handle region and part of Southeastern New Mexico, and through that Territory to Southwest Kansas, Colorado and Wyoming.

This seems rather a large extent of territory to cover in three weeks, but perhaps the committee will overrun their estimate and take a more thorough look into affairs than three weeks would allow. It would seem that it would require about that much time to cover the distance at ordinary rate of railway speed, and that a car-seat review would be all that could be made. We trust that the telegram is in error and that the committee will give three months to the work.

As to participation by the U. S. Geological Survey, the telegram says that the committee will be accompanied by the director of the Geological Survey, and by Richard J. Hinton, who prepared for the Department of Agriculture a report on irrigation in the United States, published by the United States Senate in 1887. He accompanies the special committee as an expert, having been appointed Irrigation Engineer in the U. S. Geological Survey, which will have six engineering parties in the field some time before the committee starts. The public domain west of the tenth meridian will be divided finally into about 15 hydrological districts, as the topography of the region best indicates proper storage basins.

The California State Board of Trade is undertaking to arrange facts and routes for the use of the visiting committeemen and experts. Senator Stewart of Nevada, who has pushed this project from the start, is now engaged with local preparations for the committee's visit. A determined and we trust successful effort will be made to convince the visitors, and through them the Eastern people, of the vastness of the possibilities of the arid regions west of the Rocky mountains if adequate irrigation work is done, and we hope it will succeed.

BULL-DOGS AS FIRE PREVENTIVES.—It is reported that the Standard Oil Co. has placed an order in Philadelphia for 200 bull-dogs, which will be used to guard the company's tanks in the Ohio field against tramps. Numerous fires have been caused by sparks from the pipes of tramps, and it is thought that the bull-dogs will keep them away.

LA VELERA MINE, within two miles of La Trinidad mines, Mexico, owned by an English company, is now in high-grade ore, carrying from 100 to 400 ounces in silver per ton. A water-jacket furnace and a mill have been purchased in this city and will be running by July.

D. O. MILLS says that he has not sold his one-third interest in the Treadwell mine, Alaska. The stock of the mine amounts to 100,000 shares, and Mills says the owners of two-thirds of these have sold out at $16 a share to British capitalists.

THE people in Prescott, Arizona, are very anxious to have good reduction works, and stop shipping ore away.

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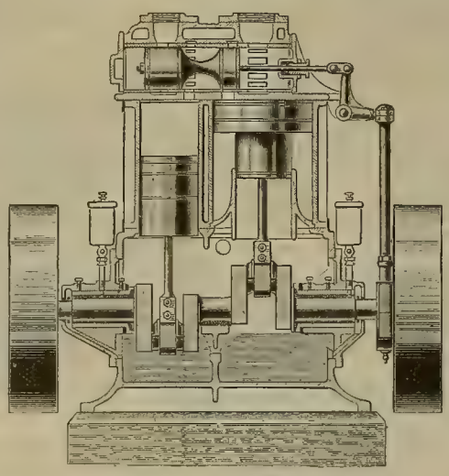

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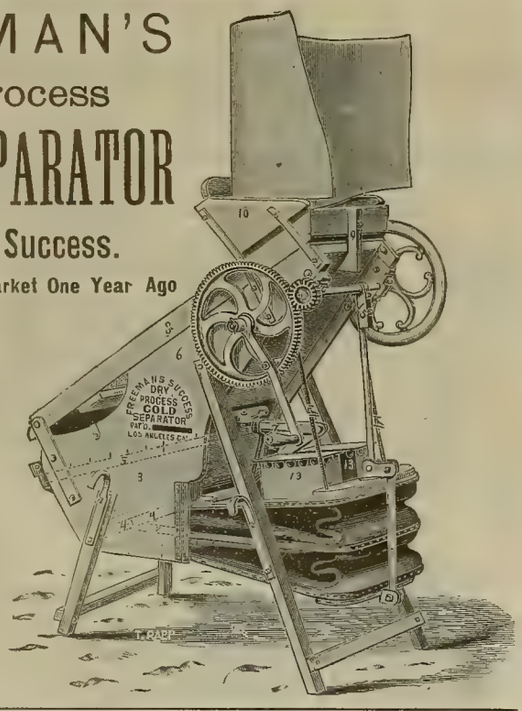

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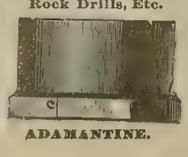

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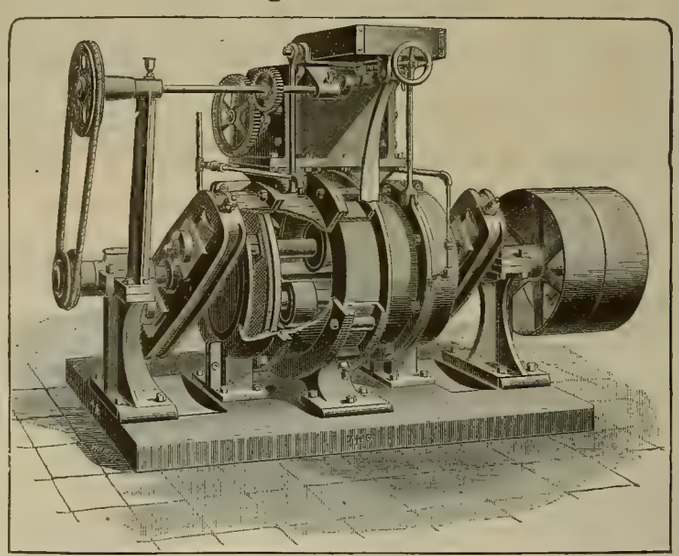

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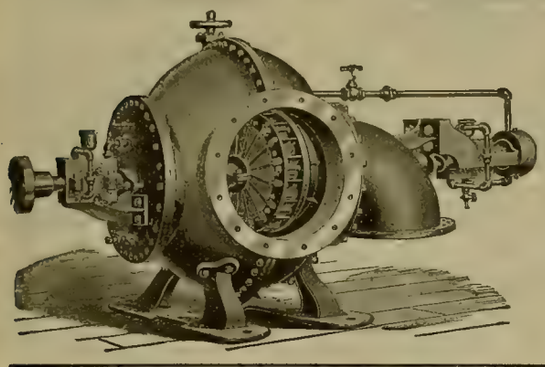

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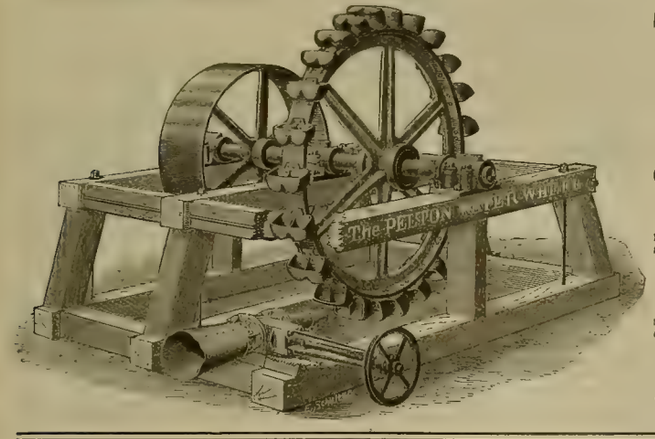

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MARKET REPORTS.

Local Market.

SAN FRANCISCO, May 23, 1889.

General trade the past week was good, with an increase in the volume of goods going out on orders. The outlook for a large trade was never so favorable as at present. The crops of all kinds promise to be exceptionally good, particularly in cereals, which will, without an unfavorable change in the climate, be the largest on record. To secure the various crops, a large force of men will be required, probably fully one-third more than were given employment last harvest. From the mines our advices are to the effect that more gold-producing quartz mines are being developed than ever before in the coast's history. This gives employment to a largely increased number of men. All advices are confirmatory that a mining boom will soon "be on," and which will not be confined to any one State or Territory on this coast.

The money market continues easy, but there is a growing belief that an active demand will set in soon from the country to aid in moving the crops. So far, interior banks and capitalists have met the wants of their particular section, but as harvesting becomes general and farmers begin to make deliveries, this city will be called on for funds. The low prices at which new crop wheat and barley will rule for at least one or two months, will, without doubt, cause more to be stored and money borrowed on it. If this proves true, large sums of money will be tied up in grain. For wool, there is a fair call for money. Manufacturers are not urgent in their wants. Considerable money is going into circulation, owing to more buildings going up and other improvements being made.

Treasure imports by sea the past week were as follows: Mexican dollars, 37,587; coin, $10,148. silver bullion $68,280.

The steamer City of New York, hence May 18th, for China, took out the following treasure: To Hongkong, Mexican dollars, 447,635; silver bullion, $189,000; gold coin, $5419. To Bombay, silver bullion, $95,000.

SILVER—Under freer competitive buying, the market has held strong, with 92¾c readily paid. The receipts are not large, which is contrary to what the ruling opinion was the forepart of the year. It was then thought that the Comstock mines and other silver-producing mines would turn out more bullion than they have done so far. With the revival of business that is now going on in Europe, it is generally conceded that more silver coin will go into circulation, which will naturally improve the market for silver bullion.

MEXICAN DOLLARS—The last steamer for China took out more Mexican dollars than has any one steamer this year. Supplies being well held, cause any improved call to be met by better prices. The market has been creeping up until 74c is paid for new, and 73¼c for old.

QUICKSILVER—Receipts the past week were as follows: One hundred and forty-five flasks, Haas Bros.; 50, Parrott & Co.; 32. C. S. Neal; 66, A. Abbey; 19, R. F. Knox; 7, D. Myer. Total, 319 flasks. The market is very strong at another advance, under a freer demand and light obtainable supplies.

LEAD—The market is without essential change. The general tone appears to be weak in sympathy with the East.

TIN—Both pig and plate on spot are weak at a lower range. Buyers appear to have their temporary wants met. The East and Europe come through easier.

COPPER—The situation is virtually unchanged. It now looks as if some kind of truce or compromise will be patched up between European holders of copper and mine-owners.

IRON—The imports the past week were 360 tons of pig from Irondale. The market for all kinds continues very dull and heavy. It is claimed by buyers that they can get spot parcels for less money than we quote.

BORAX—Receipts the past week were only 364 ctls. The works in Alameda county will start up soon. Stocks are said to be so far reduced as to justify this move. The market is firm.

LIME—Receipts the past week aggregated 3284 barrels. The market is barely steady, notwithstanding there is a good demand.

COAL—Imports the past week were as follows: Seattle, 7120 tons; Nanaimo, 750; Australia, 20,820; and Departure bay, 7968. Total, 37,658 tons. The market appears to have a steadier tone since the recent contracts for Australian to the gas company to arrive. These contracts are as follows: Twenty-five thousand tons at $7; 15,000 at $6.75; and 10,000 at $6.87½. Buyers outside of the above continue to confine their purchases as much as possible to nearby wants.

Eastern Metal Markets.

By Telegraph.

NEW YORK, May 23, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42¼	92¾	$12 00	$3 80	$20 80
Friday	42¼	92¼	12 00	3 80	20 70
Saturday	42¼	92⅜	12 00	3 80	20 70
Monday	42¼	92⅜	12 25	3 70	20 60
Tuesday	42¼	92⅜	12 25	3 70	20 40
Wednesday	42¼	92⅜	12 25	3 70	20 40

NEW YORK, May 23.—A recent settlement of 12c for Lake Ingot copper allows consumers 4¼c rebate upon April and May deliveries. Buyers, however, do not take kindly to the deal, as an impression prevails that the price must eventually move more favorably, so no important sales are noted. A sale was made on 'Change at 11¼c for 25,000 for September. Pig lead dropped to $3.80; small, prompt deliveries; $3.75 bid for important lots. Refined petroleum in barrel, $6.85; plain casks, $8.85. The latter is active, on a free shipment to Spain. There is the usual consumers' demand for borax at the old prices. Quicksilver is firm at 62c.

San Francisco Metal Market.

WHOLESALE.

THURSDAY May 23, 1889.

ANTIMONY	— @ 14
BORAX—Refined	7½@ 7¾
Powdered	7½@ 7¾
Concentrated	7 @ 7¾
COPPER—	
Bolt	26 @ 27
Sheathing	26 @ —
Ingot	17½@ 18¾
Fire Box Sheets	—@ 25
LEAD—Pig	4¾@ —
Bar	5 @ —
Sheet	8 @ —
Pipe	7 @ —
Shot, discount 10% on 500 bags Drop, ₩ bag	1 45 @ —
Buck, ₩ bag	1 65 @ —
Chilled, do	1 85 @ —
STEEL—English, lb	16 @ 20
Canton tool	9¼@ —
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Toe Calk	4¾@ 5
TINPLATE—B. V., steel grade, 14x20, P. S.	4 80 @ 5 85
B. V., steel grade, 14x20, spot	4 95 @ 5 00
Charcoal, 14x20	6 50 @ 7 00
do roofing, 14x20	5 37½@ 5 50
Pig tin, spot, ₩ lb	23½@ 23¾
do, do, prompt shipment	— @ —
QUICKSILVER—By the flask	47 50 @50 00
Flasks, new	1 05 @ —
Flasks, old	85 @ —
COKE—English, ton, spot	20 00 @— —
Do, do, to load	13 50 @13 75

IRON—Glengarnock ton	Spot. 27 00 @— —	To Load. 27¾@ —
Eglinton, ton	26 00 @— —	25¾@ —
American Soft, No. 1, ton	— — @31 00	31¾@ —
Oregon Pig, ton	— — @30 00	— @ —
Clay Lane White	— — @24 50	25 @ —
Shotts, No. 1	28 50 @29 00	— @ —
Bar Iron (base price) ₩ lb	2¾@ 3	— @ —
Chrome iron ore, ₩ ton	— — @10 00	— @ —

Lumber.

Pine, Fir and Spruce.

	RETAIL.	JOBBING.
Rough Pine, merchantable, 40 ft	$19 00	$16 00
41 to 50 ft	20 00	17 00
51 to 60 ft	22 00	19 00
61 to 70 ft	26 00	22 00
1x3, fencing	21 00	18 00
1x4, "	20 00	17 00
1x3, 1x4 and 1x6, odd lengths	18 00	15 00
Second quality	16 00	14 00
Selected	23 00	21 00
Clear, except for flooring	30 00	27 00
Clear for flooring	1 00	.....
Clear V. G. No. 1 flooring	5 00	.....
Firewood	13 00	9 00
Dressed Pine, flooring, No. 1, 1x6	31 00	28 00
No. 1, 1x4	33 00	29 00
No. 1, 1¼x4, 1¼x6, and odd sizes	36 00	32 00
All sizes, No. 2	26 00	23 00
Stepping, No. 1	34 00	30 00
Stepping, No. 2	38 00	24 00
Ship timber and plank, rough	26 00	17 00
Selected, planed 1 side, av'ge 40 ft	28 00	23 00
" " 2 " " "	30 00	25 00
" " 3 " " "	32 00	27 00
" " 4 " " "	34 00	29 00
Deck plank, rough, average 35 ft	34 00	31 00
Dressed, average 35 feet	39 00	34 50
Pickets, rough, B M	19 00	15 00
¼x1½, 4 ft long, ₩ M	5 50	4 00

Coal.

TO LOAD.

Per Ton.		Per Ton.
Australian	$ 6 75 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	16 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	6 00
Scotch Splint	8 00	Seattle	6 00
West Hartley	10 00	Coos Bay	5 00
Greta	8 00	Cannel	10 00
Westminster Brymbo	8 00	Egg, hard	16 00
Nanaimo	9 00	Cumberland, in sacks	18 50
Sydney	$ 8 00	do, bulk	17 50

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

MEXICAN BONANZA M. CO., May 17. Location, Sonora, Mexico. Capital stock, $2,000,000. Directors—S. R. Norton, T. L. Flanagan, Menzo Spring, Charles Henderson and Orson Wentworth.

COFFIN COMBINATION PUNCH & TICKET CO., May 18. Object, the manufacture and sale of punches and tickets. Capital stock, $10,000,000. Directors—D. E. Hayes, C. S. Neal, R. Derby, W. W. Coffin, S. R. Chappel.

GANDEE JOURNAL BEARING CO., May 20. Object, to acquire the exclusive right to manufacture the Gandee system of machinery bearings. Directors—F. P. Veisard, Geo. W. Arnold, J. B. Pitchford, E. L. Campbell and Oswald Lubbick, Capital stock, $100,000.

DYKES IMPROVED AUTOMATIC GAS MACHINE CO., May 21. Object, to manufacture gas machines under the Dykes patents. Capital stock, $100,000. Directors—H. J. Dykes, W. A. Ristenpart, W. A. Knapp, W. H. Moore, and V. A. Lewis.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Justice, May 21, $3166; Hale & Norcross, 21, $4224; Hanauer, 15, $2100; Mt. Diablo, 21, $10,650; Con. California and Virginia, 18, $62,093; Hale & Norcross, 18, $30,104; Hanauer, 16, $2675; Alice, 16, $19,442; Hanauer, 16, $1800.

NEARLY 8000 miners have resumed work at Pittston, Pa., after an idleness of over seven months. All the collieries owned by the Pennsylvania Company and nearly all those owned by individual operators are now working.

ON the 19th of September last Albert Van Der Naillen was injured by the fall of an elevator in the History building. He now sues to recover from the Bancroft Company the sum of $25,000 damages and cost of suit.

THE cruiser Charleston has been insured in English companies by the builders, and the agents of the American insurance companies in this city decidedly object.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS
Belle Isle M Co	Nevada	12	10	Apr 19	May 23	June 13	J W Pew	310 Pine St
Bodie Con M Co	California	10	50	Mar 25	Apr 30	June 4	B L Burling	309 Montgomery St
Buena Vista Petroleum Co	California	34	50	Apr 24	May 30	June 27	J Morizio	328 Montgomery St
Bulwer Con M Co	California	5	25	Apr 10	May 15	June 12	L Osborn	309 Montgomery St
Calaveras Blue Gravel M Co	Cal	1	05	Mar 28	Apr 30	May 27	B Burris	240 Montgomery St
Exchequer M Co	Nevada	27	25	Apr 2	May 7	May 28	C E Elliott	309 Montgomery St
Found Treasure M Co	Nevada	5	12½	Apr 10	May 16	June 6	J Stadfeld Jr	309 Montgomery St
Gould & Curry M Co	Nevada	62	30	May 1	June 5	June 27	A K Dustroa	309 Montgomery St
Gray Eagle M Co	California	13	05	May 15	Jun 25	July 16	O H Bogart	327 Pine St
Inyo Marble Co	California	6	5	May 14	Jun 24	July 24	G W Luce	205 Front St
Kentuck M Co	Nevada	18	30	Apr 26	May 29	June 19	J W Pew	310 Pine St
Locomovive M Co	Arizona	4	50	Apr 25	May 29	June 18	A H Fish	309 Montgomery St
Morgan M Co	California	13	15	May 9	Jun 17	July 8	C S Neal	230 Montgomery St
North Commonwealth M Co	Nevada	2	30	Apr 3	May 3	May 30	J W Pew	310 Pine St
Optir M Co	Nevada	55	50	May 11	Jun 16	July 2	E B Holmes	309 Montgomery St
Occidental Cons M Co	Nevada	4	50	Apr 8	May 15	June 5	A K Dustroa	309 Montgomery St
Oak Con M Co	California	2	3	Mar 29	May 25	June 20	E J Ryan	230 Montgomery St
Pinal Con M Co	Arizona	8	13	May 15	Jun 21	July 12	A Chemisant	328 Montgomery St
Potosi M Co	Nevada	32	50	Apr 10	May 15	June 5	C E Elliott	309 Montgomery St
Silver Hill M Co	Nevada	24	20	Apr 20	May 23	June 13	D C Bates	309 Montgomery St
Sierra Nulon M Co	California	1..10	00	Apr 10	May 15	June 5	Wm V White	218 Sansome St
Teirakoff M Co	California	2	10	May 18	Jun 18	July 18	W J Gurnett	308 Pine St
Trinity Riv Tun & M Co	California	1..7	1-2c	Apr 11	May 24	June 13	L H Parkman	Cor Bush & Montgy Sts
Union Con M Co	Nevada	38	25	May 13	Jun 19	July 10	J M Buffington	303 California St
Weldon M Co	Arizona	13	10	May 13	Jun 18	July 9	A Waterman	309 Montgomery St
Yellow Jacket M Co	Nevada	45	50	Mar 28	May 1	June 1	W H Blauvelt	Gold Hill

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Cadmus M Co	Nevada	J Craig	204 California St	Annual	June 3
Crown Point M Co	Nevada	J Newlands	329 Pine St	Annual	June 3
Goodshaw M Co		C C Harvey	303 California St	Annual	June 4
Pinal Con M Co	Arizona	A S Cheminant	328 Montgomery St	Annual	June 4
Seg Belcher & Midas Con M Co	Nevada	E B Holmes	309 Montgomery St	Annual	June 4
Silver Hill M Co	Nevada	D C Bates	310 Montgomery St	Annual	May 29

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	Feb 11
Caledonia M Co	Nevada	A S Cheminant	328 Montgomery St	08	Apr 26
North Star M Co	California	E A Jennings	401 California St	50	Dec 31
Nacho M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Mining Share Market.

In mining stocks the market, so far as the Comstocks are concerned, has been disappointing to the bulls in the almost continuous sagging in prices. At times there were slight revivals, but which were unfortunately followed by a still further sinking in values. This condition obtained up to yesterday (Wednesday), when a steadier tone set in, as if the pool was about ready to force some of the smaller bears to cover, and at the same time get out the stock taken in at the low prices on the outside public at a good profit. Although the general public are bearish, yet there are many who believe in better times within the near future, but what they base this belief on is not at present apparent, for it is quite certain that stocks are too widely distributed to allow of the making of much of a move. Manipulators, unless when prepared to make a market, never buy back much of the stock at the prices at which they sold. There is nothing as yet to warrant a belief that the pool is ready for a market, although they may be for a small deal so as to collect assessments to continue active prospecting work in the more promising mines. From all the writer can learn, the situation is as follows: That while the work going on in the mines is very important, yet it takes time to get everything in order for taking out bullion, even after it is found. While running drifts and crosscuts, making upraises and sinking winzes, strikes of ore of varying width and value are liable to be run into at almost any time, which are, if the market is in position, taken advantage of to make an upward movement, but how much will depend on the amount of stock the pool has taken in and wish to sell out at profit. These moves keep life in the stock business and also make the bulls hold their stock and pay assessments.

Private reliable news from the Comstocks is to the effect that the drift mentioned in last week's issue, which is being run from Con. Virginia into Ophir, is on the 1665-foot level and is double track. In Union they expect soon to be in ore, not much, but enough to make a slight stir of from one dollar upward, if it is so desired. When they get under the winze sunk in ore from the 1300-foot level of Union, an upraise will probably be started so as to get ventilation. In the Mexican crosscut an upraise, it is claimed, will be commenced soon, so as to run into the ore on a higher level, and also get air connection with the 1300-foot level. With good ventilation in Union and Mexican, more active prospecting can be inaugurated in the two mines. It is claimed that further work west will give good results. In Utah and Sierra Nevada important work is now going on. On the 500-foot Alpha level a crosscut has been started west on the Con. Imperial line. Some time ago this paper mentioned that active work would soon be commenced in the Ward shaft so as to prospect to the west the mines running from Chollar to Exchequer. It is claimed that the work is liable to result in running into ore of some value lying toward the west. In Yellow Jacket very important work to the west is now under way. The upraise from the 1100-foot level in Belcher is said to be proving of more value than the inside is willing to admit. In Hale and Norcross, as the work goes westward, more interest centers. In Best and Belcher active work toward the west will soon be inaugurated. All the work in the mines is toward the west, which goes far in proving that the West Con. Virginia's work has awakened renewed interest in the west side, and which may result in considerable excitement as the work progresses, but there is a probability it will take more time and money than is claimed at present.

In the outside stocks the Tuscaroras held up well during the break in the Comstocks. The Quijotoas were weak with a slight shading in values. The reports from the above two districts continue flattering, but apparently there is too much ore to make a successful deal. The Bodies followed the Comstocks on the down grade. It now looks as if they will soon be ready for another line of assessments. It takes money to work the Bodies on the lower levels.

THE STORY METHOD of counting ballots was followed at the Stockton city election last Tuesday and worked admirably. About 2300 votes were cast. The returns of 11 of the 12 precincts of the city were all footed up within 2½ hours, and the result in the whole city was known at 8:30—3½ hours after the polls closed.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 1.		WEEK ENDING May 8.		WEEK ENDING May 15		WEEK ENDING May 22.	
Alpha	1.90	2.25	1.90	2 30	2.00	2.20	2.65	2.10
Alta	2.10	2.10	1 75	2.00	1.65	1.90	1.40	1.85
Andes	.80	.90	.75	.80	.75	.85	.50	.75
Argenta	....	....	....	....	....	....	....	....
Belcher	3.80	4.40	3.75	6.25	4.80	....	3.75	4.95
Best & Belcher	3.90	4.40	3.75	4.20	3.80	4.30	3 50	3.90
Bullion	.90	1.05	.90	.95	.90	1.00	.70	.90
Baltimore	.25	.30	....	....	....	....	....	.20
Belle Isle	....	.20	....	....	.20	.25	....	....
Bodie Con	1.60	1.90	1 75	2.00	1.65	1.80	1.45	1.70
Benton	....	....	....	....	....	3.50	....	....
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.30	.35	.30	.35	.30	.60	.45	.50
Commonwealth	5.00	5.50	5.25	5.50	4.80	5.50	4 70	4.90
Con. Va. & Cal	8.00	8.25	8.00	8.50	7.75	8.50	7 50	7¾
Challenge	3.80	4.00	3.25	3.50	3.25	3.85	2 70	3.30
Chollar	2.60	2.80	2 45	3.30	2.55	3.00	2.05	2.60
Confidence	10	10½	8.50	10.00	7	8½	7	7¾
Con. Imperial	.65	.70	.60	.70	.60	.70	.50	.60
Caledonia	.35	.40	.35	.40	.30	.35	.20	.30
Con. Pacific	....	....	....	....	....	....	....	....
Crown Point	4 00	4.60	3.80	4.80	4.05	4.30	3.40	4.35
Crocker	.50	.65	....	.65	.45	.50	.40	.45
Central	....	....	....	....	.10	.15	....	....
Dudley	.20	.30	.25	.30	....	.30	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	2.00	3.00	....	2.00	....	1.50	....	1.50
Exchequer	.70	.8	.65	1.10	.90	1.00	.75	.95
Grand Prize	.75	.8	.70	.80	.70	.75	.70	.80
Gould & Curry	2.55	2.90	2 35	2.60	2.40	2.65	2.10	2.35
Hale & Norcross	4.45	4.90	4.50	5.00	4.25	4.75	3.75	4.30
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	....	....	.25	.35	.30	.35	.20	.30
Justice	1.35	1.40	1.35	1 40	1.30	1.40	1.00	1.20
Kentuck	1.65	1.75	1.45	2.10	1.50	1.70	1.10	1.20
Lady Wash	....	.40	.30	.35	.35	.40	.25	.35
Locomotive	....	....	....	.10	....	.05	....	....
Martin White	....	....	....	....	....	....	....	....
Mono	1.50	1.75	1.75	1.95	1.60	1.70	1.35	1.60
Mexican	4.70	5¼	4.25	4 60	4.40	5¼	3.30	4.45
Mt. Diablo	....	....	....	....	....	....	....	....
Navajo	.80	.90	.80	.95	.75	.80	1.70	.75
North Belle Isle	1.75	2.15	1.55	1.75	1.20	1.55	1.35	1.50
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	1.70	2.15	1.60	1.70	1.20	1.45	1.20	1.50
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.10	1.35	1.10	1.20	1.50	1.75	1.45	1.55
Ophir	5¼	5.75	4.95	5.50	4.90	5¼	4.10	4.90
Overman	....	1.35	1.30	1.50	1.35	1.50	1.10	1.45
Potosi	2.05	2.10	1.80	2.25	2.45	2.60	2.00	2.45
Peerless	.65	.75	.60	.65	....	.60	.50	.60
Peer	....	.35	.25	.30	....	.25	....	.25
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.90	3.10	2.70	3.25	2 60	3.25	2.30	2.60
S. B. & M	2.70	3.00	2.90	3.90	3 00	3.20	2.60	3.15
Sierra Nevada	3.70	4.00	3.40	3.85	2.45	3.80	2.65	3.45
Silver Hill	.45	.55	.40	.45	....	....	.35	.50
Silver King	1.05	1.10	....	1.05	....	....	....	....
Scorpion	.60	.65	....	.60	.55	.60	.50	.55
St. Louis	....	....	....	.50	....	.50	.40	.50
Syndicate	....	....	.10	....	....	....	....	....
Union Con	4.50	5¼	4.05	4.60	4.50	5¼	3.30	4.45
Utah	1.30	1.5	1 30	1 50	1.30	1.40	1.70	1.30
Yellow Jacket	3.30	4.15	3.90	4.70	4.25	4.45	3.80	4.65
....	....	....	....	....	....	....	....	....

Sales at San Francisco Stock Exchange.

THURSDAY, May 16, 9:30 A. M.

200	Hale & Nor		4.15
150	Justice		1.00
350	Mexican		3.60
50	Nev. Queen		1.40
200	New York		15c
100	N. Commonwealth		1.40
250	Occident		1.60
100	Overman		1.30
240	Ophir		4 45
325	Potosi		2.30
100	Savage		2.55
100	S. B. & M		2.85
150	Sierra Nevada		2.80
350	Union		3.65
200	Weldon		15c
100	Andes	65c	
420	Belcher	3.95	
100	Belle Isle	30c	
100	Bodie	1.55	
150	Bullion	85	
150	Caledonia	25c	
100	Chollar	2.30	
350	Crown Point	3.65	
250	Con Va & Cal	7.75	
100	Diana	20c	
50	E. S. Nevada	25c	
100	Exchequer	80c	
450	Gould & Curry	2.40	

BEEF TRUST.—At a meeting of the representatives of the American Meat Co. and the American Cattle trust held in New York on the 18th, a contract for a term of years was signed by the controlling powers of the two organizations by which the meat company will handle the entire product of the cattle trust. Senator Dorsey said that the two organizations had not been consolidated, adding: "We have effected a traffic agreement, which practically makes the American Meat Co. the agent of the American Cattle trust."

PROMPT AND RELIABLE. — From the manner Knupp & Anderson, searchers of records at Visalia, Tulare county, recently executed an order from this office, we can give them credit as above. They are also well-known real estate, loan, and insurance agents at the Government seat of their large and improving county, the firm business having been established in 1877.

Our Agents.

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A. F. JEWETT—Tulare Co.
F. B. LOGAN—Southern California.
H. G. PARSONS—Southern California.
GEO WILSON—Sacramento Co.
J. C. HOAG—San Francisco.
CHAS F. BLACKBURN—Idaho.
FRANK S. CHAPIN—Colusa Co.
MRS. E. J. SEPHERS—Sierra Co.
R. G. HUSTON—Montana.
E. H. SCHAEFFLE—Calaveras and Tuolumne Cos.
WM. WILKINSON—Amador and San Joaquin Cos.
CHAS. DUGAN—Stanislaus Co.
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Table of Contents:

reface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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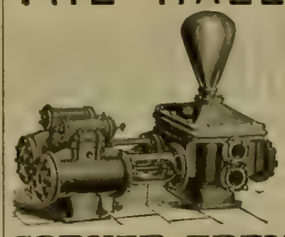

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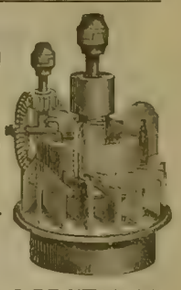

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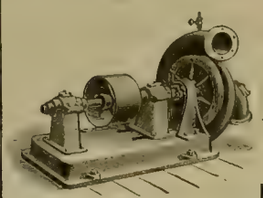

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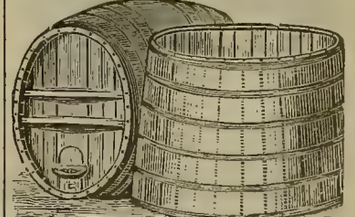

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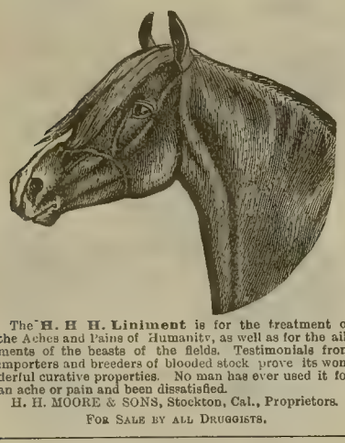

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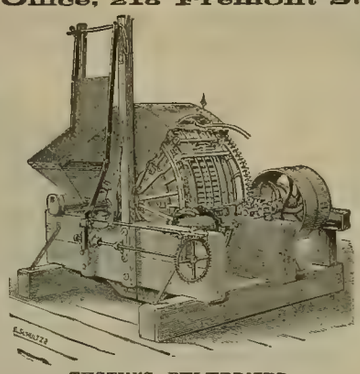

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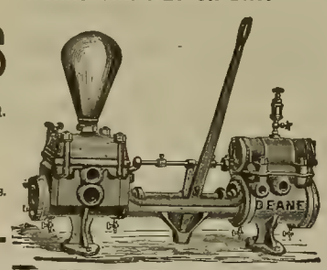

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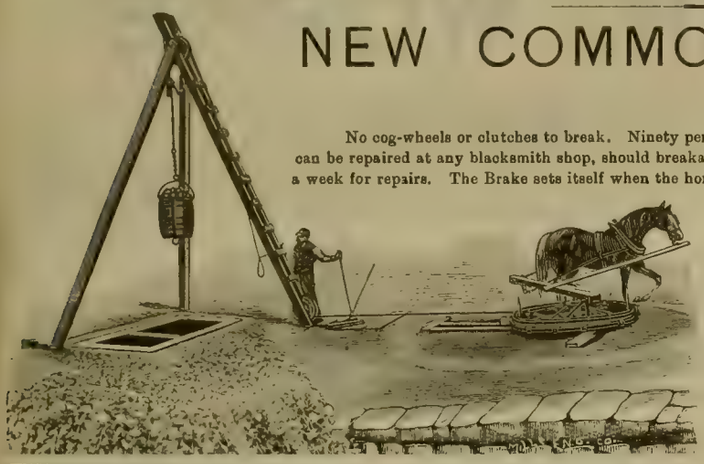

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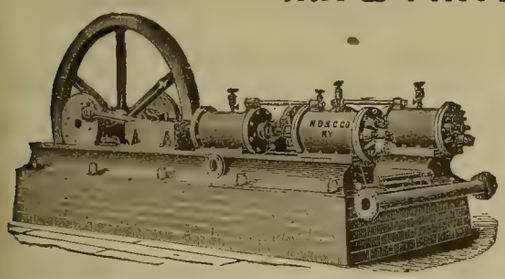

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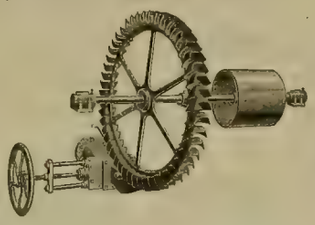

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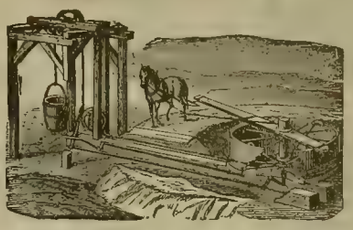

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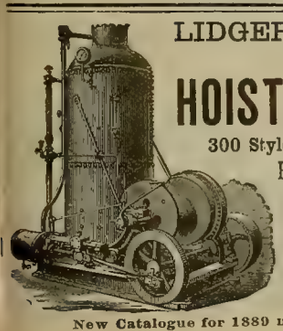

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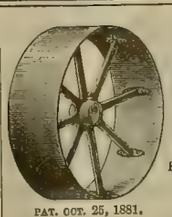

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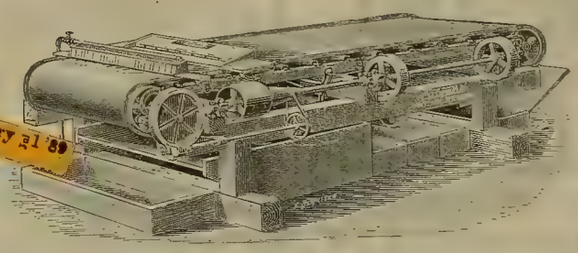

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DEAR SIRS:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

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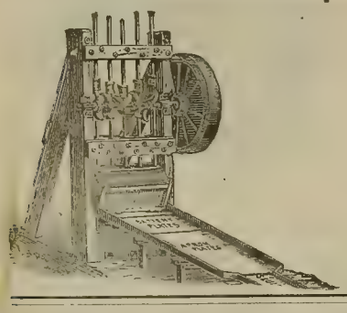

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An Illustrated Journal of Mining, Popular Science and General News.

TWENTY-PAGE EDITION.

VOL. LVIII.—Number 22.
DEWEY & CO., PUBLISHERS.

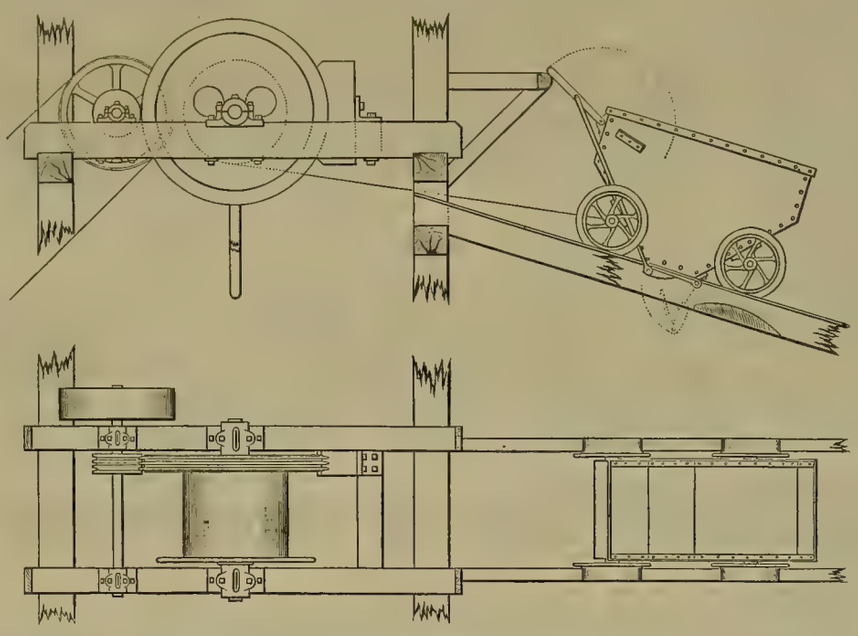
SAN FRANCISCO, SATURDAY, JUNE 1, 1889.

Three Dollars per Annum
Single Copies, 10 Cts.

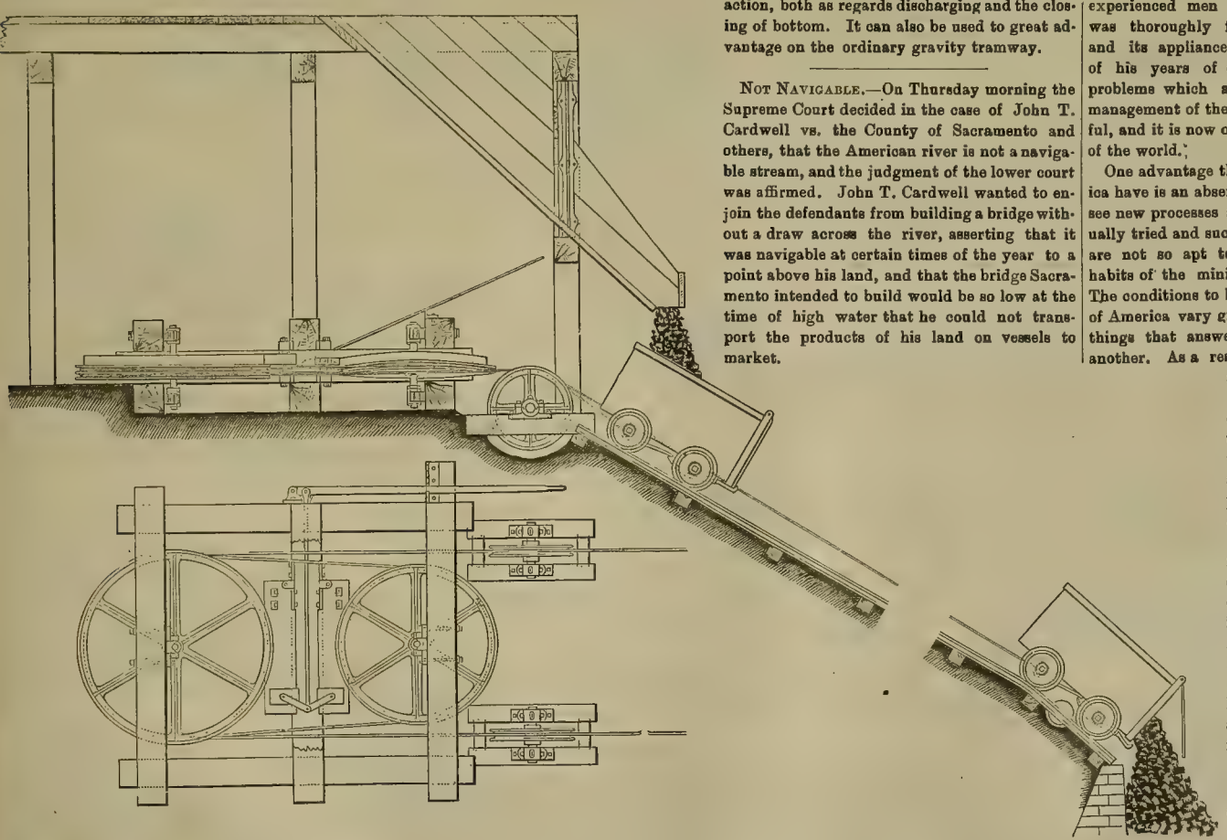
Incline Gravity Tramways.

In the last few numbers of the PRESS we have given several articles on mine tramways, arrangement of tracks, etc. On this page we give engravings of an incline gravity tramway and a hoisting tramway, as designed and built by the Fulton Iron Works of this city. The gravity tramway figured is the form most generally used for lowering ore from the upper levels of a mine to the mill when situated below. Two cars are operated; the loaded car going down draws the empty one up. A three-rail track is laid with switch in the middle to enable cars to pass. This tramway has an additional sheave to prevent slipping of rope, which is liable to occur in cold or frosty weather. Each sheave has a brake-wheel cast to it, both of which are brought into action by the same lever.

The other cut shows a hoisting tramway with Behr's self-dumping car, which can be used either for hoisting tailings to the mill should it be desirable to treat them again, or for bringing ore from the lower tunnels. Power can be delivered either by belt from any convenient shaft in mill, or, should the distance be too great, by wire rope. The small friction shaft runs constantly, the large friction or drum shaft being thrown in or out of gear by means of eccentric-box and lever. The same movement which throws friction out of gear also throws it against the brake-shoe for lowering. The car shown in cut is entirely automatic in its action, both as regards discharging and the closing of bottom. It can also be used to great advantage on the ordinary gravity tramway.



HOISTING TRAMWAY WITH BEHR'S SELF-DUMPING CAR.



INCLINE GRAVITY TRAMWAY BUILT BY FULTON IRON WORKS.

NOT NAVIGABLE.—On Thursday morning the Supreme Court decided in the case of John T. Cardwell vs. the County of Sacramento and others, that the American river is not a navigable stream, and the judgment of the lower court was affirmed. John T. Cardwell wanted to enjoin the defendants from building a bridge without a draw across the river, asserting that it was navigable at certain times of the year to a point above his land, and that the bridge Sacramento intended to build would be so low at the time of high water that he could not transport the products of his land on vessels to market.

American Miners.

U. S. Consul Griffin at Sydney, in the course of a report to the State Department, says there has been a decline of the gold product of all the colonies except Victoria, and even there the increase is very slight. It seems that as mining speculation in shares has increased the mine products have decreased, but the same thing has been noted here and elsewhere. Mr. Griffin calls attention to the extraordinary developments in the Broken Hill silver mines, where Mr. Patton, formerly of the Comstock, is in charge. The Consul says modern American processes are wanted in Australia, and that the handsome profit realized at Broken Hill is the result of the help of American experts.

The Australians are pretty good gold miners, but have not had so much experience in silver mining. They did a wise thing when they imported Mr. Patton from the Comstock, who took other experienced men with him. This gentleman was thoroughly familiar with silver mining and its appliances, and brought the result of his years of experience to bear on the problems which arose at Broken Hill. His management of the mine has been very successful, and it is now one of the noted silver mines of the world.

One advantage that the mining-men of America have is an absence of conservatism. They see new processes and appliances being continually tried and successfully introduced. They are not so apt to stick to old systems and habits of the mining-men of other countries. The conditions to be met in the mining regions of America vary greatly with the locality, and things that answer at one mine do not at another. As a result, system, processes, and appliances vary greatly.

Our American mining machinery is now sent all over the world, or is copied elsewhere. The mining appliances are ingenious and simple and adapted to meet most conditions.

Experienced mining-men from this country are now employed in managing large enterprises in South America, Mexico, Central America, Australia and Africa. They have been chosen by reason of their peculiar practical knowledge and experience, and have been very successful.

THE ore yield of the Comstock lode the current month will not fall short of 30,000 tons.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Rebel Creek District.

EDITORS PRESS:—A few weeks ago an article appeared in your paper regarding the mines in the Rebel Creek mining district, Humboldt county, Nevada.

The writer of that article has seen fit to deal more with fiction than in facts. It is the regret of all well-meaning men in the camp that such an article should appear. The actual facts as regards the mines, or rather the prospects of the Rebel Creek mining district, are these:

There is one good mine in this district which has paid from the "grass roots," viz., the Ohio mine. Your correspondent says the average of the shipping ore from this mine is 900 ounces. The gentleman is mistaken in this. A few choice lots have gone some considerable over that amount, but the *average* is some considerable less than 900 ounces, as stated by your veracious correspondent. Now as regards the 40-stamp mill and its proposed erection. This has been contemplated—upon paper. The execution of the plans has been from time to time postponed, and I am not aware that any immediate action will be taken upon them. It is estimated that this company has about 15,000 tons of milling ore upon the dumps. The Wild Deer mine is a fine and well-developed prospect, having all the indications of a good mine. There has been found in it small pockets of very rich ore, one pocket assaying over $20,000. A small amount of work will undoubtedly show up a very valuable piece of mining property. These are the only two claims to which the name of mine could be applied.

The property of the Boston Globe Company is in a state of development. Their mill is simply a prospecting one of small capacity.

The Gold Hill property, as described by your correspondent, exists only in the fertile brain of that writer. The entire property is simply a prospect. There is not over 100 tons of ore on the dump, and I doubt if $35 in gold would be its average value.

The so-called "Boone" property, *not mentioned* in the letter of your correspondent, is considered as fine a prospect as any in the camp at present. It is a mine in embryo.

The Penobscot, Moonlight, Bismarck and Black Jack are simply prospects more or less developed. The Penobscot is as promising, perhaps, as any of this group. There are many locations made here, some of them promising well at the surface, but the amount of work done on them is so small that they possess no commercial value at the present time.

Prospectors with capital would find it to their advantage to work here. The country as yet is simply scratched by the prospector's pick.

To judge from the present indications, this camp will soon awake from its "Rip Van Winkle sleep," and, no doubt, as your correspondent says, will be "one of the leading camps on the coast." CHAS. L. BRAMAN.

CHINESE MINERS IN LOWER CALIFORNIA.—Milton Santee of San Diego has returned home after having made an important deal with the Chinese Six Companies. Mr. Santee is vice-president and secretary of the Lower California Mining Company, of which Theophilus Masac of Los Angeles is president. Masac obtained the mining concessions from the Mexican Government three years ago. While here, Mr. Santee sold to the Chinese Six Companies a two-fifths interest in the company's mining properties for $80,000. The mines are located in the Real del Castello and include two old Mexican mines that have been worked successfully for many years. In the past, great difficulty has been experienced in obtaining workmen for the mines. The Indians and Mexicans on the peninsula prefer to prospect and pan for gold on their own account. An agent of the mining company came to San Francisco some months ago for the purpose of employing a large force of Chinamen to work in the mines. The Chinese Six Companies, however, would not consent to furnish laborers unless they had a voice in the conduct of affairs at the mines. More recently overtures were made the Chinese company, and, as a result, four wealthy Chinamen of this city visited Lower California last month to inspect the property. They were well pleased at the progress of the work at the Real, and when Mr. Santee arrived in this city he found no difficulty in completing the deal. The Chinese syndicate will send about 1000 coolies to the mines, where they will be employed in hydraulic mining. The Real del Castello mines are located about 60 miles north of the district where the recent Santa Clara bubble exploded. The property includes the most valuable mining claims on the peninsula.

NINETEEN KNOTS.—Irving M. Scott of the Union Iron Works says: "The Charleston is a fast boat, and without doubt will make 19 knots an hour. All the weak spots developed in the trial were weak in the specifications, and had been observed by us and brought to the notice of the Secretary of the Navy while the vessel was building. The corrections will soon be made, and as soon as her guns and carriages are at Mare island there can be no cause for delay in putting her into commission."

Nautical Mining Reports.

Yesterday at noon a nondescript of the Bohemian type entered the *Chronicle* office and asked for employment. His appearance and general make-up indicated the printer-journalist, far from the comforts of the old-fashioned farm-house and little red barn. He had evidently long since forgotten the liquid contents of the moss-covered bucket and use of the gourd by the spring. His orphan-like condition and trembling grip touched one of those responsive chords, like which all other Order links and ties are fragile imitations.

He stated that he was an all-round newspaper man; could write a variety of editorials without the aid of current exchanges, and looked with contempt upon any one who used works of reference; he had quotations and synonyms down pat. As an interviewer and an originator of fakes he had few peers, but was particularly strong on marine topics. He could discount associated and special telegraph services by underground and grapevine methods peculiarly his own—in fact, was an editor of the Greeley school and a reporter from the village where reporters were—to use his own expression—*nascitur non fit*. The mining editor was indisposed, and his chair was vacant for the day. The arrival of this invaluable general utility man was a godsend. Geology was with him a side-line amusement. He knew it all, from the Archæan period to the present sun-dried adobe. He would fill the void with some of the Spar's first grade, and no sorting or sampling required. The gentleman was engaged for the occasion, with the request that he furnish, if possible, two columns of reliable mining news that would pass rigid examination, without showing the trace of a dip to close a deal or bolster waning stock. He reports:

Chief among the properties on the contact which forms the outcrop of the ridge on the mountain south of Aspen's treasure vaults, is the None Such lode, discovered and located by Australian Jack in the fall of 1887. It is named after the gallant clipper ship on which Jack had sailed as second mate in the Australian trade. The approach to the main hatchway of the mine is reached by a zigzag path, worn smooth by a small herd of degenerate yet hardy animals of the Jerusalem strain, acclimated by missionaries in Mexico and trained to carry burdens in the same manner as the llamas of South America, only more so. The passage leading into the Silurian period of the mine is roughly yet comfortably lined with heavy lumber suitable for shipbuilding.

The miners number 80 and are divided into three watches, starboard, port and dog. The skipper is styled the superintendent, and the mates are bosses of the shifts. On going below into the forecastle, the first thing to strike the beholder is the tackle used in getting the ballast out of the hold. A huge iron cask, with the head stove in, is strapped to an inch and a half four-stranded cable, which is coiled by the donkey engine around a sheave-like substitute for a block and tackle arranged for inboard hoisting and lowering.

Into this cask your reporter stepped with the obliging Jack-of-the-Dust and went below. The descent was as easily accomplished as if done with a boatswain's chair, the only drawback being the bilgewater in the bottom of the cask.

On reaching the lower deck, the reporter witnessed a sight far surpassing in richness the famed wealth of the Peruvian Incas. Those who had been in charge of the batteries on the gun deck had just returned after the broadside, and were busily engaged in stowing chunks of sulphide, chloride, oxide and seaside rocks, rich in the metal used by silver-tongued orators for purchasing original packages that had passed the custom-house office. The bunkers were filled to the heads with large-sized ditty-bags containing finer specimens, ready to be wiped out on the spar deck.

An expert opinion, based on the geological formation of the lode, which has a lift to port sufficient to clear the scuppers, justifies the assertion that the owners will have a full cargo, outward bound, if they continue before the wind, keeping her course northeast by east, half east, along the blue lime-wall, heaving the lead and walking the gangue-plank until some lubber heaves in sight with more doubloons than doubts.

After a critical examination of the pumps, we were satisfied that there was no danger of springing aleak before the run was made. It may be well to remember parenthetically that a majority of mines are worked either by the run or old-fashioned blubber-hunter's lay, technically styled leasing.

A lease which expires on Sunday at eight bells, meridian, is liable to yield $25,000 a day until expiration of the last watch, when, *mirabile dictu*, instead of going below, they go aloft, furl sail, and Arab like, mount the long-eared steeds of scriptural fame.

All hands and the cook are now engaged in breaking cargo, and the grog-tub is doubled between watches to clear the hold before the mine-owners arrive at quarantine.—*Aspen Chronicle.*

THE WEST COMSTOCK.—The Virginia *Enterprise* says: To W. E. Sharon belongs the credit of the present agitation to explore the country west of the present known Comstock ledge. Over 18 months ago he urged the *Enterprise* reporter to advocate the scheme. A few days ago ground was broken on the 500 level of the Yellow Jacket, starting a drift westward intended to cross the black dyke, forming the so-called west footwall, and to explore a ledge whose croppings of gold-bearing rock lies about 2500 feet west of the Yellow Jacket shaft. It will tap the ledge at a depth of 1500 feet. Upon the present calculation of its dip, the drift will tap it at a distance of about 2000 feet. A more sensible move could not be made in that direction from any other point on the lode. The ledge is known to be there. They cannot miss its location by more than 100 feet. It is a gold-bearing ledge of rock in place, and a promising one. The Yellow Jacket is unaffected by Sutro tunnel complications, and the ground is their own to own, to hold and prospect. The entire community cannot help but feel kindly and "pull" for the success of the enterprise, as upon its results much future work depends, and the fate of the Comstock itself in a measure depends. The Yellow Jacket is now running the Brunswick mill, and the battery samples of its ore runs average $30 a ton.

The Ontario Mine.

The Development of a Utah Property.

One of the best-known mining properties in the United States, or in the world, for that matter, is the Ontario mine in Parley's Park, Utah, owned by Haggin, Tevis & Hearst of New York and San Francisco.

The Ontario was discovered on July 19, 1872, by a man named Herman Dudden. He, with his partners, did considerable work on the vein, which showed up so well that R. C. Chambers offered them $30,000 for it a few weeks later, and his offer was taken. Mr. Chambers was the representative of Messrs. Haggin, Tevis & Hearst. During the succeeding two years the life of the mine was not as bright as might be wished for. Nearly $200,000 was expended in development and other necessary expenses incidental to opening the mine, and their income only reached about $40,000 which came from the sale of the ore.

In January, 1874, a stock company was formed and operations were continued with rather more encouraging success. Two years later, in December, 1876, the company was reorganized with a capital stock of $10,000,000, divided into 100,000 shares of $100 each.

For nine months prior to this the company had leased two silver-mills near the mine and treated 16,000 tons of ore, which yielded $900,000, though the milling process employed only saved about 80 per cent of the assay value of the ore.

Previous to this a 40-stamp dry-crushing mill had been designed and was ready to drop its stamps in January, 1877. It cost $250,000. Additions made later increased its cost to $360,000.

In October, 1878, a fire destroyed large and costly buildings and machinery, the loss reaching $200,000. Forty days after this "incident" in the life of the Ontario the pumps were again in motion, and by the following January the hoisting works had been rebuilt and work proceeded as formerly.

The Ontario paid its first dividend of 50 cents per share in April, 1877, nearly five years after its discovery and a little over three years after the mine was first incorporated. The owners and the company had expended in purchase, development work, machinery, etc., and sustained in losses by fire about $1,500,000. Ore had been sold and milled which returned about $1,000,000.

Besides several extra dividends, a regular dividend of 50 cents a share has been paid ever since, excepting a period of eight months, but during that time nearly $500,000 was expended in new property. The total dividends to date reach the handsome figure of about $10,000,000.

The surface improvements on the Ontario are something which can only be appreciated by those who are familiar with them, while the underground workings are extensive indeed.

Water has been a source of trouble and expense in the Ontario ever since active work was commenced. A drain tunnel with a length of 5765 feet was completed in 1883. It cost $200,000. A hoist and pump was erected at a cost of $752,000 the same year. Two other smaller hoists and a large number of smaller necessary buildings swelled the expenses about $200,000 more. The total expenditure for surface improvements and the drain tunnel reaches nearly $3,000,000.

The total amount of cuttings in the Ontario exceeds 30 miles in lineal measure. The ore runs from $40 to $100 per ton. About 90 per cent is saved in the mills. The total cost of operating is about $30. The mine has produced over $23,000,000 in silver bullion, and is still in good condition, promising many years of successful output.

MONO COUNTY'S GLACIER.—The great glacier of the northern flank of Mount Lyell, in Mono county, near Lundy, has moved at least ten feet within a year. Last May they built two monuments of rocks five feet high, one being placed at the edge of the ice, the other at a distance of 15 feet. The upper monument has disappeared and the lower one is but five feet from the ice. Accurate measurements from several permanent points show conclusively that the glacial movement northward has been considerable all along the line—*Virginia Chronicle.*

No Discovery of the Lode.

Last week one of the most extensive mining contests ever begun in California, involving $40,000,000 and two of the largest companies that do business in the State, was initiated in Los Angeles by lawyer A. H. Ricketts of San Francisco, for the Waterloo Mining Co. of Milwaukee. Affidavits have been filed contesting John S. Doe's patent to the Oriental mine No. 2, in the Calico Mining district, San Bernardino county.

Emil A. Sanger, superintendent of the Waterloo, alleges that the Oriental patent is illegal because there was no discovery of a lode before the location of the claim. Many affidavits of old miners and engineers are filed setting forth that no vein was discovered before the location of the claim, and that no lode exists in the mine. Deputy United States Mineral Surveyor Smith says: "No regular vein in the Oriental was discovered, but the ore comes in streaks."

The Waterloo Co. avers that the only ledge in the Oriental is a streak of the Silver King lode, property of the Waterloo Co., and affidavits to this effect were filed by Deputy United States Mineral Surveyor Malcolm C. King, by John J. Allison, a miner, who originally located the Oriental claim, and by Daniel F. Edwards, Charles A. Hamilton, William K. Aldersley, William H. Hardy, W. P. McCullough, A. B. Garnett, and many other miners and engineers who are familiar with the mines.

A suit for $50,000 has also been begun by the Waterloo Co. for silver ore alleged to have been taken from the dip of the Silver Plume mine. The suit really involves the larger part of the Waterloo Co.'s property, for its mine is above the Oriental claim, and is said to be the only valuable lode in that mine.

The North Star Mine.

James D. Hague, President of the North Star Gold Mining Co., reports that the gross product of the mine for the first quarter of 1889 was $73,563.16. The 10 new stamps are dropping on tribute ore principally, while the original 30 stamps are kept busy with company ore. The total gross product of the mine since it was reopened, a little over four years ago, is 42,267 tons of ore, yielding $818,884 57—an average of $19.50 per ton. It is estimated that the total working expenses do not exceed $11 per ton.

The company has a surplus in the treasury of about $70,000, and it is understood that a permanent surplus of $50,000 is to be maintained.

Mr. Hague informs the *Engineering and Mining Journal* of New York that he has devised a system of mine book-keeping which is immeasurably superior in every respect to the orthodox system.

The new hoisting reels are operating smoothly. They have capacity for raising ore from a depth of 3500 feet on the incline, now down 1900 feet.

The following resume of the work done during 1888, and the result, is furnished for publication:

Ore raised	17,420 tons
Ore milled	17,269 "
Realized value of product	$334,120 85
Average yield per ton	19 33
All expenses (less sundry credits) for materials sold, tribute, ores milled, etc.	194,803 14
Cost per ton raised	11 18
Net profit in operation	139,317 71
Not including about $3000 for unsold sulphurets of 1888, making total profits, say	142,000 00
Dividends for 1888	140,925 00

A GREAT MINING TUNNEL.—A correspondent of the San Diego *Sun* writing from Iquiqui, Chili, says: In my last letter I mentioned the greatest mining enterprise in the world, a tunnel from Iquiqui to Hantagia. It will be about 8 miles long, 14 feet wide and 20 feet high. Before a distance of 200 meters is run it will have a depth of 400 meters, and at the end it will cut the lode of the Desculadoca mine at a depth of some 1000 meters. It will cut about 80 lodes. This great undertaking will require five or six years for its completion. I am of the opinion that they won't run one-quarter of the entire distance before they will be able to take out more than enough metal to pay expenses. The scheme was conceived by Colonel Harris, a pioneer, and one in every way qualified to put it through successfully. I hope soon to be able to tell you that this great work has been commenced.

MEXICAN MINING LAWS.—The Mexican Mining law provides that the original locator shall have his choice as to ground. It also provides that the possession shaft 18 feet deep, with a tunnel at the bottom 18 feet in length along the vein, shall give the mine its course, the owner having the right to say in which direction from that shaft his ground shall extend. This bars out would-be jumpers, for if the spurs or float rock denounced by them falls within the limits of the boundary lines of the mines, the jumper loses all that he has paid for locating on his spur.

THE mica mines in the Potlatch country, 20 miles by wagon-road from Julietta, were sold last fall to an English syndicate for $100,000, and a large force is now at work developing, 10 men having been employed there throughout the past winter. Good placer ground can be found throughout the entire length of the upper Potlatch. This is the southern extremity of the Cœur d'Alene mineral belt.

Meteors, Comets and Fire-Balls.

[Written for the PRESS by FREMONT WOOD.]

The new year beginning as it did with one of the most striking natural phenomena of the heavens, has had a tendency to create, even in the minds of the most unscientific, a languid interest in the myriad constellations that nightly stud the firmament. In the young, particularly those who never beheld an eclipse before, a strong propensity to star-gaze has been developed. The simple occupation of gazing at the sky of a clear night, when the stars are shining brightly, has assumed a new interest. On such a night the patient watcher is sure to be rewarded by the sight of one or more luminous objects in rapid motion among the constellations. The most casual observer cannot but have had, at some time or other, his attention enlisted and his admiration created by the brilliancy and splendor of these falling luminaries as they sweep across the sky.

Those who have pursued their observation with any diligence will have noted that these "falling" or "shooting" stars, as they are commonly called, are visible on every clear evening. They present many attractive features in their movements, and exhibit a variety of speed, form and brilliancy. Occasionally one will descend toward the horizon in a vertical path, and others again obliquely. Some sweep through space with almost horizontal courses, and now and then one will move apparently upward in the sky. Some dart along in rapid, transient courses, like a flashing ray of light; others may remain visible for several seconds, their movements being comparatively slow and majestic. Some will leave a trail of phosphoric streaks, allowing their paths to be conveniently traced; and there are those on the other hand which retain a star-like form as they speed along, devoid of train or spark.

As irregular and complicated as their movements may appear to the uninitiated, careful observation proves them to be following natural laws as capable of being reduced to harmony as those which pervade the solar system. They all diverge from certain definite points in the sky, converging, like the spokes of a wheel, upon a common center. The same may be said of those allied phenomena, comets, meteors and fire-balls.

Humboldt, it is said, witnessed a great fall of meteors on the night of November 11, 1799, and also a splendid recurrence of the phenomenon on the 13th of November, 1833. Careful observation of their courses proved that a large majority of the meteors had a common point of departure in the constellation Leo. The speculation as to thirty-three-year recurrence of the phenomenon was further proven by another brilliant display of meteors on the night of Nov. 13, 1866. A considerable number of these objects have also been observed to depart from Perseus regularly every St. Lawrence's Day, from which fact they were called "St. Lawrence's Tears." Other meteor showers have been systematically observed and their directions recorded, so that they have finally come to be designated after the constellations from which they emanated.

Our first illustration shows the appearance of a remarkable meteor observed on the night of the 12th of February, 1875, near Des Moines, Iowa. It was about the size of the full moon. It moved earthward a brilliant globe of fire, throwing a bright light over the landscape and greatly terrifying the populace.

On the 20th day of July, 1860, a very singular meteor was seen at New York, stretching horizontally across the sky, composed of several fiery spots with scintillous sun-like rays, and the usual trail marking its course.

Still another remarkably formed meteor was observed on the 27th of November, 1877, the general appearance of which is shown in our third cut. An irregularly formed molten mass, it moved through the air leaving a trail of bright particles which clearly defined its course. These trails occasionally remain for some little time clearly traced on the night sky and assuming singular forms. In our fourth drawing we show two effects of this kind, left by the meteor of October 19, 1877.

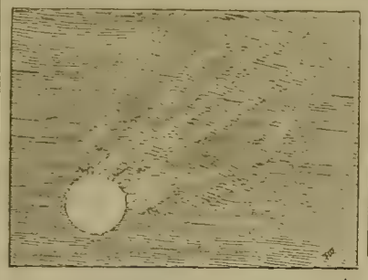
Prior to 1833, but little was known of these singular phenomena. The ideas prevailing as to their origin, etc., were most crude. They were generally supposed to be purely atmospheric apparitions hardly worthy of consideration. There was a prevalent theory that they originated in phosphoric fluids, emanating from the earth, which, when reaching the higher regions, took fire at the head from decomposition and burned rapidly backward along the column of fluid until reaching the moisture-laden current which surrounds the earth, when it was extinguished. Still another theory, which was received with considerable credence, was that meteors were simply ejections of burning masses from the moon's volcanoes, drawn toward the earth's surface when, perchance, they entered the sphere of her attraction. Later research has exploded all this, however, and proven beyond a doubt that they are of celestial origin, revolving around the sun in certain well-defined orbits.

Prof. Olmsted, after a careful study of the subject, arrived at the very reasonable hypothesis that meteors are combustible bodies constructed of light and transparent materials, which, when massed together, form a body bearing a strong analogy to the comet. What is called a meteor shower, some very remarkable instances of which were observed off Sandy Hook Nov. 14, 1867, and also in the Arctic regions, is caused by a comet which happens at the time to be pursuing its path along with the earth around their common center of attraction, the sun. Their luminous appearance is accounted for by the fact that when the two orbits (that of the meteor and the earth) intersect, and the meteor enters the earth's atmosphere, a concussion results sufficiently great to ignite the combustible material of the meteor. They are most always consumed by their own fires before reaching the earth, yet masses of stone, iron and other substances have been known to fall from them to the earth and bury themselves deeply therein. A fine specimen of this kind, called a meteorolite and seen to fall in Arizona, if we remember aright, is now on exhibition at Pioneer hall, this city.

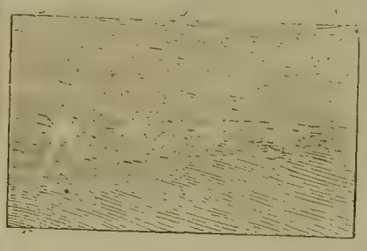
Prof. Kirkwood estimates that during the transit of the comet of 1872, when we had a notable meteor shower, the earth was immersed in the rear of the nucleus some 290,000,000 of miles. "It is evident, therefore," says Prof. Denning, "that if at a point so distant from the real body of the comet the particles are so thickly strewn as to present showers of considerable intensity, we might expect, in the event of the earth's collision with the actual nucleus of a comet, a meteoric display or illumination far beyond the experience of anything recorded in our annals. The heavens would be alive with the swarming and seething of a vast host of falling stars, chasing each other in densely packed ranks, and exhibiting a parallelism of motion most beautiful to behold. Fire-balls of great size and rare brilliancy would be mingled with a thick rain of meteoric dust, suffusing the whole sky."

As appalling as the sight might be, yet no fear need be felt for the earth's safety in such an encounter. The comet would certainly get the worst of it. As fast as the fiery particles descended they would be destroyed by combustion before reaching the earth, the atmosphere acting as an impenetrable shield against such celestial bombardment.

On a morning in June, 1881, the writer had the pleasure of viewing from Mt. Diablo the splendid comet at that time adorning the eastern heavens. At about half-past two o'clock, cold and spiritless as the morning



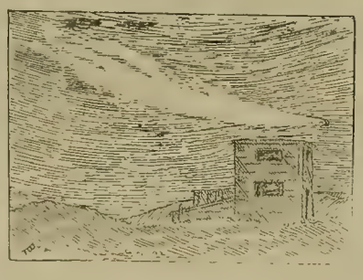
Meteor of Feb. 12th, 1875, seen near Des Moines, Iowa.



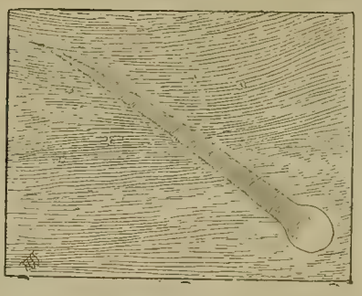
Meteor of July 20, 1860, seen near New York.

Meteor of November 27, 1877.

Two varieties of a luminous trail left by a meteor.



The comet of June, 1881, as seen from Mt. Diablo.



Fire-ball of October 7, 1867.

TYPES OF METEORS, COMETS AND FIRE-BALLS.

course elevation 65 miles above the earth's surface. The velocity of a similar number of meteors, he found, averaged per second 34½ miles. From careful observations it has been ascertained that of 20 shooting stars of the ordinary class, their weight varied between 30 grains and 7½ pounds. They are conspicuous more for their light than size.

A fire-ball is, properly, a meteor. It gains its name from resembling a ball of fire as it passes rapidly through space. It is distinguished from the shooting star by its greater apparent size. A fire-ball observed on Nov. 23, 1877, was estimated to have an apparent diameter of half a mile, but accuracy in such estimate is very difficult, because it is very hard, particularly in brilliant meteors, to determine angular diameter from the effects of glare.

In our closing illustration we give the appearance of a fire-ball seen on the night of Oct. 7, 1867.

itself, we mounted our saddle horses that were waiting before the hotel and started up the steep ascent. The fog drifted in the valleys below us, the wind blew cold and bleak from the snowbanks on the distant Sierras, and even the stars seemed to shine coldly down from the cerulean dome of heaven. The goal attained, we dismounted, and there on the very pinnacle of old Diablo, far above the slumbering world that seemed annihilated from all time and space, we stood amazed, enraptured. We had often read of comets and seen pictures of them, but now the actual phenomenon in all its startling sublimity sailed before us. To the right shone the principal planets of the constellation Aries—Venus, Jupiter, Saturn and Mars. The old moon was very near Jupiter, and all were paling in the gradually increasing light of coming day. We stood for some time deeply impressed with the wonders of the heavens, those beautiful lines of the poet forcibly recalled to mind:

"The very law that molds a tear,
And bids it trickle from its source,
That law preserves this earth a sphere,
And guides the planets in their course."

As regards the hights of shooting stars, we may take the results of Prof. Herschel's observations. Out of a record of 66 which fell during 1863–71, he determined the average hight as 75 miles at first appearance and 53 miles at disappearance, which gave the mid-

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ROLLING LIQUID METAL.—One of the most interesting and successful inventions of the day in a rolling-mill for producing sheet metal direct from the molten state, instead of rolling it from a billet or bar. Such a machine has been steadily at work for several months at the great can factory of Messrs. Norton Bros. at Maywood, near Chicago. They use it for making steel solder, six or eight inches wide, and 15 1000 of an inch thick, which the mill produces at the rate of 400 feet per minute. The apparatus is provided with hollow rolls having cold water running through them. The water is introduced through the axles, and the rolls are of sufficient size to instantly change the jet of melted metal into solid form as fast as it is fed. The powerful compression exerted by rolls upon the molten metal in forcing it between their two surfaces, and at the same time changing it to a solid body, tends to give to the sheet an even and highly finished surface. The inventors of the machine see no reason why the principle should not be successfully applied to the rolling of Bessemer steel, as well as of the softer metals. With a view to looking into the merits of the invention, Mr. O. W. Potter and other officers of the North Chicago Rolling Mill Company recently visited the Norton Brothers' plant and expressed themselves as being very favorably impressed with the present work and ultimate outcome of this rolling-mill. To accomplish the rolling of the metal direct from the liquid state, many inventors have tried in vain, but not until recently has the attempt been followed by anything like success.

CELLULAR CLOTHING.—The new cellular clothing now coming into use in England is said to be a success. It is woven out of the same materials as the common weaves of cloth, being simply, as its name indicates, closely woven into cells, the network of which is covered over with a thin fluff. Its porous quality allows the slow passing of the outside and inside air, giving time for the outside air to become of the same temperature as the body, obviating all danger of catching colds and allowing vapors constantly exhaled by the body to pass off, thus contributing toward health and cleanliness. The common objection to cotton clothing—that it is productive of chills and colds—is removed, if woven in this manner, and the invention can certainly be said to be strictly in accordance with hygienic and scientific principles.

CON. CAL. AND VA. STATISTICS.—Since the ore discovery in Con. California and Virginia mine in October, 1886, that mine has yielded 364,800 tons of ore. The space left in extracting that amount of ore was nearly 7,000,000 cubic feet. The total bullion yield of the above ore was about $10,000,000, of which nearly $3,000,000 has been disbursed to shareholders in dividends and $1,500,000 in salaries and wages to employes. The Virginia and Truckee railroad received above $300,000 for transporting the above ore to the Carson river mills, and the mill-owners $2,553,600 for crushing it. The Con. Cal. and Va. Mining Company has been paying an interest of 75 per cent in dividends annually on the quoted value of that stock the past eight months.

PAPER FROM SAWDUST.—An important experiment has been tried successfully at Ottawa, Ont. A mill has been established which makes paper pulp out of sawdust. It is now using the product of one mill. The paper made wholly from sawdust is said to form an admirable sheathing that is fit for building after being tarred and dried. A better quality of paper is made by using one-fourth waste paper. The plant cost $15,000, and consists of American machinery, with the exception of the grinders. The mill has a capacity for converting about 12,000 tons of sawdust into pulp annually.

THE great nitrate-fields of Chili are 12 to 40 miles inland from Iquiqui. That city exported 16,700,000 quintals of nitrate in 1888, and is second only in importance to Valparaiso among the cities of the southern coast. The export duty on nitrate brings about $100,000 a month to the custom-house, something enormous to be sure. Every one who has anything to do with nitrate gets rich. It is as good a field for investment as United States bonds, and pays a larger interest.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NEW DISCOVERY.—*Amador Ledger*, May 25: S. D. R. Stewart, who has been operating the Lincoln ground for some time, has struck a hitherto undiscovered chute of ore of high grade. It is said to mill from $15 to $20 per ton. We have not heard the size of the ledge. It lies close to the surface, and, indeed, the conditions would not admit of its being followed more than about 150 feet deep, as the water in the Lincoln and Mahoney mines would effectually prevent operations below that depth, except at the expense of draining those mines. The roller quartz mill at Quartz Mountain is being moved to Volcano, probably to work the gold-bearing cement met with in the French company's claim. The partial suspension of work at the Bunker Hill will be but for a short time, as timbers for the mine are now on the road. The ten stamps of the South Spring Hill which were crushing the Talisman rock, are now crushing rock, with the other twenty, for the South Spring Hill mine. The Keystone received the first timbers for the season on Tuesday. This mine is progressing very favorably. It is now working as many men as it did before the lay-off some months ago. There is strong talk of an electric plant and the dropping of the 40 stamps pretty soon. The Talisman is now working only two men prospecting. The Gover is taking out good paying rock. They are running full force, and their reservoir is permanently repaired.

AMADOR GOLD MINE.—*Amador Dispatch*, May 23: Deeds were recorded on the 21st of this month, transferring the entire property of the Amador G. M. Co. to a new corporation known as "Amador Gold Mine, Limited." There will be no change in the management of the property. Mr. John L. Minear, the very efficient superintendent, will remain at the helm and push the property to the goal of "dividends" as fast as practical. The company owning the Amador mine are thoroughbred miners. They believe in developing a mine rather than picking out a few dollars here and there. The Zeile reduction works are being thoroughly overhauled. The ovens are being repaired and put in order so as to handle the products of the full 40 stamps of the mill, which will be started as soon as the repairing of the shaft is completed.

BENSON.—Mr. Benson of Calaveras county was in Jackson last Tuesday. He showed us a specimen of gravel taken from the claim which had large specks of gold plainly visible. The owners of this property have just reached the gravel bed by tunneling 800 feet, the face of the tunnel being between 175 and 200 feet from the surface, at which place the specimen was taken from. The claim is situated about eight miles below Mok. Hill, or four miles west of San Andreas, and employs five men. The owners are contemplating the proposition of erecting a mill and working by mill process.

DRYTOWN CON.—The Drytown people have their mine well under way; they are opening the Cosmopolitan. The shaft is 300 feet deep and was filled with water to the surface; about 100 feet of water has been taken out and the company expect to see the bottom by July 1st.

PLYMOUTH CON.—Everything looks well; a new level of fine ore has been opened up. The company will no doubt declare a dividend this month, as the yield for April and May more than pays up the old indebtedness and running expenses.

MAHONEY.—The Mahoney squabble is now settled. Some 2000 feet of pipe will be laid from the Amador Canal to the Mahoney mill, and we are informed by reliable people that the Mahoney will be started up in dead earnest this summer.

MCKENZIE.—The new engine and boiler purchased by Mr. McKenzie in San Francisco have arrived and are being put in position. The whole works will soon be running in full blast.

Butte.

MILLING ROCK.—Oroville *Register*, May 23: Wm. Schneider & Son of Oroville will soon start up the Webber & Chatty quartz-mill at Granite Basin. They have several hundred tons of good milling rock and believe that the mine will prove exceedingly profitable. Since coming into possession of this lode they have had several offers for it, but declined them all, as they fully believe the lode will prove a valuable piece of property.

Calaveras.

MOKELUMNE HILL.—Angels *Echo*, May 22: The mining outlook for Moklumne Hill is daily growing brighter. Placer mines in that locality that have in past years been operated on a small scale, are now falling into the hands of men of capital who intend developing them on a larger scale. The deep gravel deposits of that section are far from being worked out, and it is our opinion that the channel of the deep blue lead which courses through that section from north to south, if properly opened up along its course would afford work for the laboring man for many years, besides richly reward those who would develop claims along this famous lead. But little attention has been paid to quartz mining in that vicinity, but we feel confident that good lodes exist there, and at no distant day this fact will be proven beyond a peradventure.

Fresno.

TEMPERANCE FLAT.—*Republican*, May 25: Gold-mining has always been more or less extensively followed along the San Joaquin river, in this county. Continued washing and rewashing of the banks and bars seemed to exhaust the placer claims in the lower hills, and, owing to the almost inaccessible nature of the higher foothills and mountainous region, little attempt was made until lately to gather gold along the upper San Joaquin. During the past few years, however, rich diggings have been worked as high up the river as Temperance Flat, and at that point considerable mining is now being done. Doc Ball and Ed Baldenebro are now working a placer claim on the flat, from which they are taking $100 worth of gold per day. It is one of the best finds yet made, and is located about 500 feet below Jackson's mill. It is on the east side of the river; their gravel bed is nine feet in thickness and is all good pay dirt, richest, of course, near the bottom. In addition to the placer mining going on there are several very promising free gold quartz mines being opened up and worked. The Temperance mine, owned by Andrews & Whittaker, near the flat, is looking finely. An arastra is kept running on very high-grade ore, while a shaft, now down 75 feet, is being sunk deeper and a tunnel 125 feet long is being driven farther into the hill. The Little John mine, a new location by Albert Austin, promises to make a stir in mining circles at an early day, judging from the preliminary work of development. Mr. Austin has only been in the Temperance Flat district about a month, and he says that he has three other finds, either of which he considers equal to if not superior to the Little John claim.

Inyo.

MAXIM MILL.—*Index*, May 22: In company with the lessee, we visited the Maxim mill last Friday and found everything in first class order and working splendidly. The new Victor concentrator is a complete success. The machine runs smoothly and in construction and operation combines the best features of other concentrators with improvements, altogether its own. That it will save all that is in the rock after going through the battery is certain, and in this is all that can be asked. Repeated trials of the tailings below the concentrator failed to show a trace of metal of any kind. The lessee is now prepared to work custom ores of any grade, and owners are assured of getting all there is in it. The concentrates not infrequently contain most of the pay, and these can be shipped elsewhere for reduction and return handsome profits, when the gross ore would not bear the expense of transportation. The lessee is prepared to sample ores and purchase them on delivery.

NOTES.—Inyo *Independent*, May 24: Nothing is being done at the mill at Panamint. A few men are taking out ore in the neighborhood on their own account, but the Surprise Mining Co. are doing nothing. Mr. C. Anthony has several men at work over at Riley taking out ore. Fitzgerald & Gunn are getting out ore right along from the Minnietta and other mines at Lookout. They are also shipping ore steadily from the old dumps of those mines. The process of concentrating the ores from the dumps is quite successful; on an average seven tons from the dumps are reduced to one, and this pays well for labor and transportation. The process of reduction is on the same plan as the old rockers used by gold miners in early days. Four or five men are employed at the Lucky Jim mine, at Darwin. They are taking out ore right along. Mr. J. A. McKenzie, owner of the mine, is at San Francisco. Mr. J. Wilson has several tributers taking out ore in Lee District. Some of the ore is very rich, running up into the thousands of dollars per ton. The ore body lately found by Dunphy and O'Keefe at Cerro Gordo is developing the features of a bonanza. Appearances indicate that it may turn out as big an ore body as that found in the Union mine, of which this is an extension. If it should yield even a quarter of the product of the Union mine, it will make millionaires of its fortunate owners.

MARBLE.—The marble quarry is opening out better with every advance made. Mr. Luce writes as follows: "We are getting along slowly here, having been short-handed for a month or more. But we are opening one of the finest ledges that was ever uncovered. It is taking longer to get uncovered than we anticipated, but it will be all I ever expected it to be when it is opened. No limit to size, quantity and quality of blocks."

Mariposa.

COULTERVILLE.—Cor. Mariposa *Gazette*, May 23: Our mining interests are about as they have been for some time, but the future prospects are encouraging. The owners of the Tyora mine are expected to put in an appearance soon, as their time is nearly up when they agreed to come and commence work. At the Bondurant mine things are looking much better, as they have got through a large "horse" or dike, that cut the vein and gave them much trouble. They now have a fine large vein of splendid rock and the mill is running on good ore, and making money for the Co. There are a number of miners on Solomon's Gulch and its tributaries, hunting pockets in the numerous strata.

Napa.

COPPER.—*Register*, May 24: J. J. Walters of Pope valley came to town Friday with the news that a rich copper mine had been found near his home. The matter has not been investigated far enough to determine how great the deposit is nor how rich the ore is, but from appearances it is a great find. Mr. Walters will take steps to develop the mine. At present all that can be seen is a ledge of ore. A few months ago mining locations were filed upon by residents of Pope valley, which were apparently rich in copper. We are informed that Mr. Rhodes of the Ætna mines is interested in these copper mines and will develop them.

Nevada.

A PROMISING MINE.—Nevada *Transcript*, May 26: John Curry is engaged in running a 500-foot drain tunnel to connect with an 80-foot shaft which he sank two years ago at his quartz claim on Rush Creek. He has a splendid prospect in both shaft and tunnel, the main ledge being two feet thick and of good quality. Two years ago Mr. Curry took out about $3000, and previous to the time he owned it the claim was made to yield some $20,000 by groundsluicing. That has always been noted as a rich mining locality.

THE DERBEC.—The Derbec drift mine has never looked better than it does right now. Sup't Galavotti is one of the best managers anywhere, and all work under his supervision is done to the very best advantage. About 120 men are regularly employed in and about the mine.

MARYLAND.—Grass Valley *Union*, May 24: An old shaft on the Maryland ground has been pumped out and put in working shape, and some sinking that has been done shows a ledge three feet in width in the bottom, the quartz carrying free gold and good sulphurets.

Placer.

OPHIR.—*Placer Herald*, May 25: The mining outlook at Ophir is brighter than it has been for several years. Mr. Shurtleff expects to strike pay ore shortly. Charley Reed is taking out splendid rock in the St. Lawrence. Prospects at the Adams & Huntley mine are good. Major Hubbard expects to start work in the Gold Blossom next month. The Hathaway mine is paying well and the rock is richer than ever. Adams & Hartley are drifting in their Ophir mine. They are now debating upon the advisability of building a new mill. A man took out $52.50 from crevice diggings somewhere near Ophir, in one day last week. He won't tell where the find is. Two men whom he employed took out $6 from two pans of dirt.

IOWA HILL.—Colonel W. C. Rich of Iowa Hill called Tuesday. Times in that town are rather quiet, according to the Colonel. The mill at the Hohrman is not finished. The Morning Star company is running a tunnel to the background.

PIONEER.—The pioneer mine below Damascus is as good as ever. A great deal of work has been done in the way of opening this mine. The company is thinking of adding more stamps.

Shasta.

WESTERN SHASTA'S GOLD MINES.—*Courier*, May 25: We have been reliably informed and personally know some of the following facts in regard to that important locality around French Gulch. That Greenbaum & Levy of San Francisco are employing 80 men grading roads, building a mill and opening up their Grizzly Gulch mines. And in the one mostly developed an ore body of 4000 tons from the level up to the surface, is opened; this body has sampled $25 a ton in free gold, with two per cent sulphurets that assays as high as $6000 to the ton. After making such a success and enriching the county to the extent in proportion that all mines do, they also deserve praise for their good staying qualities. After expending $30,000 on a prospect six miles from Grizzly and the only success gained was the distribution of this amount, they bravely attacked those claims of Grizzly, which is proving to be a large group of paying mines. At the Highland another mill and road is being constructed to work the ore from this mine. A sale has been made of a one-third interest in the J. I. C. mine. Fox & Van Meter are the purchasers. It is said that the Wheeler group of Kline's Gulch is sold and one-third of the money is deposited. The Gladstone Co. are driving a tunnel 300 feet long into the ledge, and 100 feet deeper than the one working. When drifting along the ledge is done from this tunnel, average backs of 400 feet will be gained in the extensions east and west. The new tunnel is 70 feet deeper than winzes. Since their Paul battery started the mine paid well. There are dozens of prospects working all around this district, any of which are at any time liable to jump into prominence, for they look as well as those mentioned did at one time.

CELESTINE.—*Shasta Courier*, May 25: The Celestine mine works on Grizzly Gulch, above Whiskytown, are going on with energy, and the road from the mine to the mill is progressing rapidly. Also a force of men are engaged in putting a dam across Clear Creek to raise the water into a ditch that is being cut to convey water to the mill, to be erected at Oak Bottom, to work the ore from the mine mentioned above. Forty or 50 men are employed in this enterprise, and that looks like business

Sierra.

DRIFT.—*Mountain Messenger*, May 25: The tunnel at the Golden Giant drift mine, below the Winans ranch, is in over 800 feet, all run since last October. Gravel is overhead at no great hight, probably, in the opinion of the workmen. Ed H. Gale has been contractor for the tunnel. The channel for which the company is prospecting is supposed to be the Monte Cristo lead. All work has been suspended on the Wide Awake drift mine owing to an increase of water, so great that two pumps could not keep the diggings clear. Just what the owners will do is not yet decided. The Alaska company, Pike City, is expected to resume work within the next two months. It is said that the water can be readily removed. The quartz-mill at St. Charles hill is about ready to run. The owners of the Red Ledge mine, below Forest City, have decided to put in waterpower. The Wide Awake Mining Co. has decided to run a new and lower tunnel to the gravel, from which they were recently driven by water.

Sonoma.

MINERAL DISCOVERIES.—Santa Rosa *Republican*, May 23: A specimen of chrome-iron ore, taken from the surface on the lands of J. D. Cooper, about ten miles north of Fort Ross, near the Plantation House, indicates that there must be a valuable deposit of this mineral in that vicinity. The piece exhibited by Mr. Cooper, and picked up by him as a cropping, is almost pure mineral, no steel chisel or sledge-hammer producing any effect upon it. If, as is supposed, there is a ledge of this ore in that locality, it will, when developed, add largely to the mineral wealth, not only of the county, but of the State, as this mineral is not only valuable, but rare. In the same vicinity a considerable deposit of almost pure bitumen has also been found. Being but about three miles from the coast, these deposits may become the means of making that part of the county rich and valuable in the near future.

San Bernardino.

GOLD HILL.—Redlands *Citrograph*, May 22: A new mining find is reported by that veteran prospector, Barney Carter. It is on the border of Death valley, just over the line of Inyo county. He has associated Mr. Nowlin of Riverside with him and active work commences at once. Provisions and tools have been shipped out, and a gang of men will at once be set to work to develop the ledge. The average rock brought in assays $300 in gold. The district has been named Gold Hill.

Trinity.

KNOW-NOTHING MINES.—*Journal*, May 25: From Mr. Hansen, who returned from Know-Nothing Creek last week, we gather the following items: The Gold Run mine, superintended by A. Dannenbrink, has a ledge of first-class ore, on which a four-stamp mill is being run day and night. The ore averages over $100 per ton. The company contemplates digging a new ditch by which to obtain water to run the mill during the entire summer. About 20 men are employed at present, with a probability of more being employed in the near future. The Know-Nothing is looking very well and under the superintendency of P. P. Black, an experienced miner, the mine is paying to the satisfaction of the owners. Good ore is being put through day and night, and 12 to 15 men are employed. The Hansen has been started up again with R. Junkans as foreman. Mr. Hansen recently purchased of Mr. Loftus his one-third interest in this mine. If the mine develops according to present indications there will be considerable work done on it this summer. Haglin, Reilley & Dayton have built an arastra and are running the Wolverine mine; they have some good ore. A new discovery has been made on Methodist Creek by Mitchell, Bennett and Kennon that looks very flattering; the ledge is about two feet wide. A subscription has been started to raise money for the purpose of making a trail between New River and the Gold Run mine. The mine-owners of Know-Nothing Creek have subscribed liberally and it is thought that it will be a success.

WILL RESUME OPERATIONS.—O. P. Powers, formerly superintendent of the Cherokee mine in Butte county, passed through town this week on his way to Cox Bar to take charge of the Lower Trinity Tunnel Co.'s mining interests in that vicinity. Operations will be resumed as soon as the state of the river permits, and from all indications the company should have a favorable season.

NEVADA.

Washoe District.

LANZAC.—Virginia *Enterprise*, May 25: R. T. Brodek has six men at work developing the mine, and the result of his work is encouraging.

HALE & NORCROSS.—On the 400 level the stopes in the north drift from No. 1 west crosscut continue in good ore. Now working in the fifth set above the track floor from the south upraise. Have opened a station for the 300 level and have started a drift north, which advanced 20 feet. On the 500 level the north drift was advanced 17 feet and the northwest crosscut 25 feet. The stopes above this level continue in ore of good quality. On the 600 level are extracting the usual quantity and quality of ore from the several stopes. On the 700 level the new west crosscut was advanced 20 feet; total distance, 252 feet; the last 17 feet showing stringers of quartz which give some fair assays. The stopes from the south drift are yielding fair-grade ore. During the week have hoisted 1205 cars of ore, have shipped to Nevada mill 1050 tons and have milled 1040 tons. Average battery assay, $26.30 per ton. Have bullion on hand and previously shipped for this month amounting to $64,984.

SAVAGE.—On the 400-foot level the joint west crosscut was extended 24 feet. The face is in clay and quartz. From No. 1 and No. 2 west crosscuts are stoping ore of fair grade. Are also extracting ore from the old stopes in the north and south drifts. During the week have hoisted 578 tons of ore, have shipped to the Rock Point mill 439½ tons of ore and milled 490. Average battery assay $20.22 per ton. Have shipped $6312.09 in bullion since last report.

CONFIDENCE.—The joint Challenge and Confidence north drift on the 300 level is now in 183 feet, having been advanced 28 feet during the week. The face shows porphyry. The joint Challenge and Confidence raise from the 300 level has been connected with stopes on the 200 level. The joint Confidence and Challenge east drift on the 1250 level is in 35 feet, 15 feet having been added during the week. The face shows quartz and porphyry.

CROWN POINT.—Are opening the tenth floor, 400 south stope, and find the pay streak eight to ten feet wide. Have found some fair-grade ore at the north end of the old 400 north stopes, but it is impossible at present to tell its extent. Have shipped to the mill during the past week 850 tons of ore, the battery assay of which was $18 per ton.

SEG. BELCHER.—Started a raise from the west crosscut on the 15th instant, and are now up 30 feet. The west streak found in the crosscut has been passed through. It was 18 inches wide and assayed from $30 to $50 per ton, and are now raising vertically to reach the widest streak found in the crosscut, which they expect to strike in a few feet.

BALTIMORE.—In crosscutting from the south upraise have been cutting very good ore in the last few days, and still shows in the face. West crosscut on 225 level is in running ground, which makes slow progress. Good mineralized quartz is washed out from the face with soft material.

EXCHEQUER.—On the 382 level the west crosscut on the north line is out 149 feet; face in porphyry. The east crosscut on the north line is out 155 feet; face in clay and porphyry. The north lateral drift on the 500 level is out north of Alpha shaft 506 feet. The face is in clay and quartz.

CHOLLAR.—The south lateral drift, 750 level, is out 475 feet; the face in quartz giving low assays. The south lateral drift, 850 level, is out 307 feet; face in hard porphyry. The south lateral drift, 950 level, is out 628 feet; face in clay and quartz.

YELLOW JACKET.—Shipping over 100 tons of ore daily to the Brunswick mill, the pulp assays of which average $30 per ton. Prospecting work in the mine is going on vigorously.

BELCHER.—The raise from the 1100 west crosscut is up 37 feet on the slope, the top being in porphyry, with streaks of quartz through it assaying from $10 to $20 per ton.

ALPHA.—On the 500 level east crosscut, 50 feet south of Alpha shaft, is out 82 feet; face in porphyry. The east crosscut on the south line is out 126 feet; face in porphyry.

POTOSI.—North lateral drift, 750 level, is out 233 feet; the face is in clay and porphyry. The north lateral drift, 285 level, is out 284 feet; face in hard porphyry.

SILVER HILL.—The work of opening up the mine is pushed forward with vigor, but there is nothing new to report in the formation.

CHALLENGE CON.—All the work in this mine continues to be jointly with the Confidence, and is described in the letter from that mine.

NEW YORK.—West crosscut, 240 feet north of the shaft, 800 level, is out 200 feet; face in quartz.

OVERMAN.—Extracted 251 tons and 400 pounds of ore. Shipped to the Vivian mill 316 tons.

ALTA.—Mill running steadily. No new developments to report in the mine.

JUSTICE.—Mill running steadily and ore shipments keep up.

ANDES.—Drifting west on 350 level, and doing repair work.

BULLION.—Still drifting north in ledge on 760 level.

Cedar District.

LOOKING WELL.—*Silver State*, May 22: E. N. Clark of Cedar mining district, in the Antelope range, reports the Mohawk mine as looking remarkably well. It has been bonded or bought by Messrs. Sunderland & Barrington, who have a force of men employed in working the mine. They have about 200 tons of ore on the dump, much of which carries over 40 per cent lead, and is rich in silver. This ore will be shipped to Reno to be reduced.

Eureka District.

NEW CONTRACT.—Eureka *Sentinel*, May 25: The Ruby Hill tunnel is now in 1500 feet, and a new contract was let last Monday to run an additional 500 feet, at the completion of which the company are sanguine of getting through the hard belt and striking ore.

Jumbo District.

CHEAP ORE MILLING.—Virginia *Chronicle*, May 25: J. C. Dunlop, owner of the Wild Goose mine, who is erecting a five-stamp steam-mill at the mine, says he can mine and mill the ore from the Wild Goose at a total cost of $2 per ton. There is a vast amount of ore stripped in the mine assaying from $13 to $50 per ton in gold. Another rich streak, assaying over $1800 in gold per ton, was recently cut in following the vein, and the narrow streak struck assaying $32,000 in gold per ton shows no sign of pinching out.

Ploche District.

HALF MOON MINE.—*Record*, May 20: On Monday last the Yuba Mining and Reduction Co. concluded the purchase of the Half Moon, Columbia, Rainbow and War Eagle mining claims from T. J. McMahon. The properties are situated in the western part of this district, about three miles from town, and were bonded last January for six months. The amount paid was $14,000. Of the four claims, but one, the Half Moon, has been developed. On this mine two main tunnels and several side drifts have been run for over 500 feet, showing up the ledge in good shape, and a conservative estimate places the value of the ore now in sight at not less than $50,000. Some portions of the ledge can be mined and smelted without sorting, but the greater part of it is low-grade and will require the use of concentrators for its profitable reduction. These will be provided at the reduction works here now in course of construction. The hills in the vicinity of the Half Moon abound in mineral and the success attending the work of Mr. McMahon in this case will stimulate others to further work in the vicinity.

Tuscarora District.

NORTH BELLE ISLE.—Tuscarora *Times-Review*, May 24: North drift, 500-foot level, extended 12 feet. The face is in better ground and shows more favorable for ore.

NEVADA QUEEN.—The 350-foot crosscut has been advanced 10 feet; face is all in the vein and showing some good ore. Station has been cut out and winze sunk 6 feet. Will get to the ore at a depth of 12 feet and then follow it on the inclination. There is little or no change in the stopes. Two hundred and fifty tons concentrating ore have been sent to the works. Concentrator running much smoother since the new rolls were put in. A drift will now be started from 150-foot level of Commonwealth to follow the ore found on the line.

COMMONWEALTH.—225-foot level: No. 3 east crosscut has been extended 13 feet. 300-foot level: No. 1 south drift has been extended 3 feet, and 30 feet timbered; face is showing some fine ore. The stopes are looking well in all parts of the mine. Two hundred and forty-five tons of ore have been sent to the mill; average assay, $126 per ton. The mill has run without a stop, doing good work. Bullion shipped 22d instant, $20,148.36.

DEL MONTE.—Joint crosscut, east from the 225-foot station, extended 11 feet. North drift, same level, extended 29 feet. West crosscut from the end of the north drift, 100-foot level, is in 30 feet. East crosscut, same point, extended 10 feet. The face continues to show some high-grade ore.

NORTH COMMONWEALTH.—Joint crosscut, east from the 225-foot station, extended 11 feet. East crosscut from the end of the south drift, 100-foot level, extended 22 feet; total length, 39 feet. The face shows a good width of high-grade ore; no wall has yet been reached.

GRAND PRIZE.—400-foot level: West drift from the north crosscut extended 20 feet. Face of the west drift (old vein) advanced 19 feet. South drift extended 18 feet, and west crosscut from south drift 15 feet.

BELLE ISLE.—North drift from west crosscut, 250-foot level, extended 11 feet. North drift from west crosscut, 150-foot level, extended 8 feet, showing some improvement in the face.

NAVAJO.—Crosscut No. 3, west from the end of the south drift, 350-foot level, extended 10 feet. The face shows favorable for ore. South drift, same level, extended 7 feet.

Tybo District.

DIMMICK.—Eureka *Sentinel*, May 25: We learn that Eugene N. Robinson will return shortly with plenty of capital to develop the Dimmick mine. The property has a fine reputation and will doubtless make a big mine.

ARIZONA.

CATOCTIN.—Prescott *Courier*, May 23: Paul S. Johns, who is working the Catoctin mine, under lease, has sent in to Wm. N. Kelly, one of the owners, very rich silver ore from the bottom of the 150-foot winze. Ruby and native silver are to be seen all over the pieces. B. T. Riggs of the Hillside mine will go to Ross' station on the P. & A. C. railway in a day or two, and ship two carloads of rich ore. Timmerman's pack train arrived yesterday from Bradshaw district, with rich ore for Bond & Hayden. The Oro Bella mill was running when Mr. Timmerman left the district.

BRITISH COLUMBIA.

THE REVELSTOKE SMELTER.—Donald *Truth*, May 20: Now that the smelting syndicate has commenced operations in earnest at Revelstoke, a description of the plant may not be uninteresting. The main building will have a total length of 208 feet and a width of 36 feet, and in addition there will be an engine-room and sampling works. The engine for crushing and sampling is of 60-horse power and can crush 150 tons a day. This engine will also be used for hauling up ore from steamboats. There will also be another engine to run the two furnaces. The reverberatory furnace is 10 by 40 feet and the water-jacket smelter 30 by 72 inches, with a capacity of 90 tons every 24 hours. In the construction of the reverberatory furnace 80,000 bricks will be used. The smelter will be located on the banks of the Columbia, half a mile from Farwell and the same distance from the Revelstoke depot. The site has already been cleared, and men are now at work clearing the right-of-way for a half mile siding and will commence grading it at once. The bricks used in the furnace will be made on the west side of the Columbia, about a mile from Farwell.

PORCUPINE CREEK.—The Government has put the trail to Porcupine creek in first-class order, Mr. Cameron finishing up the job Thursday. He reports considerable snow out there yet, but that it is fast disappearing. A few men are on the ground, and more will follow Monday. Holland & Co. will start a boarding-house, intending to charge miners the reasonable rate of a dollar a day for board. The Discovery, the Elsie, and the Donald gold mining companies will all be at work by June 1st. The latter has both shallow and deep ground, and its stockholders will either have much money or all be dead broke in the fall.

COLORADO.

AROUND ASPEN.—Denver *Republican*, May 22: Sam Babbit, at present a resident of Aspen, but who is known as an old-time Colorado prospector, who for almost a score of years has made it his business to visit every new mining camp of any prominence, is in the city. The reporter asked the gentleman what he thought of the possibilities of the country directly tributary to Aspen. "In my opinion all that section is destined to become very productive of precious metals. The mines about Ashcroft have been almost abandoned since 1883, but there is a better day coming for them. Many of them are true fissures, and such claims as the Tam O'Shanter will be worked at a profit long after the present generation is forgotten." "What about the Aspen district?" asked the reporter. "While I claim to know something about mining, that is too hard a question for me to answer. To such a query it would take at least four competent, first-class mining engineers, who had made a careful study of all sections of the camp for months and up to the moment of replying, to answer it intelligently. It is the wonder of the world in a mining way, and every day it becomes more marvelous. Aspen is a district that has come to stay. I believe its mines to be as permanent as the fissures about Central City, and they will last for 50 years to come."

SYLVANITE.—Elk Mountain *Pilot*, May 23: The Chicago owners of the Sylvanite mine have employed V. F. Axtell to secure a statement of the indebtedness against the mine, created by W. S. Baker, who worked it as lessee. The amount is somewhere in the neighborhood of $17,000, we believe, which could be wiped out with one car of ore, if they would only go to work and take it out. This move looks very much as though the owners will take some steps to commence work again, for it is really a shame to allow so valuable property to remain idle.

COKE.—The G. C. & I. mine is still working on about half time. The coke ovens are running in full blast, with an active demand for coke. From seven to ten cars are shipped daily, besides from 15 to 20 cars per week is being stored for stock, to be used in the future, which is the custom every year at this season. The market for coal is very dull; the railroad, for some reason, is not taking as much as usual at this season.

DAKOTA.

PORTLAND MINING CO.—*Black Hills Pioneer*, May 22: The probabilities are strongly favorable toward the early erection of a plant, under the Newberry-Vautin process, for treating refractory ores, by the Portland M. Co., owning valuable property in Bald Mountain district. Fifty pounds of ore from the Trojan mine were tested under the process at Denver. The results showed that 85 per cent of the gold assay value and 92 per cent of the silver assay value had been saved. Subsequently to this the London *Financial News* published proceedings of an annual meeting of the parent company owning the Newberry-Vautin process, which has headquarters in London. Part of the proceedings was a report from Mr. Higginbottom, agent in Colorado for the company, which stated that he was then negotiating with a Dakota company for sale to it of the exclusive right to use the process in Dakota. A few days later a Scotch paper was received containing Mr. Higginbottom's report in full. This proved what we had before assumed to be true, viz., that the Dakota company referred to was the Portland company. Not over two weeks ago a gentleman of this city received from the general agent of the Newberry-Vautin Co. in Colorado a reply to a letter he had written, in which it was stated that as negotiations were already pending for a sale of the territory to a Black Hills company, he was unable to talk business at present. The letter closed by stating that one test of a small quantity of ore had been made and had proven satisfactory. A much larger shipment was expected shortly, and by results obtained from treating, negotiations would be determined. About the time this letter was received here the Portland shipped 20 tons of ore, ostensibly to Boston. The corporation is a strong one, financially, owns some of the best property in the country, and is amply able to expend one or two hundred thousand dollars, if necessary, in building reduction works.

LOWER CALIFORNIA.

DRY WASHERS AT ALAMO.—*Lower Californian*, May 23: The dry washers, the best and largest ones, take out over an ounce a day on an average, with from three to five men at work cleaning up the ground and getting it ready for the machine. The small and crude washers take out from $2 to $8 per day each. There are about 25 machines of all sorts at work, some of them of the crudest design and manufacture. The improved Freeman washer seems to give very good satisfaction. The ground is now getting dry enough to be worked to good advantage. It is cheaper to work the dirt in a dry washer than to haul it to water and wash it out in a rocker.

ALAMO QUARTZ.—The great interest in the strikes made in the Telemaco, Ulises, Lopez and Princesa mines continues. Besides the blowing up of Butler's stamp-mill this is the leading topic of conversation. The size of the veins, the great bodies of very rich quartz, the perfect formation of the veins, the fine foot and hanging-walls, all surprise the natives. These are not the only rich or big mines in the camp. The Visnaga at Santa Clara is turning out rich ore daily. The Centipede proves to be very rich and a large vein. The Maud S. shows very fine ore on the dump, and seems to improve with depth. The Scorpion grows better every day. Every foot of depth in these mines adds thousands of dollars to their value. The Grandisima, Jupiter, Buena Vista, San Vicente and Quinota are all turning out rich ore. These veins are not large, running from 16 inches to two feet in width, but the ore is good. The Elsinore, Encantada, Placer and other veins are showing up well. Heise, Bryant & Moore have closed a trade with Juan Moreno & Co. for the Minerva, Oro Fino and Aurora prospects. Continuous reports of blasts are heard on every side of camp day and night. Work is being done on 38 mines out of the 100 locations in the two camps. As the four months which the law gives to do the possession work draw to a close, all those who have anything in view in their locations, or whose rock prospects at all well, are hurrying up their work.

IDAHO.

BOTH GOLD AND SILVER.—*Statesman*, May 23: Mr. Joseph Voshay of Idaho City, one of the owners of the Washington mine, is here to contract for the transportation of the machinery for a ten-stamp mill for his mine from this city to the point near the mine where the mill is to be erected. The mine is located about nine miles northeast of Idaho City, in the immediate vicinity of the old Sub Rosa mine. The Washington lode was discovered several years ago, but only partial developments were made upon it until recently. At the time of discovery the surface croppings indicated a width of 65 feet between walls. At a depth of 250 feet the lode was narrowed slightly, where it now shows two quite distinct and separate veins, one of gold four feet wide, and the other of silver ore 30 inches wide. The vein of gold ore works up to $100 per ton, while the vein of silver ore shows, by careful and accurate assay, a value of 200 ounces per ton. The silver vein is well defined and lies in immediate contact with the foot-wall of the lode, while the gold vein is similarly situated with regard to the hanging-wall. This is a very meager description, but it will suffice to show the great value of the lode and the singular character of the veins within it. From the tunnel which pierces the lode at a depth from the surface of 250 feet, there is a shaft or "upraise" on the gold vein, which has been extended to the surface, showing the same character of rich gold ore all the way. This development brings in sight a large body of rich ore, more than sufficient to warrant the expense that is now being made in preparation for working the mine on a liberal scale. A force of 27 miners are now at work grading the site for the mill and in other work connected with the mine. Operations at first will be restricted to working the gold vein, though the batteries of the mill will be calculated for and adapted to the working of both gold and silver ores. The Washington is owned by Mr. Charles Balbach of Omaha, Nebraska, and Messrs. Joseph Voshay, W. J. Fox and J. C. Regan of Idaho City, Boise county, Idaho.

THE MINNIE MOORE.—Wood River *Times*, May 21: The Minnie Moore mine shipped over 600 tons of ore and concentrates last month. As about six tons of ore are required to make a ton of concentrates on an average, the shipments represent the extraction of about 3600 tons of mineral for the month, or over 100 tons per day. Our properties are evidently gradually climbing up to the rank of first-class mines. The Minnie Moore is reported as showing greater reserves of ore than ever.

CŒUR D'ALENE.—Wardner *News*, May 22: There are less idle men to-day in Cœur d'Alene than in any other portion of the United States containing the same population. This is easily accounted for. It is no place for idlers, and the ambitious and energetic man encounters no difficulty in providing a field for his labor, as it immediately presents itself to his view in as many and pleasing forms as his fancy can picture or desire. If he is a miner he feels at once at home, and in his mind determines that he has struck the best country on earth. Opportunities for employment and profitable work are noticeable on all sides.

EMMA AND LAST CHANCE.—As announced in last week's *News*, operations were resumed in the Emma and Last Chance concentrator on Monday morning. The whistle blew at 6 o'clock A. M., and the mill has been running steadily every day. Night work will commence as soon as the air connections are made, which are rapidly progressing in the mine, and after the first of next month the mill will be kept going perpetually.

MONTANA.

NEW CARBONATE CAMP.—Montana *Mining Review*, May 25: The mineral field in the neighborhood of Dearborn canyon up to within the past year had received but little attention from prospectors and mining men, but the recent discoveries of fine carbonate ores in that section have resulted in bringing it before the mining world in a very favorable light, and many prospectors and miners are now in the field pursuing the work of investigation. Development work will be vigorously continued, and the prospect now is that this portion of Montana's mineral field will soon rank second to none. Recent developments on the Sweetheart lode, on the north fork of the Dearborn river, have brought to light an immense body of fine hard carbonates and galena, a specimen of which was left at this office. The ledge is said to be from 75 to 100 feet wide, lying between granite and lime walls and cropping out for several hundred feet. The pay chute is next to the granite hanging-wall, and shows up on the surface for about 400 feet, and the surface developments prove it to be 30 feet wide across solid pay ore. The owners, Messrs. Willett & Burtch, after doing considerable preliminary work, have dropped a shaft down 20 feet, which they have well timbered with square sets and lagged. The shaft is now all in ore, and they have just got through the iron cap which overlies the pay at this point. There are several other fine properties in the canyon, which only await development by the lucky owners to prove their worth.

NEW MEXICO.

DEVELOPMENT WORK.—Silver City *Enterprise*, May 25: The Colchis mill is fast being put in shape for business. Zach Redding of Hanover has opened out a large body of zinc carbonates. Concentrates this week are being shipped from the Aztec mill. There are about 300 tons of them to be shipped. The Silver City National Bank this week shipped $4542 in bullion, and the First National, $2130. Four or five tons of ore was shipped from the Alhambra to El Paso this week which is worth about $1.50 per pound. The Alhambra produces richer ore, but that is not so bad for a shipment. Paul Curtis and T. N. Childers were in from the Old Man on Monday. They both have leases on the mine, and are taking out good ore. Curtis had one pocket of $1200 ore. They regard the strike in the Old Man as immense. All of the leasers are working in ore.

SALE OF A MINE.—*Southwest Sentinel*, May 21: Mr. Nat Bell of the firm of Bell & Stephens at Pinos Altos, was in town Monday concluding the sale of the American mine at Eureka to Mr. Downey, who has had the mine under bond and lease the past year, during which time the mine has always paid dividends. The price paid for the mine was $15,000. The Mountain View M. Co. recently organized at New Orleans and operating at Pinos Altos, are pushing the work of development upon their mine. The old shaft is being extended and a new one, designed to be the main shaft, is being sunk on the ledge 70 feet west of the former. The ore taken out in these workings, both as to quality and quantity, is quite satisfactory.

OREGON.

AT CRACKER CREEK.—Cor. Bedrock *Democrat*, May 20: The explorations on the Eureka and Excelsior mines during the past six months have developed those properties into as magnificent mines as can be found anywhere on the Pacific Coast, and their wealth and permanency have been sufficiently determined to justify the erection of a stamp-mill. Several acres of dense forest have been felled and removed in order to make place for the purpose of building a large 20-stamp mill.

QUARTZ.—The report was brought to the city that a wonderfully rich find of gold quartz was made a day or so ago back of the old slaughter-house in Robinsonville. The ore is said to be of the same character as that from the Berry mine and equally as rich, gold specimens being found all through the ledge. The owner of the new discovery is a man by the name of Johnson. The Berry mine is being worked by a force of nine miners, and the ore still continues extremely rich in gold. The ore is being worked by an arastra. Last week a cleanup of 40 pounds of amalgam was made. The Worley mine is proving a bonanza and is showing to be an extensive ore body. The placers of Travillion & Mann, near Robinsonville, are being worked this spring with very flattering results, notwithstanding that water is somewhat limited. The Bowman placers are being worked with great success and the output for the season's run will be considerable. All the mine-owners of the Robinsonville section are much encouraged by the favorable showing made by their properties under development work the past winter, and they feel confident that their district is the richest in the county.

UTAH.

A FRISCO MINE SALE.—Salt Lake *Tribune*, May 23: W. S. Martin came up from Frisco for the purpose of closing the deal by which he turns over the Fisherman and Stalwart mines in North Star district to the purchasers. He returns at once with J. W. Smith, who will superintend the property for the new company. It is proposed to put on eight or ten men to get in a good working shaft, and then a larger force of men will be put on. A whim and rope are being shipped to help expedite operations. This will make things more lively about Milford.

BLUEBELL DISTRICT.—John Williams and his associates were in the city yesterday looking after their mining interests and laying in supplies for the summer. They are interested in the mines in the Bluebell district at the south end of Rush valley and a few miles from the Salt Lake & Western railway. The Morgan, owned by Hughes & May, has 2½ feet of galena running 18 to 20 ounces silver and 56 per cent lead, and it is very pretty ore. A carload of it was received yesterday. The Black Hawk, owned by Williams & Ajax, has eight feet of galena that assays 21 ounces silver and 47 to 52 per cent lead. Three men take out about a carload per week, besides doing some deadwork.

WASHINGTON TERRITORY.

THE CONCONULLY MINES.—Ellensburgh *Capital*, May 16: Mr. L. D. Davis and Mr. Thomas Clohecy, experienced miners and gentlemen of the highest character, arrived in Ellensburgh on Tuesday from the Conconully mines, and inform the *Capital* that they are well pleased with the country and its prospects. They regard it as a country of merit, with great possibilities before it, but were surprised at the limited amount of development and the apparent lack of energy displayed by the miners and prospectors. Instead of going to work and shipping ore, they have permitted it to accumulate on the dumps unsorted and uncared for, whereas by shipping they could have realized working expenses and at the same time advertised the country. The transportation facilities have been equal to any new district, as the teams which have been engaged in transporting merchandise to the camps have generally returned without loads. A little more display of energy and more reasonable prices placed upon prospects, these gentlemen think, would have placed the whole district far in advance of its present condition. Less dependence upon outside capital and more dependence upon good solid muscle, will work wonders in the mines of Conconully.

MECHANICAL PROGRESS.

Discoverers of the Telegraph.

Credit to Whom it is Due.

EDITORS PRESS:—In your issue of May 11th, page 338, in article headed "A Delayed Invention," you have the following:

"In this narration it should not be forgotten that Prof. Morse did not discover the first principles of the telegraph; they were communicated to him by Dr. Charles T. Jackson of Boston, but Prof. Morse is entitled to the credit of reducing them to practical use."

Now, as a matter of full justice, as well as history, I feel it a duty to correct in part the above.

Dr. Charles T. Jackson of Boston stated in my presence that he and Prof. Morse were fellow-passengers on a steamer returning from Europe, and that Prof. Morse asked him if he did not think electricity could be used for conveying ideas by making marks representing words. Dr. Jackson said, "I answered, yes, for I took it in at a flash," and he further stated: "We had frequent conversations during the voyage on the subject, and it was understood that on our arrival a patent was to be applied for." Dr. Jackson, as he expressed himself, expected to be interested in the patent, as he claimed he gave the professor valuable information on the subject. Dr. Jackson did not care so much for the pecuniary loss, but he seriously felt the loss of not having the credit he considered his due. Taking Dr. Jackson's side of the question, judging from his earnest declarations, there is no question in my mind but to Dr. Jackson much credit should be accorded; still the first thought was the brilliant one, as bright as the lightning's flash in a thunder-storm. This stands paramount to all after-ideas or workings. Inventions are one thing, practical application another; but the first new thought of grand conceptions is what sends the chariot of progress onward. To Prof. Morse is unquestionably due the conception. He certainly made all ideas practical.

ALMARIN B. PAUL.

[We are perfectly aware of the above facts, having known Dr. Jackson personally, and talked with him fully in regard to the same.—EDS. PRESS.]

A Disturbance in Our Iron Industry.

The situation of the iron and steel market at the present time is curious. Both metals are advancing in Europe but declining in Pennsylvania, and this, too, notwithstanding there is a decided promise of an increased demand for iron in almost all branches of industry, and especially in the line of railroad iron. The situation is somewhat anomalous, especially to those not directly interested. One who evidently knows, says that the disturbing element consists in the cheap production of iron and steel at the new iron center in Birmingham, Alabama, and that it is difficult to see when it will stop or what will be the final outcome in relation to the Pennsylvania iron workers. We quote as follows:

At the bulk of the old furnaces in Pennsylvania a good profit is made with iron at $20. There is no loss when the price is $18, but when it falls below $17 the furnaces must blow out, or bankruptcy is inevitable. This is not the case with the new open-hearth furnaces, which can work closer; but still there is little money even for them when the price falls below $17. Now, at Birmingham they get their ore, their fuel and their flax so cheaply, it is said, that they can turn out pig iron at an average cost of $11 a ton, and can pay freight on it to New York to sell there at $15, so as to have a tidy profit. The receipts of Southern iron at New York have latterly been so large that the Thomas Iron Company of Pennsylvania has just felt bound to protect its customers, to whom it had sold iron on contract deliverable throughout the summer months at $18, by reducing the price to $16.50. This, it is thought, will close most of the furnaces in the Lehigh region.

The Pennsylvania iron-makers affect to believe that the cut will only be temporary. They say that more furnaces have been opened in Alabama and Tennessee than there is capital to work, and that some of them will have to shut down. This may be so; but if the Southern furnaces can supply iron to New York at $15, while the Pennsylvania furnaces must get over $16 50 to live, capital will not long be wanting.

The English iron merchants seem to have foreseen the cut in prices, for they have reduced their shipments to this country to quite a considerable extent. During the nine months ending March 31st our imports of pig iron only amounted to 149,387 tons as against 277,005 tons in the nine months ending March 31, 1888, our imports of steel bars to 24,210 tons as against 123,671 tons during the nine months ending March 31, 1888, and our imports of ingot steel to 176,564,423 pounds as against 345,441,014 pounds. The English seem particularly to have withdrawn from the market in favor of the Southern furnaces, being the better reconciled to do so by an increased demand for English steel on the continent of Europe.

The iron and steel industry of the South is yet in its infancy, and nothing positively can be predicated regarding its future. It is nearly ten years since Abram S. Hewitt declared that Alabama was better fitted to be the seat of a prosperous iron industry than any other section of the country except the Menomonee Range in Michigan; and certainly, so far as ore, limestone and fuel are concerned, it has nothing left to wish for. But the question of labor is undetermined. When the Birmingham furnaces first blew in they used colored labor at $1 a day. Presently the laborers demanded higher pay, and the furnacemen imported help from Pennsylvania. At the present time most of the hands employed are white. It would seem that sooner or later, conflicts must occur between the two races. The recent collisions between the iron men and the authorities indicate that if they take place they will be troublesome. Such occurrences would impart unstability to the industry, and would render contracts for future delivery precarious.

Some of the New Uses for Copper.

An Eastern technical journal says that the collapse of the French copper syndicate makes it reasonably certain that copper will be for months to come at from 10 to 12 cents a pound, the price which ruled in 1885, 1886, and 1887 until the syndicate was formed. This is two-thirds of the price under the syndicate, one-third the price before the great expansion in copper production, which began 15 years ago, and a fifth the price at which copper stood during, and at times before, the war. This makes copper 10 or 12 times the value of iron, instead of 20 or 30 times, as it was a few years after the war, and often was from 40 to 50 years ago. It is now only three or four times the price of lead instead of being five, six, or seven times as it once was.

This is a great relative cheapening, and while it has occurred once before, it seems to have come now to stay. Commercially, the cheapening will be most felt in telegraph and telephone wires, which are in great bulk of copper, and in which its increase in cost was most felt. In fact, one of the demands on which the syndicate counted was the increase in this demand.

But the most visible change wrought by permanent cheap copper will be in architecture, according to the Philadelphia *Press*. Before sheet iron was cheapened by the discoveries of the past century, and when heavy freight made slates too dear to those more than 40 or 50 miles by land from a slate quarry, copper was a favorite and cheap roofing material, as it is a most beautiful one, weathering to a color which artists love and which delights the eye, while its permanence makes repairs light. If copper settles to a ten-cent price we shall see it freely used for this purpose, and the same cause will lead to a great extension in its employment for projecting details, like bay-windows and balconies. For this purpose it is far superior to iron, and we do not doubt that the next ten years will see our American streets, not overrich in color, owing a new charm to the free use of copper, which some of our architects have begun to employ with the happiest results, as in the University Library building and residences on Rittenhouse square and Spruce and Fifteenth streets.

Cheap copper ought to lead to its use for kitchen dishes; but this requires a patient labor in keeping this somewhat dangerous material bright and clean, which it is not easy to secure in an American kitchen. With this care, however, for a host of such uses, copper is far superior to iron or enameled ware, and if its price remains steadily at 10 cents or so, the copper saucepan and its like bright and shining kin are sure to appear on our ranges.

MACHINERY IN HORSESHOE MANUFACTURE.—An attempt is just now being made in England to induce English makers of horseshoes to employ machinery to a greater extent than hitherto. The representative of a firm in Denmark, which manufactures machine-made shoes, has recently arrived in England with the view of endeavoring to persuade a number of English horseshoe-makers to combine for the purchase of a process which, it is said, has proved very successful upon the continent. The system comprises 13 or 14 patents, and the purchase-money (including plant) would amount to several thousands of pounds. One of the chief difficulties hitherto experienced in the employment of machinery has been the varied nature of the many descriptions of shoes which firms have to supply for the numerous home and export markets. This is one of the main reasons why some of the horseshoe makers of the mid lands prefer to retain hand labor. At the same time, they admit that, if it were a question of turning out one class of goods only, then machine methods would, on the score of economy, prove preferable. If the new machinery can get over this difficulty, it will stand a much better chance of finding favor in England than have other descriptions which have been previously introduced; and it is understood that this adaptability to various sizes and classes of shoe is one of its strong points.

A CUBIC INCH OF WATER evaporated under the ordinary atmospheric pressure (15 pounds on the square inch) is converted into 1700 cubic inches of steam, or, in a unit of measure, very nearly one cubic foot, and it exerts a mechanical force equal to the raising of 2120.14 pounds one foot high.

MECHANICAL STOKING.—It is evident from the patents issuing that there is no decrease of interest in England in mechanical stokers. The question is asked, Why is there not greater interest on the subject in this country?

SCIENTIFIC PROGRESS.

A Rediscovered Valuable Pigment.

Prof. Fouque, of the College de France, at the last meeting of the Academy of Sciences, (February 18), read an important memoir on the blue pigment used by the ancient Romans for wall decorations. It is a magnificent color, as bright to-day as when first applied, and is found in the fresco paintings of Pompeii and other monuments, dating from the Roman period. Its production is one of the lost arts, as there is no record of the pigment being used after the invasion of the barbarians.

Modern chemists have more than once tried to ascertain the nature of the compound, but, beyond the point that it contains copper, nothing definite has heretofore been discovered. M. Fouque thinks the lack of success is owing to the fact that the ancients followed no exact rules or proportions. Having secured comparatively copious specimens of the cæruleum—such is the old name of the pigment—he has succeeded not only in analyzing it, but also in finding a process for making it regularly in quantities.

The compound is, according to M. Fouque, a quadruple silicate of copper and silica, which may be prepared with silica, oxide of copper, and lime, with or without any fluxes. The ancients simply made it with sand, calcined or roasted copper and lime, but kept to no regular proportions. He worked differently and managed to obtain an exact chemical combination, which is neither a glass nor an enamel, but a crystalline substance of the composition already mentioned. The crystals are perfectly definite, and strongly dichroic, appearing deep sky-blue when viewed from the surface, and pale rose edgeways.

The only difficulty in the preparation is the heating. A bright red heat is necessary to effect the combination, but on heating too much the blue color is lost and an adventurine green glass is obtained—a circumstance which must have rendered the process a delicate one in old times. Nowadays, however, with the means at our disposal, the difficulty is trifling, and kilogs of the cæruleum could easily be made in the College de France laboratory.

It is a very stable pigment, so far as chemicals are concerned, as it stands, unaffected, boiling with sulphuric acid or potash lye, as well as quicklime and hydrogen sulphide. That it will be air and waterproof is abundantly shown by the old fresco paintings. M. Fouque considers, therefore, it would be a great boon to the arts to produce the blue commercially, and promised his assistance to any French manufacturer who will undertake the fabrication.

While examining the fine specimens of the rediscovered blue presented by M. Fouque, M. Berthelot, who is well versed in ancient chemical lore, remarked the cæruleum in question was no doubt the Alexandria blue, known in Egypt about the beginning of the Christian era, and taken to Pozzuoli, whence its use spread all through Italy. He agreed with M. Fouque that the pigment was unknown to the Assyrians and ancient Egyptians, and is, no doubt, a most valuable one.

Atmospheric Pressure on Steam Pressure

The question of the effect which the pressure of the atmosphere exerts on the walls of a steam boiler having excited considerable interest in certain circles in the East, a correspondent of the Boston *Journal of Commerce* propounds the following questions to that journal:

1. Suppose that a boiler is placed near the level of the sea, and fired up, and the safety valve set to blow off at 60 pounds, weight of atmosphere 15 pounds. If this boiler is transported to Denver, Col., without changing the weight on the lever, would it blow off at 60 pounds as before, assuming the pressure of the atmosphere to be nine pounds?

2. If a boiler is just strong enough to withstand a pressure of 50 pounds near the sea, if taken to Denver, would it burst under the same pressure by gauge?

3. Would the ordinary spring steam gauge register the same pressure at both places, provided it was the same in the boiler, or would the weight of the atmosphere make a difference?

The editor of the *Journal* answers as follows: A steam gauge indicates the unbalanced pressure in a boiler, the difference between the absolute pressure inside and out, and 60 pounds unbalanced pressure is the same no matter where a boiler is situated. A boiler is exploded by the unbalanced pressure, and if sunk to the bottom of the ocean it would require an enormous absolute pressure to explode it, because the pressure outside would be so great. The same unbalanced pressure would explode it, however. It is by a difference in pressure or unbalanced pressure that we make steam do work, consequently it is idle to consider the question in any other way. Replying then to your first inquiry, a safety valve blows off at a certain unbalanced pressure, and will blow off when gauge indicates 60 pounds at Denver, Col., as at the sea coast; the absolute pressure required, however, would be by your figures six pounds less. To your second question, yes. Third question: The gauge would register the same unbalanced pressure, but if you intend the words "same pressure" to mean same absolute pressure, the gauge would register higher an amount equal to the difference in weight of the atmosphere at the two places. It is like weighing one's self on a pair of scales on which a weight is already standing, and then on another pair on which stands a less weight. Our weight does not change although the beam records a greater weight in one case than the other. A steam gauge records, a safety valve blows off, and a boiler explodes at a corresponding net pressure in one place as another.

Remarkable Display of Phosphorescence.

Captain Dunlap and crew of an Allan line steamship were recently very much startled when, a short distance northeasterly from Cape Henlopen, on the Atlantic Coast, they met with an unusual display of phosphorescent light upon the sea. The phenomenon, in a moderate way, is common, but in this instance, the night being very dark, the captain was roused out to witness it. "I found the sea," he says, "like a mass of flame, presenting a scene of sublime grandeur." As a remarkable feature of the display it is stated that whenever a sea broke over the bow of the vessel the drops of fire spread over the rigging and decks like the flying embers of a genuine conflagration, where sparks are driven by a strong wind. Usually such phosphorescence disappears almost instantly as the flow of water passes off the deck or rigging of a ship, but in this case it is reported that everywhere on the decks were found tiny sparkling phosphorescent beads which did not disappear until the next morning. For two hours the vessel was steaming through this sea of fire, causing considerable alarm to many of the superstitious sailors and passengers. In the distance the sea appeared to be breaking on a strand, but a dip of the log without finding bottom indicated that shoal water was not near at hand. This report and a similar occurrence, a few months ago, in the Bay of Bengal, and still others of a similar character which have been noticed within a few years, have widely and intensely interested and puzzled the scientists. The old theory is that this marine phenomena is due to the presence in the ocean of myriads of phosphorescent insects, but such unusual displays would seem to either call for some other theory to account for the phenomena or a widely different and more numerous class of insects than are usually met with.

A CURIOUS NATURAL INSTANCE OF AN EARTH BATTERY.—It has long been known that if two plates of different metals are buried in the ground and connected by wire above the surface, an earth battery is formed and a current of electricity is found in the wire. A curious natural instance of the kind recently occurred at Bridgewater, in Nova Scotia, as related by a contemporary, whence a telephone line was run to a gold-mining district. A steady current was found to flow through the wire; and the explanation is that the mineral lodes in the neighborhood gave rise to it. There are gold, silver, copper, lead and iron ores there, and it is supposed that the gold, silver, copper and lead formed the negative plate of the battery, while the iron formed the positive, the moist earth and rock completing the circuit with the wire. The natural current is observed to be stronger on rainy days, probably owing to the increased moisture of the earth. Being a steady current, it does not interfere with the working of the telephone. This case is evidently to be distinguished from the ordinary "earth current" observed in telegraph lines, when the "earth plates" at their extremities are of the same metal; and it seems to be a real case of natural battery formed by mineral deposits underground.—*Ex.*

THE MINERAL CONSTITUENTS OF PETROLEUM. The solid matter present in mineral oils has recently been examined by J. A. Le Bel, who has satisfactorily established the fact that asphalt obtained from petroleum and bitumen contains, in addition to an oxidized organic coloring matter, a large percentage of inorganic constituents. The ash from a specimen of asphalt obtained from a mineral oil procured from Egypt contained 11 per cent of lime and sulphur, while the asphalt derived from the Crimean oils yielded six per cent of ash. Purified asphalt from Lobsann, in Alsatia, gave 5.4 per cent of ash, consisting of lime, oxide of iron, silica, sulphuric acid, and a trace of manganese. The presence of silica in the ash, the author considers, supports the hypothesis of Mendelejeff, that the mineral oils are formed by the action of steam upon the heated rocks of the interior of the earth. In the asphalt from Lobsann, Le Bel has also obtained 4 9 per cent of sulphur in combination with silicon. The above refers to mineral oils of the Eastern Hemisphere. We are not aware that even any trace of sulphur has been found in American mineral oils.

ASTRONOMICAL WORK AT MOUNT WILSON.—The work of photographing the stars of the Northern Hemisphere has been commenced at Mount Wilson with the Harvard 13-inch photographic telescope. The first plates were made of the small stars in the constellation "Ursa Minor," near Polaris, the north star. The report that the great telescope has not been ordered and is not being built is untrue. A 40-inch glass has been ordered by M. M. Bovard, president of the University of Southern California.

GOOD HEALTH.

Increase of the Cancer Malady.

By reference to the monthly report of the State Board of Health, a synopsis of which was given in our last issue, it will be seen that 32 cases of death are credited to this dreadful malady during the month of April—making this the fifth in point of fatality among the total number of 21 diseases which are regularly enumerated in the monthly reports.

Health reports, not only in this State, but in most others of the Union, and in European countries as well, show that cancer is rapidly increasing in frequency all over the world. It is held by physicians to be a mysterious disease—no cause can be assigned for its appearance, and no remedy has ever been proposed by the regular faculty for its cure. In fact, the medical faculty pronounce it incurable. The only treatment given is extirpation by the knife or caustics. No constitutional treatment is proposed in medical works, or, with a few exceptions, employed by medical practitioners.

Cutting No Cure

Notwithstanding the almost universal practice of cutting, statistics show that the knife is of little avail in any case and does not even *prolong* life. A writer in the *British Medical Journal*, which stands at the very head of medical literature, says: "The popular idea that operating prolongs life is quite wrong. I believe it to be a *perfect delusion*. I believe that all of these patients would live longer if they had never been touched"—[with the knife.]

The statistics of 3974 cases of cancer which came under the observation of Leroy d'Etoilles, a celebrated French physician, 1192 of which were operated on, show that if there was any difference in the continuance of life it was in favor of those not operated on. Moreover, medical statistics show that in the best European hospitals, 1 in 11 actually dies while under the knife!

We might multiply statistics indefinitely all to about the same end. The truth is, the knife, especially when used upon the female breast, is worse than the lancet quackery which was so much in vogue 75 or 100 years ago. A medical report upon this subject made some time since by Dr. Moore, a prominent physician, says the use of the knife in cancer will soon "hold the same rank among the barbarians of the healing art which New England witchcraft and witch-murder holds among the barbarians of religion." Any amount of evidence of this kind can be produced, and of the highest character.

Sir James Paget of St. Bartholomew's hospital, Surgeon John McFarlane of Glasgow, Scotland, and numerous other prominent living surgeons of Europe, have unqualifiedly denounced the use of the knife in cancer. So did Alexander Monroe of Scotland, and so did the late Dr. Kearney Rodgers of New York, after a terrible experience in the practice. Dr. Mason Warren of Boston once said that he hoped he should never hear anything more of cancer-cutting as long as he lived. Dieffenbach, the celebrated German surgeon, came to the same conclusion before he died. He also remarked that many other of his own country surgeons agreed with him. Dr. I. C. Warren of Boston made about the same statement to the Medical Society of Boston at their meeting Nov. 12, 1888.

Why Use the Knife?

With the accumulating evidence of the inutility and positive injury from the use of the knife, why is it that surgeons still persist in that "barbarous practice"? Perhaps the question may be satisfactorily answered by saying that the surgeons themselves are deceived by the suppression of the facts in the case during their college education, that such practice is worse than useless, and of the further teaching that there is no cure for cancer.

We agree with all those higher lights of the medical profession—and they are many—who hold that the prevalent cancer practice is a shameful imposition upon patients. We have repeatedly, within the last few months and before, been told by people afflicted with cancer, that in consultation with the most prominent physicians and surgeons of this city, to whom they have applied for advice, that if they would submit to an operation they would surely be cured—that the cancer would never come again. Now these physicians know that such words are a deceit; that not one operation in 20 effects a permanent removal of the malady.

Can Cancer be Cured?

There are scores of witnesses in this city who are living evidences that cancer *can* be cured. We have given the names of many in previous issues. That number is constantly increasing, at least they have been cured of what the leading physicians have pronounced cancer—in some cases after repeated operations by the knife. There is one physician in this city, whose patient left him and went to Dr. Cook, at 124 Post street, and was cured. She afterward called upon the physician, who admitted the fact. That physician is *convinced*, and recently sent a patient to the same party for treatment. The practitioner to whom this patient was sent has at this time about

Thirty Patients Under Her Care,

Nearly every one of whom has been pronounced by well-known medical doctors genuine cases of cancer, and several of whom have been operated upon—of course the malady again making its appearance. Probably eight-tenths of these cases will be successful. Those in which cures will not be effected are either of so long standing as to be in actual extremity, or have been once or twice subjected to the knife, which usually puts the patient outside of all possibility of subsequent cure.

Every medical practitioner before he receives his diploma solemnly pledges himself that in his practice he will use every possible means in his power to save the lives of his patients. Now every physician in this city and vicinity is more or less familiar with the matter which we have above set forth. Why do they not take the trouble to inquire into the truth of the same? Simply because of a "rule of medical ethics" which forbids them to take notice of any practice outside of their associated capacity. These two rules conflict, and the one who breaks the latter is denounced and ruled out of the profession. One practitioner in this city who, in the name of humanity, sought to inquire into the truth of this matter, was immediately degraded and threatened with further action if he continued the inquiry. Another was threatened with like proceedings, but with a moral courage worthy of the man, he told them he felt that he was in the way of duty, and should continue therein. He had gone far enough to feel quite sure there was truth ahead and he should continue his investigations and take the consequences. He was unfortunately struck down with smallpox, a few weeks later, or the great fact which we are endeavoring to establish would soon have found an advocate who would have been heard in this community with no uncertain voice. Who will be the next to ignore prejudice and stand up for the truth and humanity?

The evidence of the good work which Mrs. Dr. Cook is doing is accumulating so rapidly that San Francisco will soon become the Mecca of those afflicted with cancer. She is now treating several most important cases, the outcome of which we feel well assured will be important. She has just discharged, as cured, a lady who was operated upon for cancer in Washington City, and the return of which was pronounced a fact a short time since by Dr. Lane of this city, with the further assurance that nothing but the knife could save her. She has already had several patients from the East and more are making arrangements to come. Respectable physicians there are advising such a course.

We have taken up this cause, not in the interest of Dr. Cook, but in behalf of humanity. We wish it to be distinctly understood that we have never received a dollar for what we have written or done. On the contrary, we are many dollars out of pocket. Our object is to *prove* that a San Francisco practitioner can *cure* cancer by constitutional treatment alone, no knife and no caustic being used, except in cases where the patients have been improperly treated by the regular faculty. Armed with this proof, we are assured that ample funds will be provided to give the remedy to the world. If our cotemporaries of the press would aid us in the matter, the time would be greatly shortened and thousands of valuable lives, to say nothing of an immense amount of suffering, would be saved.

USEFUL INFORMATION.

About Ropes.

A German paper calls attention to the quantity of inferior hempen ropes now manufactured, in some cases the rope being made with inferior kinds of hemp inside, but well covered with yarns of good material, this deception, however, being easily brought to light by dissecting a portion of the rope, or, in practical hands, by its behavior in use; a dark or blackish color indicates that the hemp has suffered from fermentation in the process of curing, and brown spots show that the rope was spun while the fibers were damp, and must consequently be weak and soft in those places; again, inferior ropes are made with short fibers, or with strands of unequal strength or unevenly spun, the rope in the first case appearing woolly, on account of the number of projecting ends of fibers, and in the latter case the irregularity of manufacture is evident on inspection by any good judge. Briefly, a hemp rope is hard, but pliant, yellowish or greenish gray in color, with a certain silvery or pearly luster.

Leather Ropes.

The English journal *Industries* says: Some experiments recently made in India with leather ropes of a square section are deserving of attention. Square leather ropes have for some time been used in England, and with success. They are especially suited for what are called "quarter twist" belts, not being affected by the diagonal strain as a hat leather band is. The sections are square, equilateral, and the grooves in which they run are made to an angle of 45°, so there is a perfect fit of one-half the surface of the rope, and more than is possible with a hat band of equal weight; not only this, the traction is more because of the angles. The square leather ropes employed for main driving are about 1¾ inches square, made up of layers of leather cemented so the whole is uniform and continuous. A rope of this size weighs a pound for each foot of length, and will sustain a pull of 600 pounds. A single rope of this size will, at a speed of 2500 feet a minute, transmit 25-horse power. They are, however, driven at much higher speed than this, in some cases to 6000 feet per minute; a safe or suitable speed is from 4000 to 5000 feet a minute.

Origin of Strong Liquors.

Strong liquors are a modern invention. The ancients knew of nothing more powerful than lightly fermented wines, and have left warnings enough of the abuse of them. Alcohol was not discovered till the seventh century, although an older story exists of a monk, Marcus, who collected and condensed in wool the steam of heated white wine, and then pressed out from the wool a balsam which he applied to the wounds of those who fell at the siege of Rheims, in the reign of Clovis I. He also mixed this balsam with honey and produced a cordial which brought the moribund back to life. Clovis, however, did not wait for the approach of death before claiming his share of the cordial. According to Dr. Stanford Chaelle, the distillation of spirits from wine was not discovered until the twelfth century, and spirits did not come into common use until the fifteenth, sixteenth, and seventeenth centuries. Prof. Arnoldus Villanova, in the fourteenth century, made a panacea of the water of life, which gave sweet breath and fortified the memory, besides being good for sore eyes, the toothache and the gout, and having other wonderful properties.

Distilled spirits came into use in London in 1450, and had to be prohibited in 1494. Michael Savonarola produced a treatise on the making of the water of life in the fifteenth century, which became a standard authority on the subject, and was followed by the work of Matthioli of Sienna. These books gave the start to brandy-making in Italy, whence the trade extended to France. About 1520, the Irish usquebaugh began to acquire reputation in England. Before 1601, "brand wine" had begun to be distilled in the Low Countries from apples, pears and malt; and in that year an ordinance was passed at Tournay forbidding the sale of the liquor except by apothecaries, "partly because of the dearness of corn and partly because of the drunkenness which this cheap brand wine caused, to the great prejudice not alone of home and lives, but to the extreme danger of the souls of its drinkers, many of whom had died without confession."—*Druggists' Circular.*

WILL MAKE OUR OWN ROPE.—Mr. J. M. Bailhache of San Diego, says the *Sun* of that city, is now in negotiation with Oakland and San Francisco capitalists with the view of establishing in San Diego a rope factory to utilize the tract of henniken plant which he owns in Lower California. This fiber is similar to that grown on the eastern coast of Mexico and at Yucatan, and it is now used for making sisal rope. The fiber can be brought here at a small cost, and is two cents a pound cheaper than manilla hemp. Mr. Bailhache has been engaged in the matter for several months, and has already been approached by owners of large tracts of land with liberal offers to get the factory on their territory. Yucatan alone exports 4000 bales of fiber monthly to New York and other Eastern cities.

HOW TO DETECT POTATO FLOUR IN WHEAT FLOUR.—Adulteration of flour with potato flour may be detected by means of acids. Take a spoonful and pour upon it a little nitric acid; if the flour be of wheat, it will be changed to an orange yellow; if wholly of potato flour, the color would not be altered but the flour formed into a tenacious jelly; if, therefore, the flour be adulterated with potato flour, it will not be difficult to decide. Again, take a spoonful of the flour and pour upon it a little muriatic acid; if the flour be of pure wheat, it will be changed to a deep violet color, without odor; but if potato flour be mixed in it, it will then have an odor like that of rushes.

ANOTHER BRAVE LADY.—We last week chronicled the feats of several ladies in the killing of rattlesnakes. The Fresno *Expositor* of the 15th inst. tells of a lady in that city who killed two of these venomous reptiles by hitting them alternately with a club while they were doing their level best to spring upon her. She was engaged in hanging out clothes at the time they made their appearance. One had five rattles and the other six. They were respectively 4½ and 5 feet in length.

TO RETAIN THE NOXIOUS EMANATIONS OF GAS.—A single plate of perforated zinc about a foot square, suspended over a gas jet, is said to retain the noxious emanations from burning gas, which it is well known destroys the binding of books, tarnishes the gilding, and vitiates the atmosphere for breathing.

THE OLDEST BANK NOTES are the "flying money," or "convenient money," first issued in China, 2797 B. C. Originally these notes were issued by the treasury, but experience dictated a change to the banks under Government inspection and control.

ASBESTOS POWDER, made into a thick paste, with liquid silicate of soda, is used with great advantage, it is said, in making joints fitting tops, connecting pipes, filling cracks, etc. It hardens very quickly, stands heat and is steam tight.

IRISH RENTS.—James Redpath says the continuation of the rent agitation in Ireland has had the effect of causing a reduction of the rents in Ireland—at least $25,000,000.

ELECTRICITY.

INCREASE OF ADHESION BY ELECTRIC CURRENT.—It is still a matter of dispute as to whether or not the passage of an electric current between the wheels of a motor and the rails increases the adhesion available for traction. In a recent issue of *Electric Power* is a brief account of a demonstration recently made in Washington. The experiment was conducted by Mr. Joseph Lyons. A pair of wooden strips were connected to form a frame, and a pair of short parallel strips of sheet iron, set up edgewise, secured to the frame, and a toy electric motor was arranged to move the miniature truck along the sheet-iron rails. The experiment consisted in closing the motor circuit and then lifting the forward end of the frame until the grade was such that the motor could not climb it, that is, until the adhesion due to the weight of the motor was not sufficient to overcome gravity. On closing an independent circuit through the rails and truck-wheels and shaft, the motor would start again up grade and travel a considerable distance. There was no mistaking the action of the motor. It was positive and pronounced, "like the scramble of an army mule" under the traditional stimulus. Mr. Lyons estimated the increase of traction at about 40 per cent.

REFINING SILVER BY ELECTRICITY.—Electric refining has been brought into such bad odor, says the *Modern Heat and Light*, by the fraud connected with the electric sugar scheme, that people will naturally be disposed to look askance at all statements on the application of electricity for such purposes. Yet, if the *Chronique Industrielle* is to be relied upon, the method of M. Moebius for refining silver by electricity is likely to be brought into extensive use. It is especially suitable for the treatment of auriferous silver containing about 11 per cent of gold. In an ordinary electrolytic bath, composed of a weak solution of nitric acid, at one per cent, M. Moebius employs anodes of argentiferous matter, and a thin plate of pure silver as cathode. The anodes, which are about 12 millimeters in thickness, are placed in muslin bags, which retain the gold, platinum, peroxide of lead, and other foreign bodies contained in the matter. The current employed is 150 amperes, with a difference of potential between the plates of one volt. During the whole operation brushes pass and repass over the surface of the cathode, and cause the silver deposited to fall to the bottom. If the matter contains copper, it dissolves in the nitric acid, but it is not deposited in the cathodes.

ELECTROSENTIENCE—THE COMING SENSE.—The alarm felt by the public about the effects of electricity, writes Reginald A. Fessenden in the *Electrical World*, cannot be caused by the danger which any individual citizen incurs, for gas is killing hundreds where electricity kills one. The reason is that gas is something more or less under the individual's control, and when a leak occurs it can be perceived by the senses. An electric leak may occur blocks away, and there is, moreover, no sense to warn us of it. We have touch to determine the limits and surface of bodies; taste, their chemical action; smell, the effect of the small particles they throw off; sound, the wave movements of the air; and sight, the waves of the ether; but we lack a sense that shall tell us when our hand is in a dielectric and approaching a conductor. Evolution has brought us many things, and it cannot be doubted that it will bring us this also; but till our nerves have been educated so that they are capable of perceiving etheric vortices, the electric current will always remain more or less of a mystery that provokes awe and fear.

THE PART ELECTRICITY PLAYS IN MODERN WAR VESSELS.—Electricity plays an important part in the modern war vessel; not only is it used for lighting, but it is now also applied in several ingenious forms of firing guns and for determining the range and direction of the shots. The latest application is in the use of an electric motor for hoisting shot and shell from the magazine below to the level of the guns, and for loading the guns themselves. This apparatus is the invention of Lieut. Bradley A. Fisk, and is so arranged as to prevent any possible accident resulting from the wounding or death of the gunner. This provides for all contingencies, besides reducing the number of men required to handle a large gun—a very important point where guns are mounted, as is the case in most armored ships, in turrets or barbettes where the space is very limited.

APPLICATION has been made for a patent for an electric apparatus by which an instantaneous photograph may be taken of a burglar while engaged in his nefarious operations. It is claimed for this invention that the moment the marauder touches the door of the safe or any other place to which the tell-tale wire may be fastened, a correct photograph is taken. A number of cameras placed about the room brings about the possibility of reproducing his features in all the degrees of success or failure naturally incident upon such excursions.

ARTIFICIAL EMERALDS have been produced by a French scientist by fusing silica, alumina and glucina with traces of oxide of chromium, with acid molybdate of lithia at a temperature of from 600° to 700° for 15 days.

MINING AND SCIENTIFIC PRESS

A. T. DEWEY. W. B. EWER.

DEWEY & CO., Publishers.

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☞ *Take the Elevator, No. 12 Front St.* ☜

W. B. EWER.....SENIOR EDITOR

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Our latest forms go to press on Thursday evening.

SAN FRANCISCO

Saturday Morning, June 1, 1888.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Incline Gravity Tramway Built by the Fulton Iron Works; Hoisting Tramway with Behis Self-Dumping Car, 393. Scenes on the Upper Sacramento River, 401.

EDITORIALS.—Incline Gravity Tramways, 393. Passing Events; American Miners Abroad; The New Warfare; What Becomes of the Bullion; The Magnetic Variation at San Francisco; Wonderful Results in Water-Power, 400. The Upper Sacramento River, 401.

CORRESPONDENCE.—Rebel Creek District, 394.

MISCELLANEOUS.—Chinese Miners in Lower California; Nineteen Knots; Nautical Mining Reports; The Ontario Mine; No Discovery of the Lode; The North Star Mine; A Great Mining Tunnel, 394. Meteors, Comets and Fire Balls; Rolling Liquid Metal; Con. Cal. and Va. Statistics, 395.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 396-7.

MECHANICAL PROGRESS.—Discoverers of the Telegraph; A Disturbance in Our Iron Industry; Some of the New Uses for Copper; Machinery in Horseshoe Manufacture; Mechanical Stoking, 398.

SCIENTIFIC PROGRESS.—A Rediscovered Valuable Pigment; Atmospheric Pressure on Steam Pressure; Remarkable Display of Phosphorescence; A Curious Natural Instance of an Earth Battery; The Mineral Constitutents of Petroleum; Astronomical Work at Mount Wilson, 398.

GOOD HEALTH.—Increase of the Cancer Malady, 399.

USEFUL INFORMATION.—About Ropes; Origin of Strong Liquors; Will Make Our Own Rope; How to Detect Potato Flour in Wheat Flour; To Retain the Noxious Emanations of Gas, 399.

ELECTRICITY.—Increase of Adhesion by Electric Current; Refining Silver by Electricity; Electrosentience—The Coming Sense; The Part Electricity Plays in Modern War Vessels, 399.

THE BUILDER.—Paper for Building; A New Departure; Miscellaneous, 405.

STEAM BOILER NOTES.—Kinetic Energy the Secret of the Injector; Miscellaneous, 405.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 408.

Business Announcements.

[NEW THIS ISSUE.]

Hardware, etc.—I. S. Van Winkle & Co.
Water Wheel—Rix & Firth.
Patents for Sale—J. J. Jones, Los Angeles, Cal.
Money Wanted—"G. M.," Box 2517.

☞ *See Advertising Columns.*

Passing Events.

The U. S. Debris Commissioners, Majors Benyaurd, Heuer and Hanbury, are busy in the mountain counties examining the rivers and hydraulic mining sections. They seem to be making a pretty thorough study of the subject.

In the Comstock mines large forces of men are employed and the pay-rolls are heavy. Last week the ore shipments aggregated 7188 tons, valued at $155,000.

The silver districts of Thunder Bay, on the Canadian side of Lake Superior, are attracting attention, the region showing great value as developments progress. Americans have already secured valuable tracts of mineral ground.

One of the men employed about the electric works on the Sutro tunnel level of the Chollar shaft, Nevada, came near being killed by touching a wire where the insulatory material had worn away. The employment of electricity in mines adds a new danger to mining work.

IN Juneau, Alaska, laboring men earn $3 a day, without board. Mechanics get $5. There is plenty of work ahead for all summer.

What Becomes of the Bullion?

The sworn statements of the superintendents of the bullion-producing mines on the Comstock for the first quarter of this year have been slow in coming to hand; in consequence we could not give them sooner. The total number of tons produced, total yield in bullion and total cost of production are from sworn statements as published in the Virginia City papers, but the average yield to the ton is our figures, which can be verified by any one desiring. The following are the statements:

*Mine.	Produced tons.	Total yield.	Average to ton.	Cost of Product'n, etc.	Av'ge to ton.
Challenge	1,413	$26,410	$18.78	$28,775	$20.36
Chollar..	2,425	40,322	16.62	49,187	20.28
Con. Va..	32,006	720,816	22.20	467,448	18.32
Confid'ce.	6,025	110,523	18.32	97,3 9	16.16
Crown P.	3,940	49,587	12.56	50,139	12.98
Gould & C	250	3,381	13.53	3,6?7	14.75
Hale & N.	9,963	175,027	17.56	177,894	17.95
Justice ..	2,519	32,883	13.05	4',308	16.40
Overman.	3,645	24,352	6.68	25,515	7.00
Savage...	5,940	82,502	13.88	95,169	16.02
Totals .	68,125	$1,275,803	$18.72	$1,036 481	$15.21

*Alta, Potosi and Six-Mile canyon not included in above, owing to their sworn statements not being on file.

The above for outside stockholders is food for serious consideration in several respects, not the least of which is the wide range in the cost of extraction, transportation and reduction, running from $7 a ton in Overman to $20.36 a ton in Challenge.

In this connection it may prove of interest to stockholders to learn that it was developed on the trial of the Kentuck Mining Co.'s suit in Department 6 of the Superior Court of the city and county of San Francisco, that Gov. Stevenson of Nevada made a contract with said company similar to all contracts that have been made in years past between mill-owners and the mines. In these it was particularly specified that the mill company shall take the ore and mill it, providing they (the mill company) returned to the miner 65 per cent of the assay value of said ore at the mines, thus limiting the mill company to a waste of 35 per cent, and no more, of the car-sample assays. Taking these contracts as a basis, we find the Savage Mining Company gave in 1886 and 1887 its mine assays from $50 to $35 a ton, which, at an average, is of $42 50 per ton. Now when this grade of ore comes from the mill company its pulp assays are from $19 to about $21 a ton, showing a loss of more than 50 per cent between the mine and mill assays. This is a large falling off, and what became of the difference admits of explanation to stockholders. The mill company now only returns 65 per cent of the pulp assays and not 65 per cent of the car-sample assays as in former years. It is asserted by those who ought to be in position to know, that the Hale and Norcross mines' ore is managed even worse; carload after carload has assayed above $100 per ton, and one even went about $240 per ton, yet the mill company returned only about an average of $30 per ton pulp assay, of which only 65 per cent went to stockholders. The returns for the month of April caused the management of Hale and Norcross to say "that the mill company were either incompetent or else they were stealing bullion." In view of the above, superintendents of the Comstock mines, in justice to shareholders, should again resume the assaying of ore at the mine and report the same officially.

The New Warfare.

Modern warfare is different from the times when our fathers repulsed the British with their slow-working flintlocks. If the brave 800 who made themselves famous by holding the pass at Thermopylæ had been armed with the Maxim gun or other of our rapid death-dealing inventions, it would not have been such an act of heroism. One man securely intrenched and so armed might defy a regiment with the ancient muskets. Stanley, the African explorer, charmed the natives and made them consider him almost superhuman because he was armed with a Maxim gun. The boy who invented it is an American who has added to our already famous list of inventors, and in giving it his name we have built his monument. Before its time the great guns were the Gatling, Hotchkiss and Nordenhoff, but while they were rapid they had defects; no aim could be taken on account of turning the crank. If a cartridge did not explode at the proper time, as the crank kept turning, it would explode at the wrong time and its effects be wasted. The rapid firing superheated the gun, rendering it more dangerous to the firers than those fired at. The Maxim is automatic, avoids the crank and continues to load and fire itself by simply pulling the trigger so long as the supply of cartridges lasts. The operator takes aim and fires 700 shots a minute, the gun keeping itself cool and ready for action by shooting a jet of water along the barrel by the force of its own recoil.

Wonderful Results in Water-Power.

The activity of the works of the Pelton Water-Wheel Company indicates the interest that is everywhere felt in the utilization of water-power in all parts of the country.

At a recent visit, we were shown the wheel that is to run the 120-stamp mill now in process of construction for the Alaska Mining Company at Douglas Island. This wheel is eight feet in diameter, and is speeded at 195 revolutions, which gives a peripheral velocity of 5166 feet, or nearly a mile a minute. It is fitted with an adjustable nozzle, which, with a two-inch opening, will develop 300 horse-power, running under a head of 480 feet. A governor is attached to the nozzle, which will control perfectly all the variations of load. That so simple and comparatively inexpensive a piece of machinery is capable of developing such energy, is well-nigh incredible.

Two small wheels have recently been sent to the London Hydraulic Power Company, to be operated under a pressure of 700 pounds to the square inch. One of these wheels, 18 inches in diameter and weighing but 23 pounds, is expected to develop 10 horse-power, using a nozzle only one-fifth of an inch in diameter. These small wheels are now set up in iron cases, all ready for connections, giving them a very neat and excellent mechanical effect. The capacity and high efficiency of the Pelton wheels, under such extraordinary conditions, has created a large demand for them from all parts of the world.

This company have also recently built a large and very powerful hoisting rig for the Amador Company, consisting of double, reversible wheels, with three streams applied to each, the gates being all operated by hydraulic valve-gear. This, probably the most complete and effective water hoist that has ever been constructed, will be illustrated and further described in a later issue.

The Magnetic Variation at San Francisco.

Hon. F. M. Thorn, superintendent U. [S. Coast and Geodetic Survey, has authorized Prof. Davidson to publish the results of the late magnetic observations made by Mr. Fremont Morse of the Coast Survey at the Presidio station.

The Presidio station has been occupied by the Coast Survey parties since 1852 for the determination of the magnetic elements, especially the variation of the compass which has nearly reached its Eastern maximum variation. A year since we published two important papers upon this subject and showed that the maximum would occur in 1893.

This year the observations for the magnetic variation extended through six days in the latter part of April and the first of May, and they gave an average of 16° 36′.4 east, with a comparatively small probable error. This value is 0′.9 greater than the computed variation, as last year's observation was 0′.9 smaller than the computed.

The observed value of the variation is the arithmetical mean between the greater variation of the needle at 7½ hours A. M. and about 1 o'clock P. M. The change between these two times of the day ranges from 4′.3 to 9′.9, and by an average of 7′.1 the direction of line would apparently differ if run by the compass in the morning or in the afternoon.

The dip of the magnetic needle from six days' observations is 62° 24′.2; last year, about the same date, it was 62° 23′.4. The observed horizontal intensity was observed 5.4665, and the resulting total intensity computed from this, and the dip is 11.79 in English units, or .5435 dynes.

SECRETARY TRACY has issued an advertisement calling for proposals to build the three new armored cruisers, for which Congress has appropriated $700,000 apiece. Each vessel must be finished within two years, and have a speed of 18 knots per hour.

Mexican Mines and Miners.

We present further notes on this subject which we have obtained from Mr. Dubois:

Retracing our steps, we again pass by Los Cuetes, whence one long day's ride brings us to Santiago de los Caballeros, a small mining town of some former importance, surrounded by numerous workings on veins producing mostly smelting ores, consisting of galenas, fahlerz and pyrite. These mines are at present almost abandoned, capital and enterprise being at present lacking here.

Only a few miles from Santiago is a very promising mine worked by some Spaniards—MM. Ururburu, in

Potrero de los Medinas.

This mine is developed on a considerable ledge carrying mainly pyrite, but is remarkable for the large number of bunches of ruby silver, which occurs intermingled in the pyrites. Considerable quantities of rich ores are raised and exported, the lower grades being successfully worked by the leaching process.

From this place, traveling due east, we reach Maturipa, on a small creek, with fine groves of orange trees and sugar-cane plantations. A few miles north from this is a group of veins, with free gold at the surface, but much charged with pyrite below. These have barely been prospected.

Up on the ridge, east of Maturipa, is a small ranch named Alisitos, in the immediate vicinity of which I lately saw a prospect on a vein two or three feet in thickness, bearing pyritous ores, rather coppery, assaying on an average 100 ounces of silver and a considerable amount of free gold.

The ridge here, which is the alleged divide between the States of Sinaloa and Durango, is all seamed with numerous strong lodes bearing evidences of base (pyritous) silver ores and gold. These have mostly not even been prospected on.

On crossing the divide we come into the deep Apomal valley crossed by the trail leading from Copalquin to Culiacan. In February last I had occasion to tarry some days in this place in order to measure off and stake out four new mining claims which had been registered but shortly before.

Mineral Wealth.

I was struck by the evidences of mineral wealth in a district about one mile square, seamed with veins of divers strikes and underlies. One of these as yet undeveloped prospects is the San Jeronimo, on a vein over six feet in width, striking northwest to southeast, with a dip of nearly 46 degrees to the northeast.

The vein stuff is white quartz much shaded with chlorite, and carries argentite and some dark-colored pyrite (highly gold bearing), besides zinc blende and steel-grained galena.

The other property, Ascencion, striking N. E. and S. W., dipping steeply to the N. W., shows a well-defined vein of white quartz on the hanging-wall and toward the footwall a large body of gray flinty quartz speckled with antimonial silver ore.

Both of these prospects were so far undeveloped, but, in all likelihood, will prove valuable properties.

This district of Apomal, in close vicinity to Culiacan, and only 10 miles from the actual wagon-road, will undoubtedly soon be developed, as it deserves and promises to become a flourishing camp.

Following down the trail leading to Culiacan, some three hours' ride brings us to the village of Atotonilco, famed for its hot springs.

Here is an old mine—Mina Grande—which has long been abandoned and drowned out. A tunnel has just been completed by Mr. Crawford, and he has struck in the bottom of the old workings a vein of very rich silver-lead ores.

Farther east of here, a few hours' ride brings us to Tecuane (Indian tiger), on the confluence of the Limon river with the Humaya. Here very limited working is being done by gambusinos on numerous veins, carrying spots and bunches of copper-silver glance and sometimes furnishing argentite.

Returning to Atotonilco and proceeding a couple of miles down the creek, we find a 20-stamp steam-mill with Frue vanners, etc., erected by a St. Louis, Mo., company, with the view of working a large deposit of ore, claimed to be extraordinarily rich. This is the San Jose del Oro. The natives had worked on the outcrop and abandoned it because they could not make their salt. However, the property was purchased for a large sum of money; a mill was put up for the beginning with only 20 stamps but with power sufficient to drive 60. Flaming reports of mountains of ore glittering with golden treasure made the rounds of the St. Louis papers. At last the mill started up and it was found that they had a large amount of stuff that would mill $1.25.

This swindle has thrown a shade over all mining enterprise on this coast, but in time it will wear off and legitimate enterprise will ultimately have fair play.

Beds of Gravel.

The Humaya river runs near San Jose del Oro, and on the banks of which are considerable beds of gravel; and farther down in front of the village Torribito are two large banks of gravel, one of which seems to be over one mile square. Here the river has cut its bed into the granitic or syenite bedrock on which lies a bed of coarse gravel with bowlders cemented with tough red clay some 40 to 50 feet in thickness. I found one or more colors of coarse gold about the size and shape of a tomato seed

in each pan of dirt, which I washed from all parts of the deposit. I believe it would be well worth looking into. From San Jose del Oro a good wagon-road leads us back to Culiacan.

I am in hopes that these brief and incomplete notes will attract the notice of mining parties to these districts, which, besides being fairly accessible from Culiacan, and more so if the much-talked-of line of rail from Mazatlan to Guaymas be constructed—seem to me to cover some of the most desirable mining ground (mostly imperfectly known and prospected) that I have encountered in all Mexico.

The Upper Sacramento River.

One who forms an idea of California rivers by the broad sluggish watercourses which intersect our broad valleys, running bank-full and fringed by tules, might conclude that our streams are quite devoid of the picturesque beauty which fills the poet's verses and covers the artist's canvas. This conclusion would be a sad injustice to California rivers, for if one will pursue them toward their sources he will come at length to clean-banked streams flowing through beautiful meadows and further beyond to the mountain torrents dashing along between rocky barriers through which they have cut their course. Instead of California rivers being sluggish and dreary, they are, in parts of their courses, at least, as active and as full of picturesque life and beauty as nature can make them.

IN THE UPPER SACRAMENTO VALLEY—THE SACRAMENTO RIVER AT REED'S FERRY, NEAR REDDING.

The two sketches on this page will serve to illustrate this statement. The Sacramento river in the broad valley is wide, quiet, indolent, good to run steamboats on, but not calculated to awaken much admiration. The river in the upper valley is quite another creature. About on the southern boundary of Shasta county the great floor of the valley terminates, and above that is the upper valley with its many arms with their inclosing hills and mountains, forming a country rich and picturesque, which extends northward many miles before the higher mountains close in and place the crown of eternal snow on Shasta's brow. It is in this upper valley that our scenes are to be found. The first, of the Sacramento river, shows the clean-sloping banks of the river, here and there shaded by overhanging oaks, and just behind the verdant meadows which are now radiant with the beauty of myriad wild flowers and redolent of their perfume. The landscape is as pretty and varied as the most *blase* tourist could insist upon.

The lower engraving shows another phase of our river scenery, where the stream has rocks and not meadow loams to contend with. Here, too, there is certainly no prophesy of the dull stream of the lowlands of which these waters will ere long form a part, but a restless, swift current pouring down from mountain sources, seeking quick exit from its chilly dawn to its midday murmurs in the vales below.

We trust these views will remind many that the season is at hand when tasks should be laid aside and the summer vacation amid unwonted scenes should be enjoyed. Follow almost any stream toward its source, and you will find picturesque beauty to admire. If time and money allow, take a large stream and follow it into the heart of the Sierra; if not, then hitch up your team and follow the shorter runs to the canyons of the Coast Range; if not even this, pack a lunch-basket and start on foot along the creek that crosses your farm into the little hills of its birth. In all of these you will find scenes similar in kind but different in degree; in all you will gain diversion and rest and recreation, of which this generation has far too little.

EVERY MAN HIS OWN ASSAYER.—An advertisement with this title has appeared in several numbers of the PRESS, but will appear no longer. It was received in the business office and inserted in the ordinary course, but the attention of the publishers being called to its tenor, it was considered unjust to our readers to publish it again. The powder advertised may possibly do what is claimed for it, in "separating the silver from the ore instantly," in some instances. At the same time we have seen no proof that it can do so, and do not care to advertise a chemical "for testing the value of all kinds of ore" when we do not believe such a thing exists. We regret that the advertisement referred to was ever permitted to appear in the columns of the PRESS.

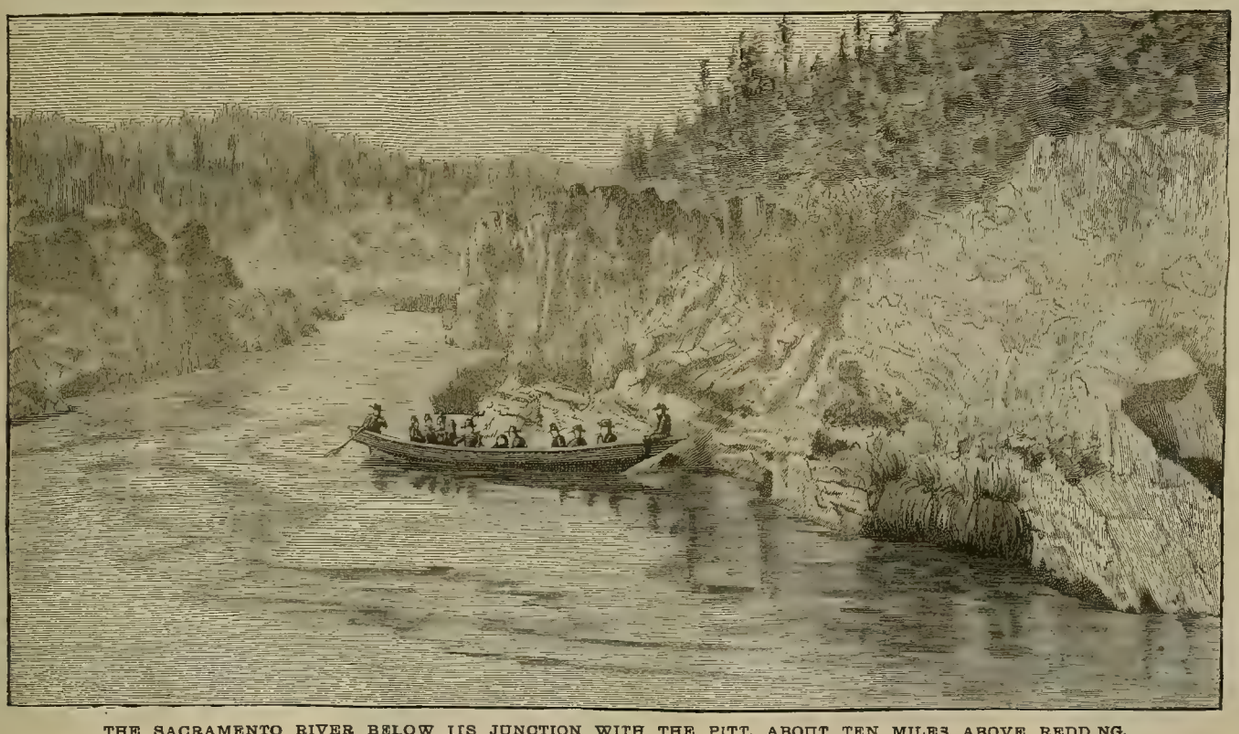
UNDER the present construction of the law, it is shown that 600 pounds of lead are brought in free with every ton of ore carrying silver. In 1866, 8000 tons of lead were brought in free from Mexico. In 1887, the amount was increased to 50,000 tons, and in 1888 was still further increased to 86 000 tons, and the indications are that in 1889 it will be even larger. There ought to be no misunderstanding in regard to the proper definition of lead ore, and the law certainly intended if ore had lead in it, and came into competition with lead produced in this country, that it should pay duty at the rate of one and a half cents per pound, provided by Congress as a protection to domestic producers.

WELLINGTON BURT, of Michigan, and Charles Burges, of New York, have been visiting England as representatives of the movement to unify American salt interests. The English Salt Union say Burt and Burges have entered into an alliance which assures harmonious relations between the English and American markets and full prices.

THE ASTRONOMICAL SOCIETY of the Pacific held a meeting at the Lick Observatory on Saturday last. W. M. Pierson read a paper on "The Corona." The astronomers of the observatory gave a short account of their observations of the solar eclipse of last January, and the important results which had followed from the work of the Amateur Photographers' Association. A report on the subject will be shortly published by the regents of the University of California.

A NEW DEPARTURE.—There is every indication that San Francisco is entering upon a new era in architectural advancement, both with regard to the materials used in construction and in architectural design. The prevailing characteristics are beauty in design, stateliness in character and durability of material. Wood is giving way to brick, iron and stone. Common brick, covered with cement, is succeeded by pressed brick ornamented with terra-cotta and sandstone, etc. Iron is also entering more largely into use. A notable instance of this is the tall *Chronicle* building now in course of construction at the corner of Kearny and Market streets. The Bancroft building, the new Parrott building, the reconstructed California theater, the Alvinza Hayward building, the bank building, corner of Bush and Sansome streets, and numerous others of lesser note, form striking examples of the transition from the old architectural structures of the past. The new Academy of Science building will soon present another example of the new departure.

The fear of earthquakes is no longer felt by our citizens, as is evidenced by the increased hight which is now being given to our principal structures. It is now known that tall buildings, properly constructed and tied, are quite as safe as the low and indifferently constructed buildings of the past.



THE SACRAMENTO RIVER BELOW ITS JUNCTION WITH THE PITT, ABOUT TEN MILES ABOVE REDDING.

The Strasbourg Clock Outdone.

The Work of a Boston Watchmaker.

A clock has just been completed in the City of Chelsea which is probably the most wonderful piece of mechanism in its line that has ever been invented. The maker, Lucius L. Robbins, has been over nine years engaged in his favorite project of manufacturing a clock of a kind the world had never seen.

In 1879 he first became impressed with the idea of making a wonderful clock, and without considering the expense of the project he went to work and began to make the plans.

His ambition has been to understand practically, and to show to the world through other than theory and words, the correct movements of the earth and the planetary system. With only limited means at his command, and depending solely on his vocation as a watchmaker to provide the necessaries of life, he has struggled along these ten years, devoting every spare moment to the accomplishment of his purpose.

The clock was started in Boston, where he lived for five years. It is 12 feet high, 5 feet wide and 3 feet deep. It is run by weights weighing over 200 pounds, while the total weight is almost a ton. The large weights are wound every eight days, and in running down they wind the smaller ones.

The face of the clock contains seven dials, two balconies and five alcoves on the upper section, while the lower part is taken up by an immense dial three feet in diameter. The topmost dial has three hands. Two are white in color and the other is red. The long white hand indicates the lunar month, the short white hand points to the day of the lunar year and the week of the year at the same time, and the red hand shows the age of the moon.

There are also two circles that fall until the 21st day of June, the longest of the year, and then rise until the 21st day of December, the shortest day of the year. In this dial representations of the sun and moon rise and set regularly every day. When the moon is in the eastern or western quarter it is accurately shown in the proper position on the clock.

There are three rows of figures on this dial. The outside row represents the days of the lunar month, the middle row the day of the year, and the inside row the week of the year. On the left side of the lunar dial is a small alcove, showing a cuckoo perched on the limb of a tree, which sings for every hour. Opposite this, on the other side of the dial, there is another small alcove, where old Father Time strikes the hours as they pass. Below the lunar dial there are two small dials. The one on the right indicates the time of the sun's rising, and that on the left the time of its setting.

In the center of the upper part of the clock is an alcove in which is hourly represented the four stages of manhood. At ten minutes past the hour an infant appears, and at the first quarter hour strikes one; at 25 minutes past the hour the infant is replaced by a youth, who, on the second quarter hour, strikes two; at 20 minutes of the hour the youth retires and a man comes in view and strikes three on the third quarter hour; at five minutes before the hour, an old man appears, and at one minute of the hour strikes four. Directly in front of the four stages of manhood is a small balcony, on which a sentinel is constantly marching back and forth. He turns about face at both ends of the balcony, and can be made to go either on the "double-quick" or "slow time."

The rise and fall of the tide is shown on a pretty scene representing the city of Boston and its harbor. The city is painted on canvas in the background. The harbor, with the shipping, is painted on glass that moves up and down with the tide. At high tide the city is seen through the rigging and masts of the shipping.

Opposite the tide indicator is another portico in which the parable of the ten virgins is shown every 15 minutes. Two doors open on either side, and from one side appear ten virgins dressed in pure white garments and file across to the opposite doors in two lines. One line have lighted lamps, while the lamps of the other are out.

The bride bids the wise virgins enter, and the other five foolish virgins go back to secure oil for their lamps, and on their reappearing they find the door has been shut and they are obliged to return from whence they came.

Below on the left is another dial, with two sets of hands, one set being painted red and the other black. The red hands indicate the time of the morning tide and the black hands the time of the evening tide.

On the right side is another dial, which is a perpetual calendar, showing the calendar months, day of the week and day of the year. One hand indicates the day of the week and the day of the month at the same time. A wonderful feature with this dial is that every four years the clock allows 29 days for February. Between these two dials are two more dials that tell the time of day.

At the foot of the upper part is a balcony in the form of a semicircle, and every fifteen minutes a general on horseback rides out and takes up a position in the center. Immediately a door in front of him opens and a full company of infantry marches out to music, with the captain at their head. When just past the general the captain turns about face and marches backward, looking at his men. After the company retires the general continues his march straight ahead and also retires. The same company of soldiers appears each time, while every other time a different general appears.

The lower portion of the clock is taken up by the astronomical part. The dial is 36 inches in diameter. There is a five-inch globe to represent the earth, inclined at 23 degrees and 28 degrees, and revolves on its axis once in 24 hours. A short distance from the earth is the moon, that revolves around the earth once in 29 days and 12 hours, and also on its own axis during the same time. The earth and the moon revolve around the sun in the center of the dial, once in 365 days and in 366 days in leap year, which is regulated by machinery. The sun revolves once in 25 days.

From the center is a projecting axis to which is attached by long thin rods the planets Mercury, Venus, Mars, Juno and Ceres. Mercury makes the revolution around the sun once in 88 days, Venus in 224 days, Mars in 686 days, Juno in 1593 days and Ceres once in 1681 days. Around the side of this dial there are the 12 signs of the zodiac, and the earth is always at the proper sign at the proper time.—*Boston Globe.*

Dewey & Co.'s Scientific Press Patent Agency.

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ASSESSMENT NOTICE.

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NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 15th day of May, 1889, an assessment, No 13, of Five Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, 327 Pine St., Room 9, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1889, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 16th day of July, 1889, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

O. H. BOGART, Secretary.

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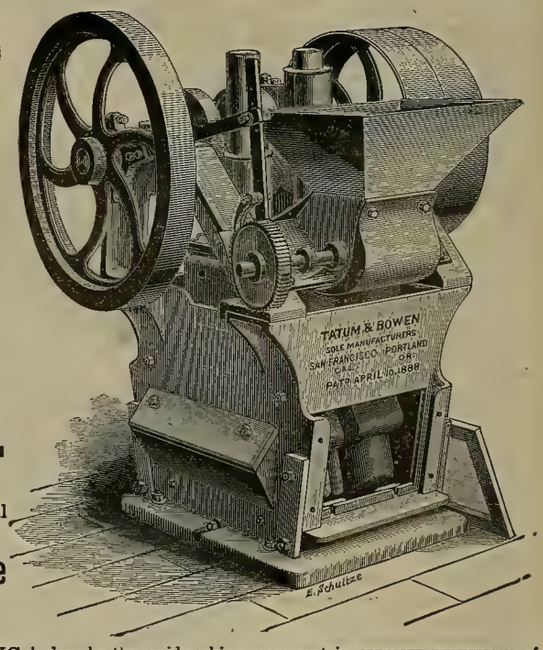

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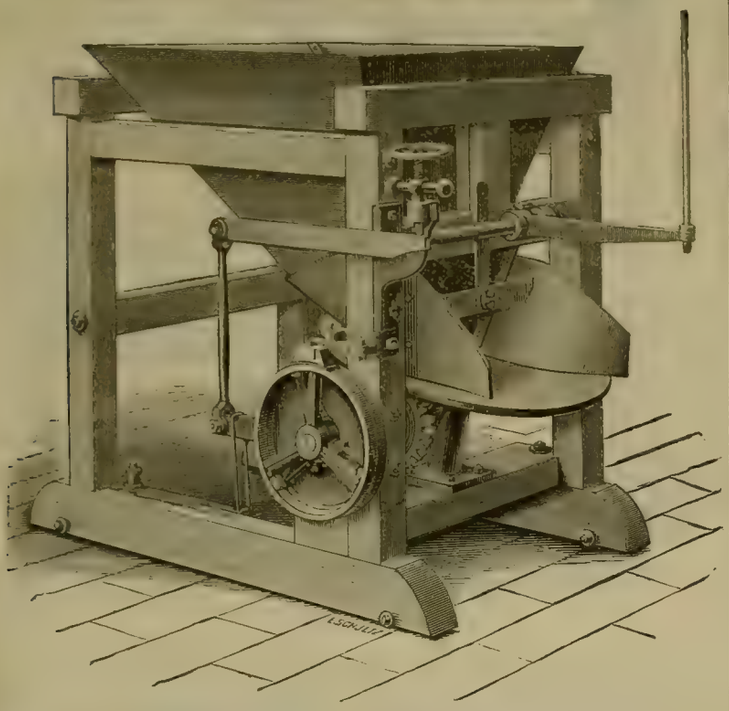

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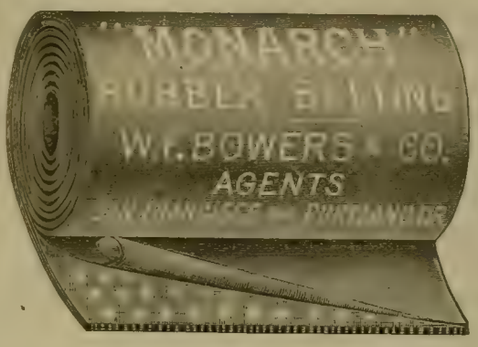

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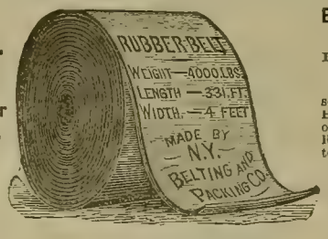

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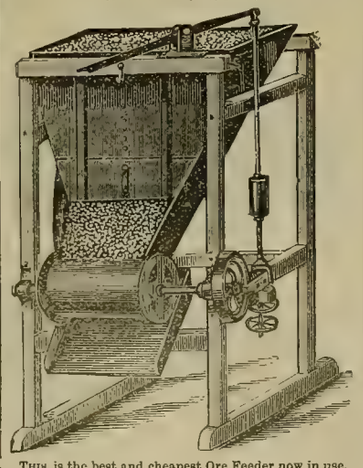

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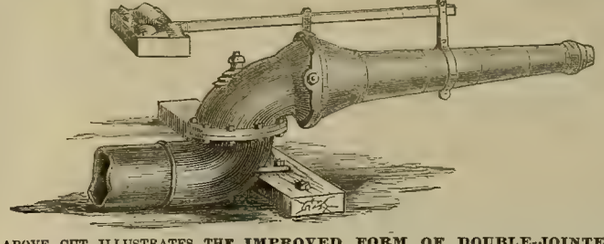

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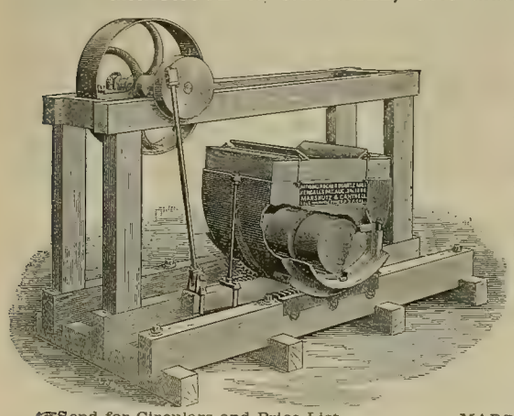

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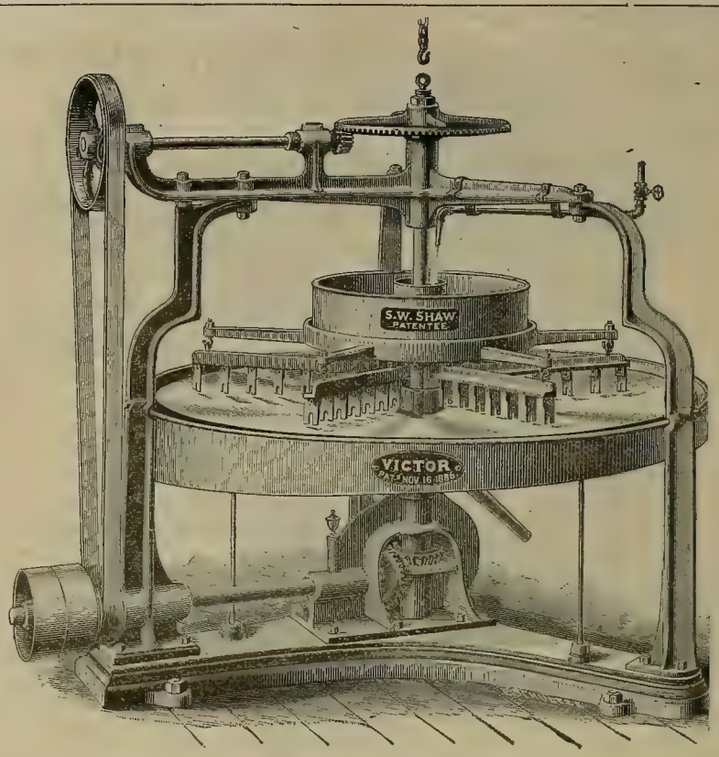

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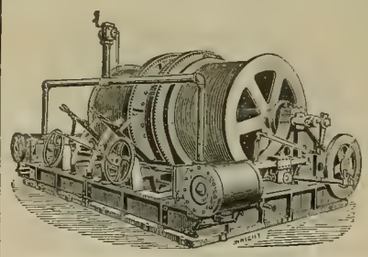

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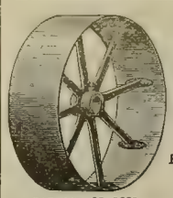

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FOR WEEK ENDING MAY 21, 1889.

403,728.—CABLE RAILWAY CONDUIT MOLD—Ira Bishop, S. F.

403,738.—BAILING-PRESS—T. J. Corning, San Jose, Cal.

403,877.—WELL BORING OR DRILLING APPARATUS—J. E. Day, S. F.

403,656.—HINGED HANDLE—J. Gerstle, Portland, Oregon.

403,702.—EXCAVATOR—Isaac P. Lambing, Ione, Cal.

403,766.—SLEIGH—Felix J. Mette, Ruby Hill, Nevada.

403,602.—STEP LADDER—J. A. Neill, East Portland, Oregon.

403,783.—WRIST PROTECTOR—C. L. Smart, Los Angeles, Cal.

403,784.—CAN HEADING MACHINE—Wm. H. Smyth, Berkeley, Cal.

403,786.—ELECTRIC RAILWAY—F. M. Speed, S. F.

403,795.—SCHOOL DESK—Chas. B. Towle, S. F.

403,796.—SCHOOL DESK—Chas. B. Towle, S. F.

403,799.—SURFACE CONDENSER—E. W. Tucker, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SCHOOL DESK.—Chas. B. Towle, S. F. No. 403,796. Dated May 21, 1889. This patent covers an adjustable sliding top which serves as a complete top to the desk and also as a cover for the book receptacle and for the place for pens, pencils and inkwell. The seat and foot-rest are also adjustable by peculiar means of construction.

SCHOOL DESK.—Chas. B. Towle, S. F. No. 403,795. Dated May 21, 1889. This invention relates to that class of school desks in which the seat can be vertically adjusted to different hights and in which the foot-rest can be adjusted in position to suit different pupils. The object of the invention is to provide a desk in which the several adjustments can be accomplished in the simplest and readiest manner and yet keep the desk free from complications and within the bounds of economy.

WELL-BORING AND DRILLING APPARATUS.—J. E. Day, S. F., assignor of one-half to Joseph Pracy. No. 403,877. Dated May 21, 1889. This relates especially to that class of drilling apparatus which is employed in drilling in rock or hard material. The patent covers the drill rod having undercut beveled shoulders at the lower end and the spear head extending below these shoulders, in combination with the independent drill shanks lying upon each side of the drill rod and spear head, the shanks of the drills being provided with shoulders corresponding with and engaging those of the rod when the latter is lowered, and having concavities or depressions within which the spear head is inclosed when the rod is raised.

SLEIGH.—Felix J. Mette, Ruby Hill, Nev. No. 403,766. Dated May 21, 1889. This covers improvements in that class of sleighs known as "bob-sleighs," which have two independent sets of runners, supporting respectively the front and rear ends of the body or box. The invention consists in connecting both front and rear bobs with the sleigh body by means of king-bolts, so that both may be turned about these king-bolts, and in connecting the front and rear opposite sides of the two bobs together by links having turn-buckles for adjusting the tension and taking up the slack. By this construction it is possible to drive a team at a high rate of speed around short corners and to turn rapidly. Different bodies may also be used and easily secured or detached. During the working hours a suitable body for the purpose may be secured to the running gear, and when desired it may readily be removed and another substituted for pleasure or other purposes, the same runners being employed for all.

CABLE-RAILWAY CONDUIT MOLD.—Ira Bishop, S. F. No. 403,728. Dated May 21, 1889. This mold for concrete work is specially adapted for the formation of conduits for subways, having narrow or contracted top openings, such as the tubes or tunnels of cable railways. The invention consists in separable opposing plates forming between them the space for the conduit and serving as the mold against which the concrete is tamped, said plates being adapted to be readily removed, through the contracted top opening without having to remove or disturb any portion of the work; and in a spreading frame between the plates, and adapted to hold them apart and in position while the concrete is being tamped and is setting, said frame being adapted to be readily removed from between the plates by drawing it out through the narrow top opening, whereby the plates themselves being relieved may also be removed. The invention also consists in the construction and arrangement of the removable mold plates, the spreading frame for holding them in position and relieving them, and the locking bar for the frame.

SURFACE CONDENSER.—Edwin W. Tucker, S. F. No. 403,799. Dated May 21, 1889. This invention relates to that class of surface condensers in which the tubes are arranged in groups or sections, adapting any group or section to be readily removed and replaced when desired. The invention consists in the novel framing of the sections, their arrangement with relation to each other and to the shell or casing of the condenser, and their novel connection therein. It further consists in a novel plate secured to the face of the tube-sheet and receiving and holding the forward ends of all the tubes; and it finally consists in a novel construction of the tubes themselves. The general object of the invention is to provide a practically constructed condenser in which the groups or sections of tubes may be readily removed and replaced without interfering with other groups or sections. The object of the securing plate in the face of the tube-sheet is to avoid the use of separate gland-nuts for each tube, and to permit any or all of the tubes of any given section or group, or of the whole condenser, to be readily taken out upon the removal of said plate. The object of the peculiar construction of the tubes is to avoid interference with the steam by affording it a clear passage, thereby reducing back pressure and also to effect the required condensation with less cooling surface than is usual with the ordinary tubes.

EXCAVATOR.—Isaac P. Lambing, Ione, Amador Co. No. 403,762. Dated May 21, 1889. This is an improvement on the excavating bucket which is in use at the Arroyo Seco mine, in Amador county. In a patent issued last July to this inventor and S. N. Knight, they showed a dredger bucket composed of sections which when closed together form a hollow hemisphere, these sections being opened and closed by means of a piston and certain connecting rods and links. Certain objections have arisen in the actual operation of this apparatus which it is the object of the present invention to overcome. The excavating bucket is formed of sections which when closed together form a cup or continuous vessel shaped something like a flattened hemisphere. The method of application of the power to close these sections is better than in the old plan and insures the perfect closing in hard material. Experience has shown that a segment of a perfect globe does not do satisfactory work because the excavated material piles up in an irregular manner when the sections are closed together. The improved construction allows the excavated material to slide well up from the point toward the sides, thus filling the bucket more evenly than when hemispherical sections are used. The bucket sections are also strengthened and the steam-power applied to better advantage than formerly.

MACHINE FOR HEADING CANS.—Wm. H. Smyth, Berkeley, Cal. No. 403,784. Dated May 21, 1889. This machine consists of but few main essential parts, namely: A stand, a reciprocating cross-head having a jaw on each side for receiving the cans, a movable carriage having a jaw in each end opposing the jaws of the cross-head, pressers for forcing the heads on the can bodies, and suitable runways and guiders for directing the can bodies and can heads. The cross-head operates between the jaws of the carriage, which are separated sufficiently, and through the intervention of a can body picks up the carriage and moves it first one way and then the other, and by this movement of the carriage the pressers are operated. A can body is placed in the runway, and, passing down, drops on to the top of the cross-head, thence in front of its jaw, and is then carried by said jaw into the jaw of the carriage, and is thus held between the jaws, and while both cross-head and carriage are moving the heads which have been properly directed down upon each side are forced by the pressers upon each end of the body. A second body having followed the first is meanwhile directed in front of the other cross-head jaw, and as the cross-head returns it is caught between said jaw and the other carriage jaw, and while both cross-head and carriage are moving on their return stroke two heads are forced by the pressers upon said body. Thus the machine is a continuous acting one, of double capacity, turning out a headed can at each stroke from each end. Minor details of construction, arrangement and adjustment go to make the machine complete.

ACCORDING TO *Invention*, a new process has been discovered by Mr. J. B. Hannay of Glasgow. By means of an entirely new method of chlorination, the cost of extracting the precious metals from refractory ores is said to have been greatly reduced. A strong syndicate has been formed by capitalists in Glasgow and Brighton, in conjunction with Mr. Fitzgerald Moore, "The Australian Silver King," to work the process.

GOVERNOR WATERMAN is making arrangements to build a 40-stamp mill at the Stonewall mine in San Diego county. The mill will cost completed about $60,000.

THE steam that blows the whistle doesn't help to make the train go.

STEAM BOILER NOTES

Kinetic Energy is the Secret of the Injector.

In a work on the steam engine, by Thomas Goodeve, the *Engineer* finds this explanation of the action, or the principles upon which the injector acts. It quotes:

"Since action and reaction are equal, it is abundantly clear that a simple jet of high-pressure steam issuing from a pipe could never drive back a jet of water issuing from another orifice of greater diameter—under the same pressure. It was a great step in science to conceive the idea that the absorption of heat which takes place at the meeting of the steam and water, could furnish a source of energy directly available for work. There has been no parallel to this discovery in any analogous direction, and it is difficult to account for its action.

"On the steam side there is the 'kinetic' motion of the molecules of steam; and on the water side there is the motion of translation of a quantity of water, and the problem is to show a possible method of passing from one to the other."

Here ends the quotation, and one need not follow it further to find the gist of the argument, which is, in brief, that kinetic energy is the secret of the injector's action. We have no right to dispute this belief, for we cannot prove to the contrary; but what does "kinetic" action, or "kinetic" energy, mean in this application? It means simply the momentum of a mass in motion—live-force, in other words; and water is the mass when we are considering the injector.

The value of the kinetic action in work is stated to be the product of the mass into half the square of the velocity, and under this view of the matter, the water is driven into a steam boiler by an injector, simply by the velocity of the mass of water, and the power developed by such velocity.

This is plausible and probable. The only elements which seem to conflict are that the velocities must be greatly reduced by tortuous passages, small orifices and condensation of the steam on meeting the water. The fact remains, however, that the water goes in, passages or no passages, and in spite of condensation.

THE IDENTIFICATION OF DRY STEAM.—At a late meeting of the American Society of Mechanical Engineers, Prof. J. E. Denton presented a paper on the above subject of which the following is an abstract: Jets of steam show unmistakable change of appearance to the eye when steam varies less than one per cent from the condition of saturation either in the direction of wetness or superheating. Further investigations show that the instrumental error of portable condensing calorimeters does not theoretically interfere with the measurement of about one per cent of variation in the heat of saturated steam. But in the use of such calorimeters there has always been found to exist an accidental variation of error considerably in excess of the theoretical instrumental error, even Regnault's magnificent work not being an exception in this respect. Consequently if a jet of steam flows from a boiler into the atmosphere under circumstances such that very little loss of heat occurs through radiation, etc., and the jet be transparent close to the orifice, or be even a grayish-white color, the steam may be assumed to be so nearly dry that no portable condensing calorimeter will be capable of measuring the amount of water in steam. If the jet be strongly white, the amount of water may be roughly judged up to about two per cent, but beyond this a calorimeter only can determine the exact amount of moisture. A common brass pet-cock may be used as an orifice, but it should, if possible, be set into the steam drum of the boiler and never be placed further away from the latter than four feet, and then only when the intermediate reservoir or pipe is well covered.

FEEDING BOILERS.—Mr. Plumier, mining engineer, recently read a paper at the monthly meeting of the graduates from the Engineering School of Liege, on the best manner of feeding steam boilers. He is opposed to the ordinary method of feeding in the coldest part, the most remote from the furnace. The boiler sheet has always about the same temperature as that of the water in contact with it. The feed should not be introduced in such a manner that the hot and cold water rest in strata; for in this case the plates in contact with the feed water (which goes to the bottom by reason of its greater density) will have at times a much lower temperature than the rest of the boiler. Hence there will necessarily result a different amount of expansion between the upper and lower sheets, which will tend either to open the riveted joints or to produce corrosion and rapid deterioration of the boiler. This is proved by numerous practical examples. Mr. Plumier concludes, therefore, that the feed-water must be mixed at once with the heated water in the boiler, thus preventing the former from sinking in a mass to the bottom and remaining there for some time at a comparatively low temperature. The engineers of the Boiler Inspection Company advise that the end of the feed pipe should be curved so as to discharge into a small vessel placed in the steam space, from the edges of which vessel the water flows gently in minute quantities. Other engineers feed in the steam space, discharging into a long pan, where a large portion of the impurities are retained, because water suddenly heated to a high temperature precipitates its saline matter.

DANGEROUS PRACTICES.—The fifth annual report of the State Inspector of Workshops and Factories in Ohio is full of instructive matter. Among other things he makes some good suggestions regarding the care of boilers and fittings, which we quote and commend: "Another dangerous practice is the calking of joints in steam pipes while pressure is on. If pipes or fittings are corroded, as they very frequently are, there is danger that the chisel or calking tool may be driven through the pipe. In such a case the workman is likely to be seriously scalded. The practice of screwing up man hole, hand-hole, and similar plates, while boilers are under pressure, to stop leakage, is of a similar nature and should be as strongly discountenanced. A great many accidents have been caused in this manner. The following occurred some years ago: A battery of three horizontal tubular boilers was fired up, and on raising steam the joint of one of the man-hole plates was found to leak quite badly. Instead of letting down the steam and repacking the joint, a wrench was applied and the attempt was made to stop the leak by screwing up on the bolt. This proving insufficient, a long piece of pipe was slipped over the handle of the wrench and more force applied. The immediate result was the fracture of the man-hole frame, the explosion of the boiler, the destruction of about $10,000 worth of property, and the loss of three lives."

GAS UNDER STEAM BOILERS.—An officer of the Philadelphia Natural Gas Company, at Pittsburg, is credited with the following statement: Experiments prove that with the present method of boiler heating it requires 2½ cubic feet of gas to evaporate 1 pound of water. The use of a proper burner will enable 1 pound of water to be evaporated by 1 38 cubic feet of gas. When we consider all the boilers in the two cities that daily evaporate hundreds of gallons of water, we can see that the excess of gas used amounts to millions and millions of feet weekly. The same principle applies to the making of salt and the puddling of iron. To puddle a ton of the latter, the mills now use 28,000 cubic feet of natural gas. The same work may be done with 14,000 feet. About the same facts obtain in the use of crude oil, as burned in this State. We shall soon have something to say in regard to economy in the use of appliances for burning oil.

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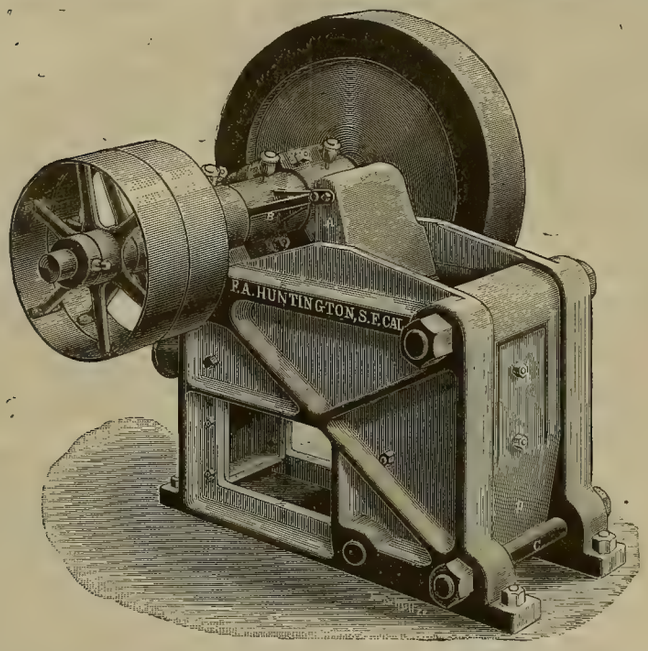
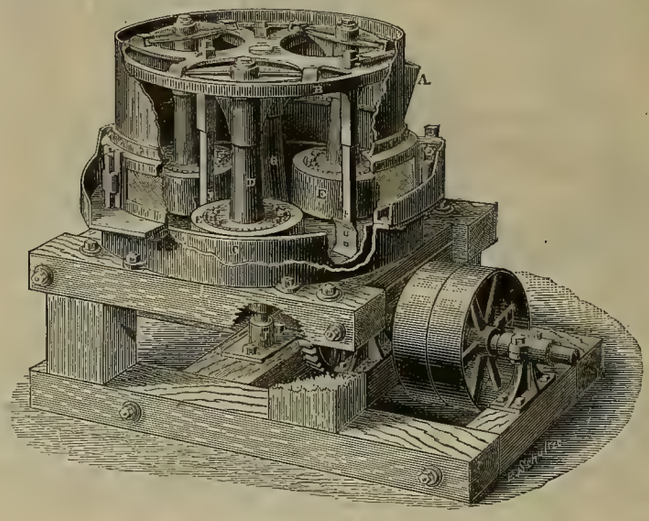


Huntington's Improved Rock-Breaker.

The main features of this machine are strength, ease of adjustment and simplicity of construction.

The movable jaw *A* is worked by the eccentric *B* and is pivoted at the bottom. The stationary jaw *D* is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt *C*. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt *C* and the jaw *D*. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



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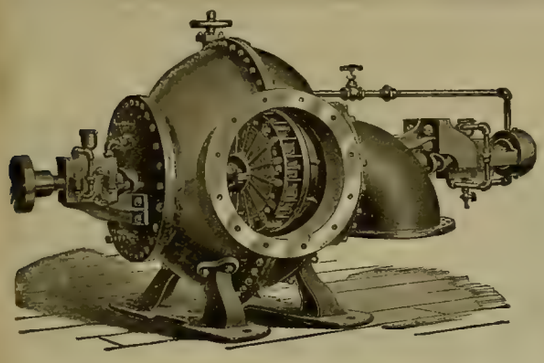

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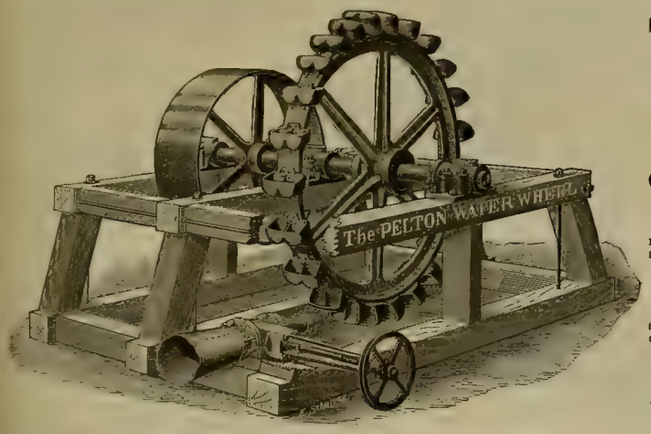

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Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

C. A. LUCKHARDT & CO.,

(Formerly Huhn & Luckhardt,

Mining Engineers and Metallurgists.

J. KUSTEL. H. KUSTEL.

METALLURGICAL WORKS.

318 Pine St. (Basement),

Corner of Leidesdorff Street, - - SAN FRANCISCO

Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters.

Mines Examined and Reported on.

Practical Instruction given in Treating Ores by im proved processes.

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Mining Engineers and Metallurgists.

GREAT REDUCTION!

BATTERY SCREENS.

Best and Cheapest in America.

No imitation, no deception, no planished or rotten iron used. Only genuine Russia iron in Quartz Screens. Planished iron screens at nearly half my former rates.

I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

PERFORATED SHEET METAL

For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass Zinc and other metals punched for all uses.

Inventor and Manufacturer of the celebrated Slot Cut burred and Slot Punched Screens.

Mining Screens a specialty, from No. 1 to 15 (fine).

Orders promptly attended to.

San Francisco Pioneer Screen Works,

21 & 223 First St., San Francisco, Cal.

JOHN W. QUICK, Proprietor.

QUICKSILVER

For Sale in Lots to Suit by

PARROTT & CO.,

306 California St., San Francisco, Cal.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, May 29, 1889.

General trade continues fairly active for the season of the year. In view of the favorable prospects for large crops and liberal water supply in the mining districts, interior merchants by not buying freely appear to be controlled by a conservative spirit, which is very commendable. There is no doubt but the State and coast in general are gaining in population, and of a class that is very desirable. This year, so far, is noticeable for an absence of land booms; the buying and prices appear to have drifted to a more substantial basis. All advices are confirmatory that in every direction improvements are going up, particularly residences in the larger cities. In this city and Oakland, it is stated that so far this year there have been expended in new buildings over $2,500,000, of which amount nearly $700,000 was paid out in Oakland. It is claimed by many that 1889 will be the banner year in building in this and adjoining cities. Iron workers, as a rule, report slack business, yet they are very hopeful of a turn in the tide for the better at an early day; already there are signs of improvement.

Money is still reported to be easy, and in excess of immediate requirements, but present indications point to an active call setting in soon for crop purposes. It now looks as if more money will be tied up in grain than for several years past; yet the money advanced on the grain will go into general circulation, so that no friction will be had even if the grain is not sold for export. For the other crops considerable money will be required, but as they will go almost immediately into consumption or be shipped, the money advanced will soon be returned. The rates of interest at commercial banks range from 4 to 8 per cent per year, according to security and time wanted.

The steamer Belgic, hence for Hongkong on May 25th, took out the following treasure: To Hongkong, Mexicans, $382,204; gold coin, $3730; gold-dust, $325; silver bullion, $107,000; total, $493,259. To Hiogo, silver bullion, $45,000.

The clearing-house returns continue to show an increase in clearings and balances over last year at this time; and this, too, in the face of an absence of any speculative movement in this month.

SILVER—The market held to firm prices abroad up to Monday, when they shaded off one-sixteenth, with another drop yesterday of another one-sixteenth. In this market 92¾, and even a point or two higher was paid for bullion for shipment by the last steamer for China, but on Monday the market dropped to 92¼ to 92⅜ cents. The receipts of silver bullion continue surprisingly light, with the outlook not at all favorable for an immediate increase. It now looks as if in the summer months the receipts from the coast mines will be very light. The vain endeavor made to induce the administration to increase the silver coinage is not calculated to improve the outlook for bullion. Friends of the metal affirm that they will be able to pass a more favorable law through Congress, the coming winter.

To-day's (Wednesday's) cablegram quotes silver at 41 15-16@42d in London, and at 91⅛@91⅝ cents in New York. Our markets also quoted lower, with no sellers at the bids. Buyers give 91¾@91⅞ cents here; holders want more money.

MEXICAN DOLLARS—The market held strong up to Monday at 74 cents for new, but fell on that day to 73¾ cents in sympathy with a decline in silver bullion and an absence of buyers. For old, the prices generally ranged about ½ cent below new. The shipments by the last two steamships for Hongkong were quite heavy.

Owing to a decline in silver, buyers are trying to get more concessions on Mexican dollars. Quotations are nominal at 73¾ to 73½ cents for new.

QUICKSILVER—The market has held to very strong prices throughout the week, under continued light supplies, a fairly good demand and a strong market abroad. Receipts the past week aggregate 227 flasks.

LEAD—Shipments by sea the past week aggregated 20,078 pounds to Victoria, B. C. The market is fairly steady. The consumption on this coast compared with the like time in last year shows an increase. At the East the market fluctuated to some extent the past week. The demand consumption there appears to be increasing.

TIN—The shipments by water the past week aggregated 700 boxes tin plate to Victoria, B. C., and the imports 33,588 boxes from Liverpool. The market is heavy and weak at lower prices for tin plate, both spot and prompt shipment. Canners and other consumers confine their wants as much as possible. Pig tin on spot is only in fair stock, but near by shipments keep prices down.

BORAX—Receipts the past week aggregate 1510 centals. The market is quiet but firm.

LIME—Receipts the past week aggregate 5385 barrels. The demand continues free with prices unchanged.

IRON—The market for pig continues inactive, but bolders are reported to be firm in their views, owing to the active and strong markets abroad. Consumers confine their purchases as much as possible.

COAL—Imports the past week were as follows: Seattle, 602t tons; Nanaimo, 5640; Tacoma, 6000; Coos Bay, 860; total, 18,321 tons. The market for coast is easier under liberal supplies and a light demand for household purposes. Australian is very strong with the tendency to higher figures, owing to the sale of 50,000 tons (reported in last week's PRESS) being off the market. Other foreign descriptions are also firm.

Eastern Metal Markets.

By Telegraph.

NEW YORK, May 29, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42½	92¾	$12 25	$3 70	$20 40
Friday	42½	92⅝	12 20	3 77½	20 35
Saturday	42½	92⅝	12 20	3 80	20 40
Monday	42 3-16	92¼	12 25	3 87½	20 65
Tuesday	42½	92	12 00	3 90	20 50
Wednesday	41 15-16	91⅝	12 00	3 87½	20 45

NEW YORK, May 28.—The dictated price of 12c to consumers for Lake copper is still quoted, with only moderate sales. Casting brands, mainly Arizona, 11¾@11½. A Paris cablegram announces that the American copper-mine delegates, with the exception of Tamarack, ratified the provisional arrangements concluded with M. Moreau, the liquidator of the Comptoir d'Escompte. The agreement is binding without the adhesion of the Tamarack Co. The Lake Superior production in April was 4572 tons; April of last year, 4475; January to date, 18,070 tons; last year, 16,194. Pig lead is quiet for speculation or consumption; closing cash prices, $3.80@3.85.

San Francisco Metal Market.

WHOLESALE.

THURSDAY May 29, 1889.

ANTIMONY	—	@ 14
BORAX—Refined	7¾	@ 7⅞
Powdered	7¾	@ 7⅞
Concentrated	7	@ 7⅛
COPPER—		
Bolt	26	@ 27
Sheathing	26	@ —
Ingot	17½	@ 18½
Fire Box Sheets	—	@ 28
LEAD—Pig	4½	@ —
Bar	5	@ —
Sheet	8	@ —
Pipe	7	@ —
Shot, discount 10% on 500 bags Drop, ₱ bag	1 45	@ —
Buck, ₱ bag	1 65	@ —
Chilled, do	1 85	@ —
STEEL—English, lb	16	@ 20
Canton tool	9½	@ —
Black Diamond tool	10	@ 15
Pick and Hammer	8	@ 10
Machinery	4	@ 5
Toe Calk	4½	@ —
TINPLATE—B. V., steel grade, 14x20, P. S.	4 70	@ 4 75
B. V., steel grade, 14x20, spot	4 85	@ 4 95
Charcoal, 14x20	6 50	@ 7 00
do roofing, 14x20	5 37½	@ 5 50
Pig tin, spot, ₱ lb	23	@ 23½
do, do, prompt shipment	—	@ —
QUICKSILVER—By the flask	47 50	@50 00
Flasks, new	1 05	@ —
Flasks, old	85	@ —
COKE—English, ton, spot	20 00	@— —
Do, do, to load	13 50	@13 75

IRON—Glengarnock ton	Spot. 27 00	@—	To Load. 27½@ —
Eglinton, ton	26 00	@ —	26½@ —
American Soft, No. 1, ton	— —	@31 00	31½@ —
Oregon Pig, ton	— —	@30 00	— @ —
Clay Lane White	— —	@24 50	25 @ —
Shotts, No. 1	28 50	@29 00	— @ —
Bar Iron (base price) ₱ lb	2¾	@ 3	— @ —
Chrome iron ore, ₱ ton	— —	@10 00	— @ —

Lumber.

Pine, Fir and Spruce.

	RETAIL.	JOBBING.
Rough Pine, merchantable, 40 ft	$19 00	$16 00
41 to 50 ft	20 00	17 00
51 to 60 ft	22 00	19 00
61 to 70 ft	26 00	22 00
1x3, fencing	21 00	18 00
1x4, "	20 00	17 00
1x3, 1x4 and 1x6, odd lengths	18 00	15 00
Second quality	16 00	14 00
Selected	23 00	21 00
Clear, except for flooring	30 00	27 00
Clear for flooring	1 00	.....
Clear V. G. No. 1 flooring	5 00	.....
Firewood	13 00	9 00
Dressed Pine, flooring, No. 1, 1x6	31 00	28 00
No. 1, 1x4	33 00	29 00
No. 1, 1¼x4, 1¼x6, and odd sizes	36 00	32 00
All sizes, No. 2	26 00	23 00
Stepping, No. 1	43 00	34 00
Stepping, No. 2	33 00	24 00
Ship timber and plank, rough	26 00	17 00
Selected, planed 1 side, av'ge 40 ft	28 00	23 00
" " 2 " " "	30 00	25 00
" " 3 " " "	32 00	27 00
" " 4 " " "	34 00	29 00
Deck plank, rough, average 35 ft	34 00	31 00
Dressed, average 35 feet	39 00	34 50
Pickets, rough, B M	19 00	15 00
¼x1½, 4 ft long, ₱ M	5 50	4 00

Coal.

TO LOAD.

	Per Ton.		Per Ton.
Australian	$ 6 75 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	6 00
Scotch Splint	8 00	Seattle	6 00
West Hartley	9 50	Coos Bay	5 00
Greta	8 00	Cannel	10 00
Westminster Brymbo	8 00	Egg, hard	17 00
Nanaimo	9 00	Cumberland, in sacks	18 50
Sydney	$ 8 00	do, bulk	17 50

New Incorporations.

ATLAS IRON WORKS, May 24. Object, to conduct a foundry and ship-building business. Directors—J. B. Jardine, James Jardine, Wm. Hendry, J. T. McCrossen and L. Greenebaum.

PACIFIC COAST WOOD-WORKING CO., May 24. Directors—Frank S. Zimmerman, Robert P. Hastings, J. C. L. Wadsworth, Nathan L. Lenhan and C. H. Fitler.

LAS ANIMAS LAND AND CATTLE CO., May 24. Capital stock, $2,000,000. Directors—George W. Grayson, A. Borland, W. S. Hopewell, N. Grayson and Robert R. Grayson.

RADAM'S MICROBE KILLER CO., May 28. Object, to manufacture medicine. Capital stock, $100,000. Directors—H. G. Billings, S. A. Billings, C. E. White, H. Garthwaite, and Charles E. Wilson.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Cons. California and Virginia, May 26, $71,316; Justice, 28, $4531; Navajo, 28, $14,000; Alice, 24, $33,728; Hanauer, 22, $9500; 24, $3000; Crescent, 26, $5350; Hanauer, 26, $2750; Commonwealth, 25, $20,000; Standard Con., 25, $7386.

THE BOILER FURNACE.—When you have to repair your boiler furnace, says the *Stationary Engineer*, and can't get any fire-clay, take common earth mixed with water in which you have dissolved a little rock or other salt; use the same as fire-clay. The furnace will last fully as long.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T. LEVIED.	DELINQ'NT. SALE.	SECRETARY.	PLACE OF BUSINESS
Belle Isle M Co	Nevada	12	10	Apr 19	May 23	June 13	J W Pew	310 Pine St
Bodie Con M Co	California	10	50	Mar 25	Apr 30	June 4	B L Burling	309 Montgomery St
Buena Vista Petroleum Co	California	34	50	Apr 24	May 30	June 27	J Morizio	328 Montgomery St
Bulwer Con M Co	California	5	25	Apr 10	May 15	June 12	L Osborn	309 Montgomery St
Exchequer M Co	Nevada	27	25	Apr 2	May 7	May 28	C E Elliott	309 Montgomery St
Found Treasure M Co	Nevada	5	12½	Apr 10	May 16	June 6	J Stadfeld Jr	309 Montgomery St
Gould & Curry M Co	Nevada	62	30	May 1	June 5	June 27	A K Dustron	309 Montgomery St
Gray Eagle M Co	California	13	05	May 15	Jun 25	July 16	O H Bogart	327 Pine St
Inyo Marble Co	California	6	5	May 14	Jun 24	July 24	G W Luce	205 Front St
Kentuck M Co	Nevada	18	30	Apr 26	May 29	June 19	J W Pew	310 Pine St
Locomotive M Co	Arizona	4	50	Apr 25	May 29	June 18	A H Fish	309 Montgomery St
Morgan M Co	California	13	15	May 9	Jun 17	July 8	C S Neal	330 Montgomery St
Opir M Co	Nevada	55	50	May 11	Jun 16	July 2	E B Holmes	309 Montgomery St
Occidental Cons M Co	Nevada	4	50	Apr 8	May 13	June 5	A K Dustron	309 Montgomery St
Oak Con M Co	California	2	3	Mar 29	May 25	June 20	E J Ryan	230 Montgomery St
Pinal Con M Co	Arizona	8	13	May 15	Jun 21	July 12	A Cheminant	328 Montgomery St
Potosi M Co	Nevada	32	30	Apr 10	May 15	June 5	C E Elliott	309 Montgomery St
Silver Hill M Co	Nevada	24	20	Apr 20	May 23	June 13	D C Bates	309 Montgomery St
Sierra Union M Co	California	1	10	00	Apr 10	May 13	June 5	Wm V White	208 Sansome St
Teirakoff M Co	California	2	10	May 18	Jun 18	July 18	W J Gurnett	308 Pine St
Trinity Riv Tun & M Co	California	1	7	1-2	Apr 11	May 24	June 13	L H Parkman	Cor Bush & Montgy Sts
Union Con M Co	Nevada	38	25	May 13	Jun 19	July 10	J M Buffington	303 California St
Weldon M Co	Arizona	13	10	May 15	Jun 18	July 9	A Waterman	309 Montgomery St
Yellow Jacket M Co	Nevada	48	50	Mar 28	May 1		W H Blauvelt	Gold Hill

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Cadmus M Co	Nevada	J Craig	204 California St	Annual	June 3
Crown Point M Co	Nevada	J Newlands	329 Pine St	Annual	June 3
Goodshaw M Co		C O Harvey	303 California St	Annual	June 4
Pinal Con M Co	Arizona	A S Cheminant	328 Montgomery St	Annual	June 4
Seg Belcher & Midas Con M Co	Nevada	E B Holmes	309 Montgomery St	Annual	June 4

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	May 10
Caledonia M Co	Nevada	A O Cheminant	328 Montgomery St	08	Apr 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Mining Share Market.

The market the past week, or up to last evening (Tuesday), so far as the Comstocks are concerned, has been an almost constant sinking in prices. It looks as if the manipulators have instructed their brokers not to bid for stocks, but take them in at steadily declining prices. By this means a panic is prevented, the large shorts kept from filling and the inside get margin stock. The street wears a deserted look, but this is not at all the unusual occurrence when prices drag around about bottom. As soon as the inside is ready and throw out the bait, suckers rush in to buy.

At the 9:30 session this A. M., the market for the Comstocks opened weak and lower, but began to rally when the Gold Hills were called. After the board, prices did better. The advance is looked on by many as a natural reaction, while others again think that the mines justify an upward move. In the outside stocks there was a steady tone in the Quijotoas and Tuscaroras, as if insiders were preparing for a small move. An attempt was made to galvanize the Bodies into life under the old contest for election racket. They moved up about 40 per cent, but with some of the outside holders attempting to realize, the market began to break this forenoon.

From the Comstock mines the news continues of a meager and unsatisfactory character. Either there is nothing new to report or else the pool is purposely keeping information back. Those having correspondents at the front assert that it is nearly impossible to keep information back, consequently, if this is the case, there is nothing to report outside of the stale old statistical work reports. From Con. Virginia our advices report an improvement on the 1400-foot level near the Ophir line. From the Middle and Gold Hill mines all advices are of favorable character, as they are from the North End mines. The work is still westward. In several of the drifts or crosscuts, stringers are expected to be run into as work progresses, which ought to make a livelier market here. There is no doubt but the inside has some cheap stock which they will want sooner or later to sell out at a good profit. When this time comes outside holders who do not want the earth can get out and wait for developments. As it now looks, there ought to be quite a number of assessments levied in the near future. Owing to this being a broken week—to-morrow being a legal holiday—not much can be said either on the market or on the mines.

Elsewhere an editorial appears on the bullion output of the Comstock lode, together with cost, etc. It will be seen by referring to the article the cost of extraction, milling, etc., is very high in some of the mines, which contrasts strongly with the following from the Virginia City *Chronicle*, May 25th: "J. C. Dunlop, owner of the Wild Goose mine in Jumbo district (west side of Mt. Davidson), and who is erecting a five-stamp steam mill at the mine, says he can mine and mill the ore from the Wild Goose at a total cost of $2 per ton."

The Comstock lode is on the east side of Mt. Davidson.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. C. HOAG—San Francisco.
R. G. BAILEY—San Francisco.
W. E. BECK—San Francisco.
W. W. THROBALDS—Central California.
F. E. LOGAN—Southern California.
H. G. PARSONS—Southern California.
GEO WILSON—Sacramento Co.
FRANK S. CHAPIN—Colusa and Lake Cos.
E. H. SCHAEFFLE—Calaveras and Tuolumne Cos.
DR. W. F. DRAKE—Sonora, Cal.
CHAS. DUGAN—Stanislaus Co.
A. F. JEWETT—Tulare Co.
E. B. GREENOUGH—Humboldt and Mendocino Cos.
CHAS. F. BLACKBURN—Idaho.
R. G. HUSTON—Montana.

A VALUABLE PAPER. — THE MINING AND SCIENTIFIC PRESS of May 18th devotes considerable space to Tuolumne county and the mines. On the first page is a photo-facsimile of Sonora with an article descriptive of her county. An entire page is devoted to the early history and description of Tuolumne mines and another page to an interesting history and description of the Bonanza. The PRESS is a valuable paper and ought to be read by every one interested in mining and scientific matters on the coast.—*Sonora Democrat, May 25.*

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 8.		WEEK ENDING May 15		WEEK ENDING May 22.		WEEK ENDING May 28.	
Alpha	1.90	2 30	2.00	2.20	2.65	2.10	1.70	1.85
Alta	1.75	2.00	1.65	1.90	1.40	1.65	1.45	1.60
Andes	.76	.80	.75	.85	.50	.75	.60	.70
Argenta	....	....	....	....	....	....	....	....
Belcher	3.75	6.25	4.80	5½	3.75	4.95	3.80	4.20
Best & Belcher	3.75	4.20	3.80	4.30	3.50	3.90	3.65	3.95
Bullion	.90	.95	.90	1.00	.70	.90	.80	.85
Baltimore	....	....	....	....	....	.20	.15	.15
Belle Isle	....	....	.20	.25	....	....	.30	.30
Bodie Con	1.75	2.00	1.65	1.80	1.45	1.70	1.50	2.10
Benton	....	....	....	3.50	....	....	....	....
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.30	.35	.30	.60	.45	.50	.40	.55
Commonwealth	5.25	5.50	4.80	5.50	4 70	4.50	4.90	5½
Con. Va. & Cal	8.00	8.50	7.75	8.50	7.50	7¾	7¼	7⅞
Challenge	3.25	4 25	3.50	3.05	2 70	3.3	3.00	3.15
Chollar	2 45	3.30	2.55	3.00	2.05	2.60	2.15	2.45
Confidence	8.50	10.0	7	8¼	7	7¾	7¼	7¾
Con. Imperial	.60	.70	.60	.70	.50	.60	.50	.60
Caledonia	.35	.40	.30	.35	.20	.35	.25	.25
Con. Pacific	....	....	....	....	....	....	....	.15
Crown Point	3.80	4.80	4.05	4.30	3.40	4.35	3.45	3.80
Crocker	....	.55	.45	.50	.40	.45	.35	.40
Central	....	....	.10	.15	....	....	....	....
Dudley	.25	.30	....	.30	....	....	.20	.30
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	2.00	....	1.50	....	1.50	....	....
Exchequer	.65	.95	1.00	1.05	.75	.95	.85	.85
Grand Prize	.70	.80	.70	.75	.70	.80	.65	.75
Gould & Curry	2 35	2.60	2.40	2.65	2.10	2.35	2.15	2.45
Hale & Norcross	4.50	5.00	4.25	4.75	3.75	4.30	3.90	4.25
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	.25	.35	.30	.35	.20	.30	.25	.25
Justice	1.35	1 40	1.30	1.4	1.00	1.20	1.05	1.15
Kentuck	1.45	2.10	1.50	1.70	1.10	1.20	....	....
Lady Wash	.30	.35	.35	.40	.25	.35	....	....
Locomotive	....	.10	....	.05	....	....	....	....
Martin White	....	....	....	....	....	....	....	....
Mono	1.75	1.95	1 60	1.70	1.35	1.60	1.60	1.85
Mexican	4.25	4.60	4.40	5½	3.30	4.45	3.40	3.75
Mt. Diablo	....	....	....	....	....	....	....	....
Navajo	.80	.85	.75	.80	1.70	.75	.50	.60
North Belle Isle	1.55	1.75	1.20	1.55	1.35	1.50	1.35	1.50
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	1.60	1.70	1.20	1.45	1.20	1.50	1.35	1.45
North G. & O	....	....	....	....	....	....	....	....
Occidental	1.10	1.20	1.50	1.75	1.45	1.55	1.50	1 60
Ophir	4.95	5.50	4.90	5¼	4.10	4 90	4.30	4.75
Overman	1.30	1.35	1.35	1.50	1.10	1.45	1.30	1.35
Potosi	1.80	2.25	2.45	2.60	2.00	2.45	2.20	2.45
Peerless	.60	.65	....	.60	.50	.60	.50	.60
Peer	.25	.30	....	.25	....	.25	.25	.25
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.70	3.25	2 60	3.25	2.30	2 60	2.45	2.75
S. B. & M	2.90	3.90	3 00	3.20	2.60	3.15	2.75	3.05
Sierra Nevada	3.40	3.85	2.45	3.80	2.65	3.45	2.55	2.85
Silver Hill	.40	.45	....	....	.35	.50	.45	.50
Silver King	....	1.05	....	....	....	....	....	....
Scorpion	....	.60	.55	.60	.20	.55	.20	.25
St. Louis	....	.50	....	.50	.40	.50	....	....
Syndicate	....	.10	....	....	....	....	....	....
Union Con	4.05	4.60	4.50	5½	3.30	4.45	3.35	3.75
Utah	1 30	1.50	1.30	1.40	1.00	1.30	1.05	1.25
Yellow Jacket	3.90	4.70	4.25	4.45	3.80	4.65	3.80	4.00
....	....	....	....	....	....	....	....	....

Sales at San Francisco Stock Exchange.

THURSDAY, Jun. 29, 9:30 A. M.

		250	Justice	1.10
		50	Lady Wash	35c
370	Alta	1.50	500	Locom	10c
270	Alpha	1.75	50	Mexican	3 40
270	Belcher	3.95	1550	New York	25c
300	Best & B	3.65	30	N. Belle Is	1.60
200	Belle Isle	30c	20	Ophir	4 25
50	Benton	3.00	100	Peerless	65c
350	Bodie	2 15	50	Potosi	2.20
100	Bulwer	55c	150	Savage	2.50
100	Challenge	3.00	1009	Scorpion	25c
50	Chollar	2.25	400	S. B. & M	2.90
110	Commonwealth	5.37½	350	Sierra Nevada	2.70
290	Crown Point	3.60	200	Utah	1.10
200	Con Va & Cal	7.87½	450	Union	3.45
100	Grand Prize	80c	100	Weldon	15c
220	Gould & Curry	2.20	300	W Comstock	45c
100	Hale & Nor	3.90	50	Yellow Jacket	3.90

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Should this paper be received by any subscriber who does not want it, *or beyond the time he intends to pay for it*, let him not fail to write us *direct* to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

AN expert representing a New York company will arrive on the Comstock next month to inspect the North Bonanza mine in Flowery district, with a view to its further development.

THE Bear's Nest mine will have its first 120 stamps up this fall, making a total of 480 stamps across the slough from Juneau, Alaska.

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1850. —BUILDERS OF— 1888.

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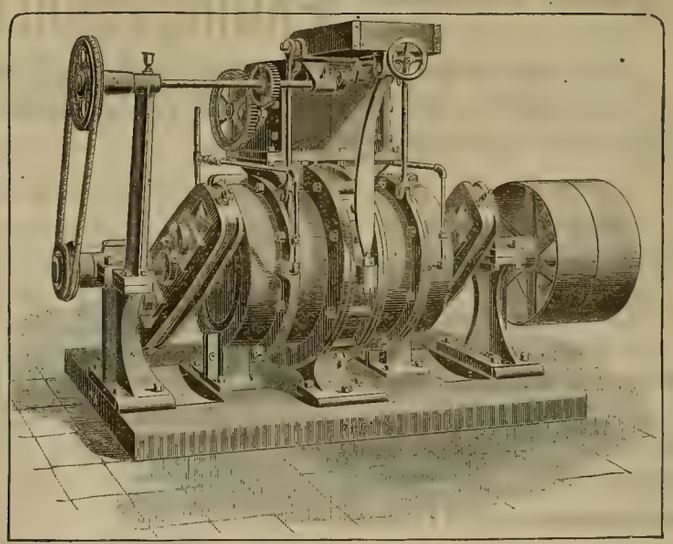

IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

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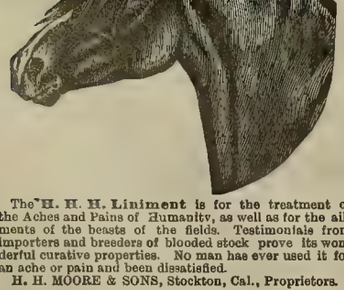

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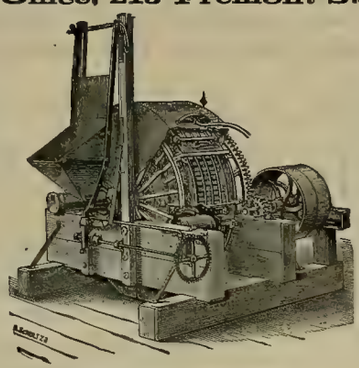

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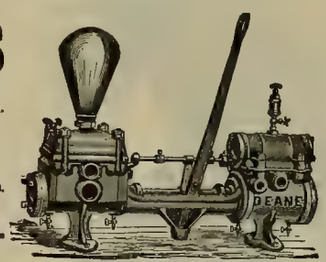

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COAL MINES OF THE WESTERN COAST.
A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for $2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

N. W. SPAULDING
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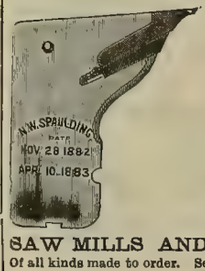

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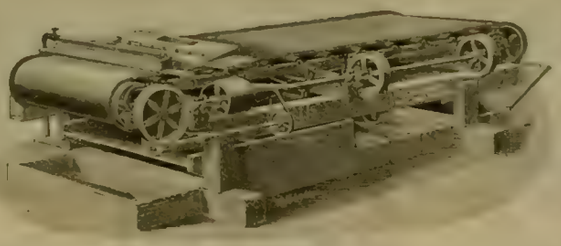

Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

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DEAR SIRS:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

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The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

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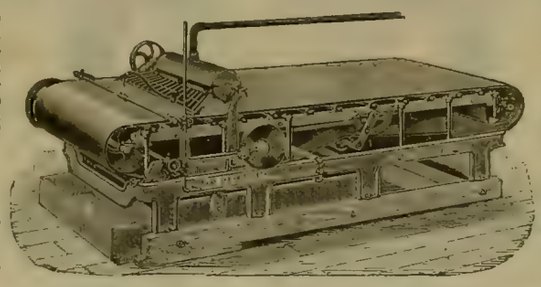
We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



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(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

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Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.

GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.

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GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID McKAY, JR.,
[Signed] Sup't North Star and Original Empire Mining Co.

N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

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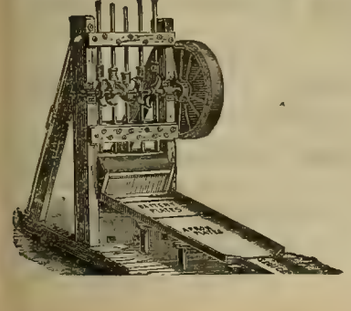

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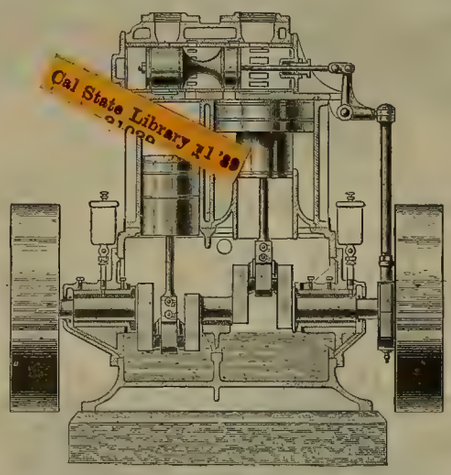
GREATEST CAPACITY
OF ANY CONCENTRATOR MADE,
One Machine Taking Pulp from 10 Stamps.



SAW MILLS, MACHINE TOOLS,
PLANING MILLS, INJECTORS and EJECTORS,
BELTING, PACKING, OILS, LUBRICATORS,
FIRE EXTINGUISHERS,
CENTRIFUGAL PUMPS,
ROTARY PUMPS, GANG EDGERS,
CAMPBELL'S STEAM FEEDS,
MILL and MINE SUPPLIES.

GENERAL AGENTS FOR

WESTINGHOUSE AUTOMATIC ENGINES.

SALES DURING LAST FOUR MONTHS:

COMPOUND, 44 ENGINES, 5215 HORSE POWER. STANDARD, 99 ENGINES, 4500 HORSE POWER. JUNIOR, 166 ENGINES, 4260 HORSE POWER.

Grand Total, 309 Engines, Aggregating 13,975 Horse Power.

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Risdon Iron and Locomotive Works,

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Mining and Milling Machinery,
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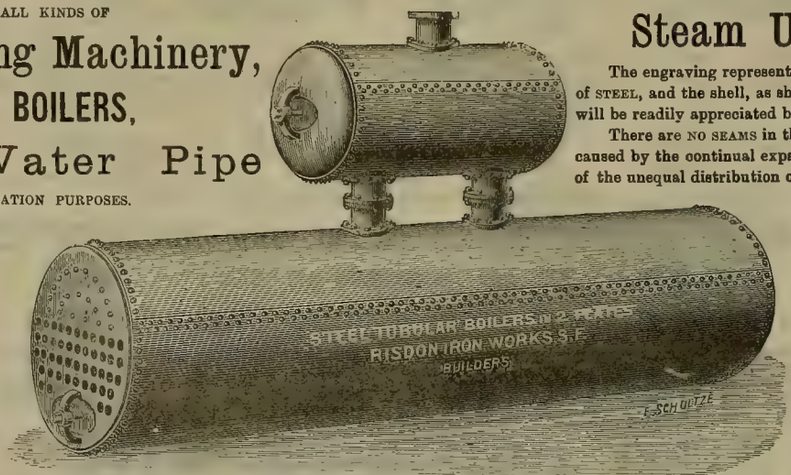
FOR MINING AND IRRIGATION PURPOSES.

Manufacturers of
Bryan Roller Quartzmill,
Best in the World,
—AND—
SAWMILL MACHINERY.
Heine Patent Safety Boiler
—AND—
Macbeth Steel Pulley.



STEEL BOILERS IN TWO PLATES.

Steam Users, Attention!

The engraving represents our standard Boilers. These boilers are made of STEEL, and the shell, as shown, being in TWO PIECES, the advantage of this will be readily appreciated by steam users.

There are NO SEAMS in the fire to leak, nor loose rivets to contend with, caused by the continual expansion and contraction of the plate on account of the unequal distribution of the heat under the boiler, the bottom presenting a smooth, even surface which can be easily cleaned. We place a manhole at the back end above the tubes, and one in the front end under the tubes.

The FRONT MANHOLE gives free access to the sheet over the fire, THE VITAL PART OF EVERY BOILER. This point is often overlooked by purchasers, and boilers are bought which have a small hand-hole, and the remaining space filled with tubes which allows absolutely no access for cleaning, and in a short time tubes and sediment are one solid mass, and instead of gain in efficiency by a few feet of tube surface, the result is a positive loss.

SPECIFICATION OF BOILER AND FIXTURES:

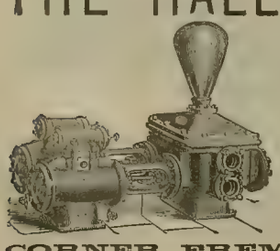
1 Boiler, 1 Steam Drum, 1 Breeching, 1 Smokestack, 300 Feet Galvanized Strand for Guys, 1 C. I. Front Complete, 1 Foundation Plate for Front, 1 Set Grate Bars for Coal or Wood, 1 Back Bar Bearer, 1 Ash Cleaning Door and Frame, 1 Back Arch Plate, 1 Set Binder Braces and Bolts for Brickwork, 1 Stand for Back End of Boiler, 1 Steam Gauge for Syphon, 1 Glass Water Gauge Complete with Column and 3 Gauge Cocks, 1 Safty Valve, 1 Feed Valve, 1 Blow-off Valve, 1 Check Valve.

These Boilers are tested to 150 pounds hydrostatic pressure and are intended for a working pressure of 100 pounds.

Boilers of the following Sizes in Two Sheets kept Constantly on Hand ready for Shipment: 60 Inches Diameter x 16 Feet Long; 54 Inches Diameter x 16 Feet Long; 48 Inches Diameter x 16 Feet Long; 42 Inches Diameter x 16 Feet Long.

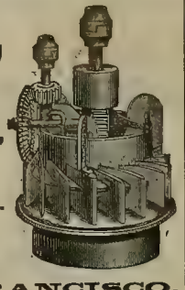
SEND FOR CIRCULARS.

THE HALL DUPLEX STEAM PUMP,



The Most Simple, Efficient and Durable Duplex Steam Pump in Use
FOR ALL DUTIES.

THE T. H. RISDON TURBINE WATER WHEEL,
SUITABLE FOR ALL FALLS. ADAPTED TO ALL CONDITIONS.
Built Specially for Durability.
HAS THE HIGHEST RECORD FOR PERCENTAGE OF POWER.
Catalogues Sent on Application.



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TWENTY-PAGE EDITION.

VOL. LVIII.—Number 23.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, JUNE 8, 1889.

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Single Copies, 10 Cts.

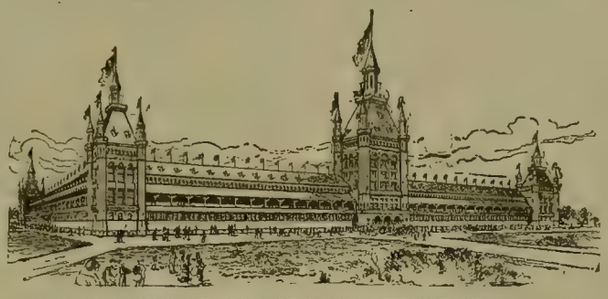
A Frame for Dumping Cars.

Illustrations are given herewith of Behr's car-dumping frame, which can be used to great advantage in gravel and drift mines where cars are run in trains. The frame is hinged on each side, and after car has been run upon it is released by a catch operated by treadle: a slight shove then throws the car into position for discharging, as shown in dotted lines in one of the cuts. The same catch working automatically, holds car and frame until car has discharged, when the center of gravity having changed, the car falls back to its usual position upon releasing catch. This method of dumping not only permits a large number of cars being dumped in a short time, but also does away with the necessity of having any device on car itself for dumping.

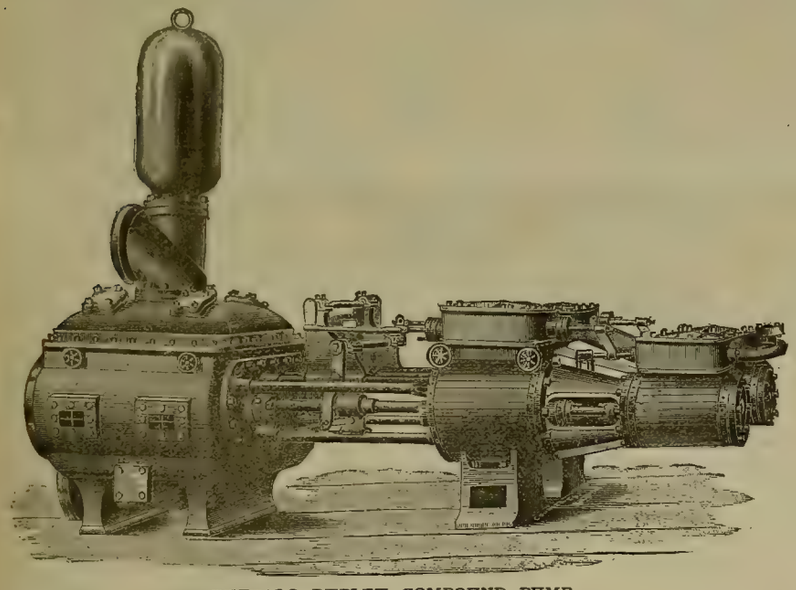
The engraving representing the car-dumping frame and car shows in dotted lines the position assumed by the frame and car when dumping. The car is designed for use in gravel and drift mines where trains are used. As no dumping arrangement is required on a car when used in conjunction with this dumping-frame, the body of boiler iron is placed directly upon a pine frame and securely bolted and held to it by wrought braces at each end. A drawbar runs the length of frame, with a hook on each end for coupling up. Side frames are carried out and capped so as to act as buffers. As will be seen, this car is very strong and simple in construction, insuring long wear and reduced first cost. These cars and dumping-frames are manufactured in this city by the Fulton Iron Works.

LARGE deposits of aluminum and beds of blue clay of peculiar tenaciousness have been discovered at El Toro station, south of Santa Ana, Los Angeles county. It is thought a fine quality of cement can be manufactured there.

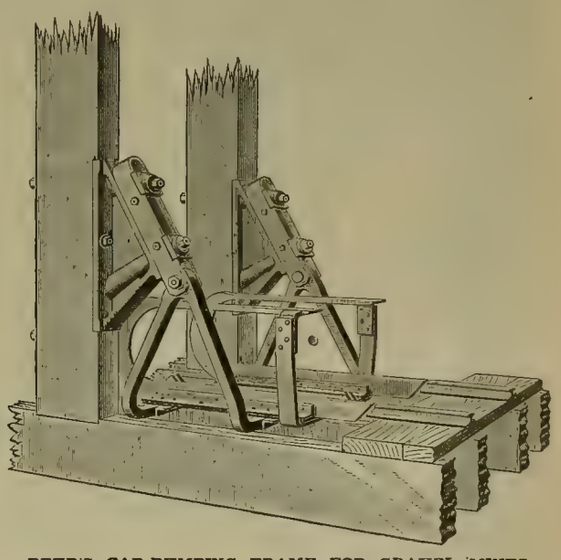
GOLD-DUST is shipped daily from Folsom, and on Monday of last week $12,000 worth of it went from that town by express.



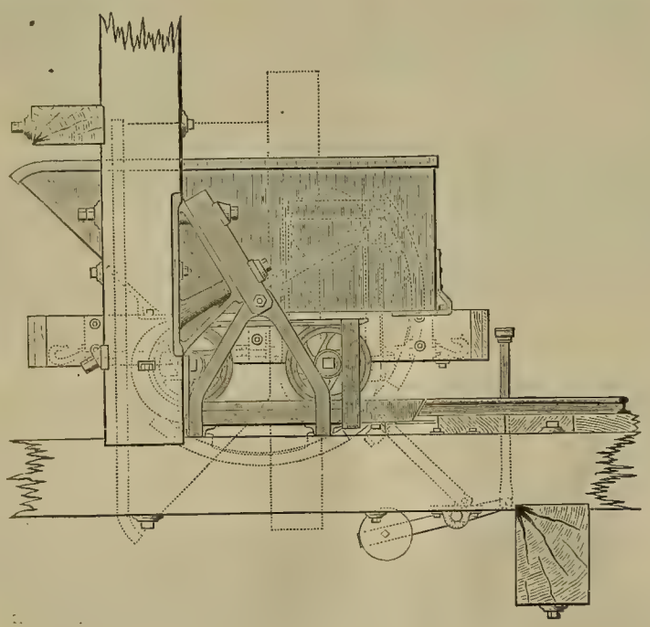
MAIN BUILDING OF THE DETROIT EXPOSITION.—See page 420.



BUFFALO DUPLEX COMPOUND PUMP.



BEHR'S CAR-DUMPING FRAME FOR GRAVEL MINES.



BEHR'S CAR-DUMPING FRAME AND CAR.

Buffalo Duplex Compound Steam Pump.

The duplex movement in steam pumps has always possessed an interest from a mechanical standpoint, and excellent results have been obtained by its adoption and use.

In the form of pump illustrated on this page not only is the duplex theory exemplified, but an admirable valve motion is adopted by which concussion, jar and noise are entirely obviated.

It will be noted that two steam pumps are practically placed side by side, and so arranged as to act reciprocally upon the steam valves of each other. The one piston acts to give steam to the other, after which it completes its own stroke and waits for its valve in turn to be acted upon before it can renew its motion. The slight interim allows all of the water valves to seat quietly and thus prevents anything like concussion of action.

As one of the steam valves by this arrangement must always be open, there can be no dead point, consequently no jar, and the pump is always ready to start when steam is admitted; nothing is required to be done but simply to open and close the throttle valve. This arrangement is the perfection of simplicity in its own action, the operation of each pump being dependent upon its counterpart, while each is directly and arbitrarily dependent on the motive-power, the steam, and the whole on one simple throttle.

In the matter of comparison it is, of course, evident that the duplex pump, being as stated, in fact, two steam pumps working side by side, only taking steam from one valve, and discharging water into one pipe, has double the capacity, for any given period of time, of any single cylinder steam pump of same diameter of plunger, and to possess the same capacity of service, a single cylinder pump must have a plunger or water piston of twice the area of one of the plungers of a duplex pump.

(*Concluded on page 420.*)

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Northern Counties of California—No. 3.

Auriferous Gravel and Quartz.

EDITORS PRESS:—Referring to an article under the above caption in your issue of May 25th, with Mt. Shasta, in Siskiyou county, as the focus of disturbance, we find the formation of the surrounding country changed, broken and shattered owing to the previously described violent convulsions caused by dynamic influences. Intrusive masses of porphyry and granite appear with dykes of trap and lava-filled fissures breaking the continuity of the strata and in places faulting entire belts with their metalliferous lodes, throwing them for greater or lesser distances, invariably, however, appearing in place on the same line of strike and angle of inclination. The trend of the stratification is north 20 east in contradistinction to the strike of the metamorphic slates that flank the Sierra Nevada range proper in more southerly counties, which strike is west of north, corresponding to the axis of the main chain.

In this vicinity sections taken from east to west show the following results:

[Reference is here made to the Eighth Annual Report of the State Mineralogist for the year ending Oct. 1, 1888, under the headlines of "Metallic Wealth," pages 583 and 584, in which much data relating to the mineral belts of Siskiyou county has been published. The facts submitted in this article were excluded for want of space.]

Commencing at the extreme northerly boundary of Siskiyou county, in Tp. 48 N. R. 7 and 8 west,

An Important Gold-Bearing Belt

Which is as yet comparatively virgin, was accidentally discovered last year by a prospector. Crossing the divide that separates the waters of Cottonwood and Bumblebee creeks, he saw a long line of quartz croppings that presented a marked feature. He broke a few pieces of the rock, took it with him to his camp, and, to his surprise, by the horn-spoon test, proved it to be very rich in gold. The next day he made several locations, and, with others, has since been quietly developing the mines with good results. The fortunate discoverer is an old prospector and has made repeated trips with his mining outfit from Alaska to Mexico. He has made many discoveries of metalliferous lodes, but considers this the "last and best of all." He holds three locations, for which he asks the modest sum of $250,000, and "won't take a cent less."

This and other veins in this belt have undoubtedly been the feeders and source of supply of the rich placers found on Cottonwood, Hungry and Bumble creeks.

Thence southerly in the same formation we encounter Beaver, Little Hungry, Barkhouse, Deadwood, Indian, Greenhorn, McAdams, Oro Fino creeks, Quartz valley and the Pinery placers, all of which have been fabulously rich in placer gold.

At a point a short distance southwesterly from the last-named place the

Salmon Range of Mountains

Intervenes, and has evidently been the disturbing element that broke the continuity of the belt. This range is largely composed of eruptive rocks—porphyries and granites. Auriferous rocks do not come to the surface for a distance of 12 miles in this formation. Their first appearance is in the Black Bear district on the waters of the Salmon river. Here nature apparently endeavors to make amends for the barren waste of unproductive ground by an oasis of gold-bearing veins of mammoth proportions, resembling in many respects the celebrated mother lode that courses through the middle and southern counties of our State.

The principal vein is composed of a black slate—several hundred feet in width—magnesian, talcose, and in places chloritic, soft, unctuous and greasy to the touch (technically known to the miner as plumbiferous slate). We find here that the stratification has changed to N. 10 E. and S. 10 W., a divergence of 10 degrees. This vein or belt is inclosed in walls of a stratified silicious slate of a peculiar structure on the west with porphyry on the east. It contains kidneys of lenticular-shaped masses of auriferous quartz of mammoth proportions, forming bonanzas of great value, in many respects resembling the deposits of a similar character found in the Keystone mine of Amador county. Several of these bodies have been found and exhausted after having yielded many millions of dollars to the fortunate owners. The Black Bear mine, from which the district takes its name, has been the most productive. For the history and full particulars of this remarkable property see pages 621 and 622 of the Eighth Annual Report of the State Mineralogist.

On the Same Belt

There are other mines of note, the Uncle Sam, Mountain Laurel, Evening Star, Klamath and Mistletoe, that are being exploited with encouraging results. Were it not for the inaccessibility of this mountain region and the want of capital, mining would be prosecuted here with more vigor. Wagon-roads are unknown and the hurricane deck of a mule a luxurious mode of traveling.

From the latter point westerly we cross alternate belts of granite, limestone and syenitic rocks, and enter still another belt of auriferous slates of which but little is known, as the country in this region has not been prospected to any extent.

At a point eight miles northerly from Happy Camp, on the Klamath river, in Tp. 17 N. R. 7 E. on Indian creek (in the same belt), extensive bodies of talcose slate occur reticulated and seamed with stringers of quartz that are unusually rich in free gold. The mass being soft and decomposed, the hydraulic system with water under a heavy head has been successfully introduced in working the deposits. This process is wasteful in the extreme, as but a small percentage of the gold is saved, but from the unusual richness of the material, large sums are yearly extracted, particularly from the Classic mine, which is owned and worked by a company of Chinese. Southerly from this point the serrated peaks of the Trinity range of mountains stand in bold relief against the horizon, a marked feature in the landscape, their highest points reaching elevations of from 8000 to 10,000 feet, forming the boundary-line between the counties of Siskiyou and Trinity. At a point on the headwaters of the South Fork of the Salmon river in Tp. 37 N. R. 10 and 11 E., small areas of tableland or mesas occur on which we find

Several Lakes

Which have been used as storage reservoirs for the conservation of water by Mr. Geo. C. Spooner, who owns and works large tracts of auriferous gravel banks below this point on the South Fork of the Salmon by the hydraulic process. These lakes are fed from the perpetual snows laying on the westerly flank of the range. My informant, Mr. Spooner, states that he has visited this source of supply, and that what to all appearances is snow is simply an iceclad sheet, the remains of a glacier of considerable area and thickness. This is not improbable, as g'acier marks and furrows are visible in many places wherever the bedrock is uncovered and exposed. The main south fork of the Salmon takes its rise in a small mesa or tableland known as Big Flat, where the waters divide. It contains a superficial area of 600 acres. Its center forms the dividing line between the two counties. The flat to all appearances once formed the bed of a lake, being cup shaped and filled with rich auriferous gravel and subsoil; this deposit is worked as a drift mine.

The central core of this mountain range is granitic, flanked on the west by a secondary transition granitic formation composed largely of quartz, feldspar, magnesium and trappish rock, which is in turn flanked by gold-bearing metamorphic slates carrying strong veins of auriferous quartz in which some work of development has been done and a prospecting mill of two stamps erected, forming

An Inviting Field

For the quartz miner. The large deposits of auriferous earth and gravel situated on the banks, high bars and terraces of this river extend for many miles on its course with an abundant supply of water under a heavy head, ample dump and in no possible event trouble from the "anti-debrite" (as there are no agricultural lands to interfere with or injure), rendering it a promising field of operation for the hydraulic miner.

Southerly from this point the Coast Range of mountains and Sierra Nevadas commence to diverge and take form and shape as separate and distinct chains. The blending and confusion caused by the previously described plutonic effects are no longer apparent.

JAMES H. CROSSMAN.

The 13-14-15 Puzzle.

EDITORS PRESS:—The statement is often made that the '13-14 15 Puzzle" has never been solved. Having published directions for working this puzzle successfully in the Denver *Republican*, May, 1883, I will give the following key, which will enable any one to master it:

The chances are even if the blocks are put on at random that it can be done with 1, 2, 3, 4 on upper line, with 13, 14, 15 on the lower. The first two lines are filled without difficulty, counting to 8. The key to the puzzle is placing the 9 in left hand lower corner with the 10 directly over it. There is no necessity in moving the 9 or 10 or either of the blocks from 1 to 8 in now placing the 13, 14, 15 in right corner, the 15 over the 14. If the 12 now stands over 11 with blank space over 13, one move of 12 to right allows the 11 to be raised and complete the count from 1 to 15. If, however, the 11 stands above 12, with blank space over 13, then the reverse count must be made from 15 back to 1, with 12, 13, 14, 15 on lower line.

The next line above will be 9, 10, 11, which should all be moved to right. Now drop 5 from above, making 5, 9, 10, 11. Move those on line above—6, 7, 8 to left; raise 11 to line above; move 5, 9, 10 to right, drop 6, making 6, 5, 9, 10; move 7 and 8 to left; now raise 9; now move 5 to right under 9; now drop 8; move 7 to the right; raise 6; move 8 and 5 to left; drop 9; move 7 to right; raise 5; now move 9 and 10 to left and drop 11, thus: 8, 9, 10, 11; now drop 4; move 1, 2, 3 to right; raise 6; move 5, 7, 4 to the left; drop 3; move 6, 1, 2 to the right; raise 5; move 7 and 4 to the left; drop 1; move 6 to the right; raise 4; move 7 to the right; drop 5; move 4 and 6 to the left; raise 1; move 7 to the right; drop 6; move 1 and 2 to the left; raise 3; move 5, 6, 7 to the right; drop 4; this completes the count from 15 back to 1, with 1, 2, 3 on upper line.

The transposition of two blocks changes the order of sequence, but the numbers can be arranged to count from 1 to 15 if the above formula be observed.

When skill in moving the blocks has been gained by practice, it will enable a person to place the numbers in regular sequence from upper line to lower and back in reverse order within three minutes. If the blocks are not removed from the board, they will invariably count one way. EDWARD E CHEVER.

San Francisco, Cal., June 1, 1889.

Mexican Lead Ores.

EDITORS PRESS:—The *Engineering and Mining Journal* in attempting to prove that importation of lead ores free of duty is working no injury to our country, balancing resulting benefits, falls into a grave error. One patent fact must be admitted: Mexico is now supplying our country with an enormous amount of lead, and this influx has operated to shut down many of our own great lead mines, thereby throwing out of employment thousands of our miners, and shutting down contiguous smelters. Against this injury the *Journal* says manufacturers of machinery have profited in a new demand from Mexico. This demand has come by destroying old values, and preventing a like new demand for men working at home in the development of new mines. Where, then, is the gain? At the same time thousands of miners at home have been prevented from earning their three dollars per day, that a like number of Mexicans may earn fifty cents or one dollar per day, and the mine-owner from realizing on his investment.

Again, the *Journal* says that if prices of lead were to advance by the collection of the duty of 1½ cents, the stimulus to production would soon overstock the market, and the present low price soon return. Then the free-trader or the consumer should not object to the tax. He is not going to suffer but temporarily, while our mines will be worked, large money disbursed to the American miner and smelter. But it makes no difference with the smelter. The foreign ore is smelted here. Yes, big smelters along the line of the Atchison, Topeka & Santa Fe, but nowhere else. Without this influx, they will all live on home ores.

As to the railroads, the *Journal* says that it is only a question of one or another getting the freight *on this lead ore*. Is this true? Subtract the mining industry proper from Leadville, leaving the smelting industry. Let the railroad carry from Mexico to the smelters here the tonnage taken from the mines there, reducing the city to the village, a few smelters would work; would their receipts equal the business made by a city ten times the size of such a village? Who does not know that great mines make a city, and that city ramifies every industry with its demands? Who does not know that Leadville was built up by the *mines*, and that Leadville mines also gave Denver its grand increase in population and wealth? Could we possibly have built up mountain towns and cities in mining districts if we had let foreign countries do our *mining* though we smelt their ores? The miraculous development of Colorado alone, through the development of Leadville mines, is worth more to the country at large from ocean to ocean, to every industry in the country, than all the lead aggregates in value that has come from Mexico, or will come, in the next decade. Why do we stand and haggle over 1½ cents on the product, even if it were to cost that much more, if the duty be collected? Shall we destroy the immense value of our mines themselves? Destroy this means of labor and the general demand it creates in the hope of saving a trifle in the price by giving the work to *peons?* But the *Journal* says the price will adjust itself again by the production. Then let it do so under *American* conditions.

The *Journal* endeavors to show by specious reasoning that it makes no difference to the miners, as the smelter charges less for smelting dry ores. Does that save the lead mines? But this is not true, as the schedules of the smelters show.

Again, the *Journal* says we *must* take of Mexico ores in payment for working or must import as much as we export. Then let Mexico furnish us what we cannot produce at home. We cannot afford to kill a great industry at home to support a like industry there or in any other country.

The long and short of the argument is, *mines* build up cities and towns and create enormous demands upon *every* industry. Smelters do not. Foreign trade is but one-tenth of the domestic. Develop and take care of our home trade first, last and all the time.

The ruling of the Government that lead shall come free, if in combination with a free metal, seems without reason or rhyme. The law collecting 1½ cents duty absolutely, it is as much as to rule that if a contraband commodity gets shipped in company with an article not contraband it ceases to be contraband. There is no such ruling in the case of copper. It has to pay even if gilded all over with gold. Where is the reason for the distinction?

Another fact should be understood. The Government does not sample the ores to see if their silver contents are really more valuable than the lead, leaving large opportunities for violations of even the ruling.

There can be no doubt but that it is the interest of *every* industry in the United States that this Mexican importation of lead ore be checked by imposition of the duty laid by custom laws and which was intended by the framers of the law to protect the lead industries of our country. This ruling has been made by the connivance of a few smelters along the line from Kansas City to El Paso rather than by any public interest. We protect iron and other industries. The law intended protection to the lead industry. It is thwarted by a mere ruling.

G. P.

Paper for Building.

The use of paper fabric for building purposes is now advocated by some builders on the following grounds: First, continuity of surface; that is, it can be made in rolls of almost any width and length, is flexible, or by gluing several layers together may be made stiff, and will stop the passage of air because there are no joints. Second, it has no grain like wood, and will not split. Third, it is not affected by change of temperature, and therefore has an advantage over sheet metal as roofing material. Fourth, whereas in its natural condition it is affected by moisture, it may be easily rendered waterproof. Fifth, it is a non-resonant, and well fitted to prevent the passage of sound. Sixth, it is a non-conductor of heat, and can be made also of incombustible material like asbestos, or rendered fire-resisting by chemical treatment. The combination of paper with other substances, and solidifying the mass by pressure, renders practicable the production of a material capable of replacing wood for many purposes; and not the least among its characteristics of adaptability is the ease with which it may be made into sheets of any width and thickness, that will not warp or shrink from heat, cold or dampness.

There is a paper house in Atlanta, Ga., in which no wood, brick, iron or other material, except paper, is used about the building. It is used as a store, painted sky-blue and attracts considerable attention. The gaudy color is not the cause of the little building being the object of so much attention, but the material of which it is constructed makes it a novelty. It is made entirely of paper. The store was built by a Frenchman who is agent for the paper of which it is constructed. The rafters, the weather-boarding, the roof and flooring are all made of thick, compressed paper boards, impervious to water and as durable as wood. The house cannot catch fire as easily as a wooden building, because the surface of the paper is smooth and hard. The building is warm in cool weather and comfortable when the weather is warm.

Salt-Making in England.

The quantity of brine used annually has been estimated at 9,000,000 tons, which will yield (allowance being made for waste) 1,800,000 tons of white salt. A gallon of fully saturated brine contains 2 pounds 8 ounces, sometimes 2 pounds 10 ounces, of salt. The general average of sea-water does not exceed 3 to 3½ per cent. The manufacture of white or table salt, and practically of commercial salt of every description, is effected by evaporation in shallow pans, either over a coal fire or by the utilization of waste steam from engine boilers. The heat applied varies according to the quality of salt which it is desired to produce. Domestic salt of the finest grades requires for its manufacture a temperature of 226° Fahrenheit—the boiling point for brine. As the liquid evaporates the solid particles sink to the bottom of the pan, forming in the aggregate the lumps with which every housewife is so familiar. For commoner salt the temperature is 160° to 170° Fahrenheit. This salt is close in texture and clustered together in larger or smaller pyramids, according to the heat applied. For large-grained flaky salt the temperature is 130° to 140° Fahrenheit, and for large-grained fishing salt 100° to 110°—the slowness of the evaporation allowing the salt to form in cubical crystals. What used to be called bay salt, or salt formed by the operation of the air and heat of the sun, although still extensively practiced in warmer climates, seems now to be a thing of the past in this country. In the earliest times this process was probably the only one carried on. Ether brine or sea-water was run into shallow pits or reservoirs, where it evaporated to a certain degree, the work being afterward completed by pouring upon twigs, and sometimes, it is said, by pouring the liquid upon burning wood and collecting the salt deposited upon the ashes. Until long after historic times, wood was the only fuel used; it was not until the year 1656 that the substitution of coal, at Nantwich, is mentioned as a novelty. This might be explained by the difficulty of carriage in those days, as no coal-beds exist within a good many miles of the salt districts.—*Chambers' Journal.*

IMPROVEMENT IN THE OTTO GAS ENGINE.—It is reported that M. Otto, the inventor of the gas engine, has constructed a new machine which automatically prepares its own gas by means of the Dowson apparatus. The new model is of eight horse-power, and only consumes two pounds of coal per horse-power per hour.

ROTTEN BOILERS, says the Baltimore *American*, and careless employes are sending more victims out of the world unprepared than would be slain in a battle.

New Silver Region.

It will scarcely be disputed that the anticipations of the French Copper Syndicate were mainly upset by the enormous increase in the shipments of the metal from American mines, and notably from the Calumet and Hecla and Montana properties, which have done so much to make American copper famous. But Americans are not to have matters all their own way, for there has sprung up within the last two or three years on the Canadian side of the lake an industry which threatens to throw completely into the shade the commercial value of the southern shore. We refer to the silver region, actually discovered nearly four years ago, but only practically tested in the early part of last year, situated in the Thunder Bay district, near Port Arthur, a rapidly rising business center in Ontario, Canada. In this country, comparatively little has been heard of the discoveries, but American experts have visited the district in large numbers, and have secured valuable areas which are already yielding enormous quantities of silver, and promise in the future to rival, if not to surpass, in productiveness the world-famed Comstock mines of Nevada and the Broken Hill properties of Australia. This may seem a somewhat sanguine view to those who have not looked into the matter, or have only done so in a casual manner. A closer study of the progress which the Port Arthur silver industry has made within the past 12 months shows, however, that, judging from actual experience, it would be really difficult to overestimate the geological value of the district which is now being opened up. We should be within the mark, at all events, in saying that for the short time which has elapsed since the district was first proved to be argentiferous, a greater amount of valuable ore has been discovered and laid over for future working than has ever taken place in anything like the same space of time.—*Montana Mining Review.*

A United West.

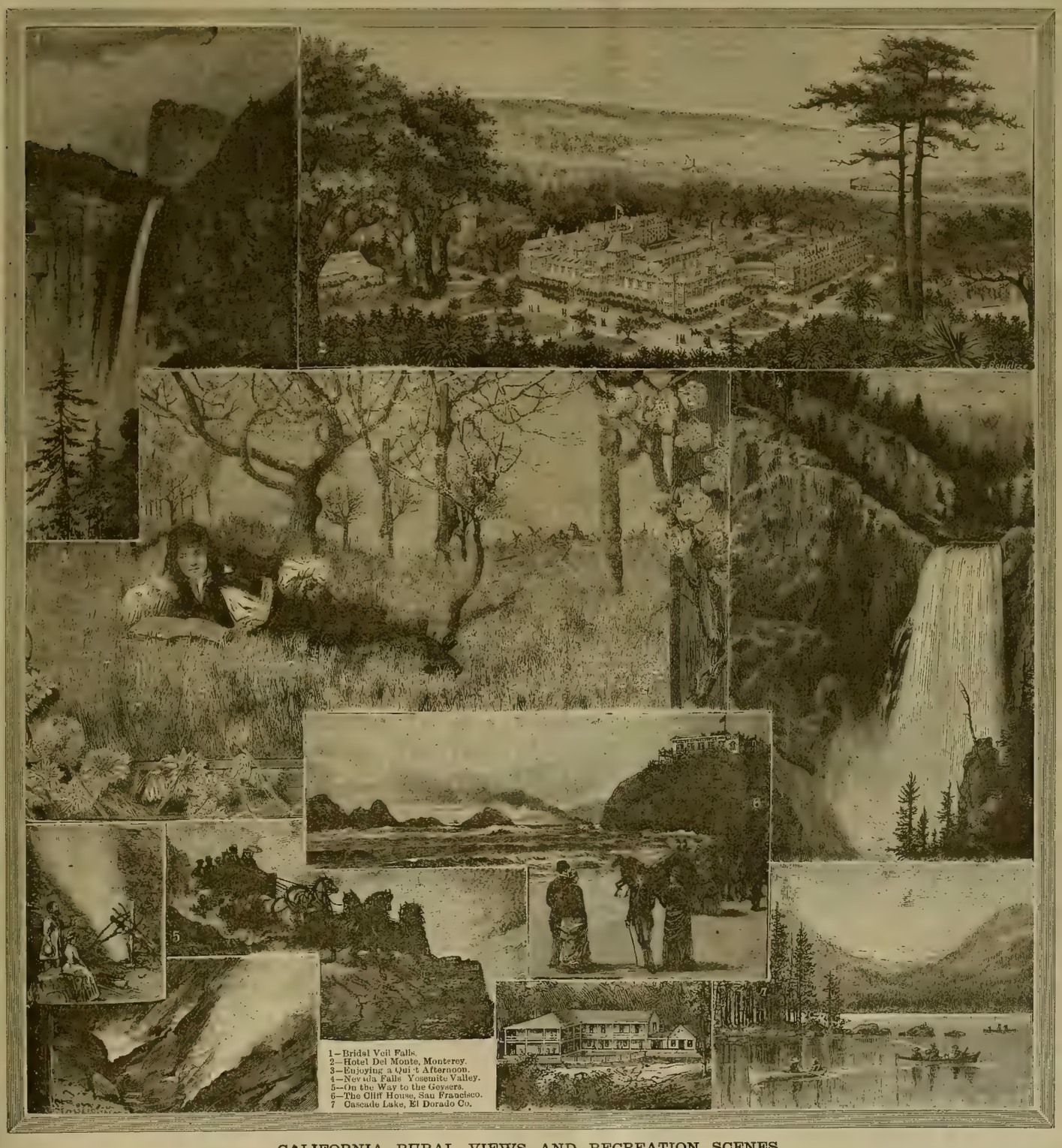
Colorado deserves the thanks of the States and Territories on the Pacific Coast for its efforts to secure Government aid in redeeming the arid, desert lands by means of irrigation reservoirs. The first convention of the West to consider that subject was held in Denver, about one year ago, and as a result of that convention the Government has sent out explorers to locate sites for these reservoirs, and Congress has made an appropriation for this work. Now Governor Cooper of Colorado proposes that Western States hang together in irrigation and other kindred matters regardless of politics. He suggests that there are certain broad subjects in which all the West takes interest, but which have no pertinence in the East. Although politically divided, yet both parties combine when a measure is introduced which is beneficial to their section, and they get about what they want while the West goes begging.

The number of Western States interested in irrigation have a representation in the electoral college nearly equal to the State of New York, which will give them influence whenever it is felt that they will vote together where their own interests are concerned. Such a course would secure nearly every improvement we need, and bring in a crowd of home-seekers which would increase our power in the Union.

CARE IN USING FORCED DRAFT.—Instructions by the British Admiralty are to the effect that more care must be taken in the use of forced draft. The appliances for creating draft are not to be used at full power except for brief periods in emergencies, and not, under ordinary circumstances, for the purpose of getting up steam quickly. All rapid changes in the temperature of boilers are to be avoided.

THE NICARAGUA CANAL.—Men, tools and stores are now on their way to Nicaragua.

NO ESCAPE FROM LABOR.—The motto, labor conquers all things, might be changed to nothing without labor, and be equally true. There is a foolish desire on the part of American youth to avoid work, or, at least, what is termed hard work, but no one need expect to succeed without work and plenty of it. That which appears easy looks differently when we can get at the actual facts. Many, tired of farming amid the stones and stumps of New England, come to California, buy an orange grove or a fruit farm, and imagine that all they have to do is to sit down and watch their fruit grow. They soon learn, however, that the scale attacks their orange, and nearly every variety of fruit has its pest. We are not saying this to discourage the would-be immigrant, for it is not to be compared with the endless work and small profit per acre of Eastern farming, but we believe it is better for one to know the difficulties before he enters upon them. He will be surer of success. The successful California producer has work before him.—*Rural Press.*


1—Bridal Veil Falls.
2—Hotel Del Monte, Monterey.
3—Enjoying a Quiet Afternoon.
4—Nevada Falls Yosemite Valley.
5—On the Way to the Geysers.
6—The Cliff House, San Francisco.
7 Cascade Lake, El Dorado Co.

CALIFORNIA RURAL VIEWS AND RECREATION SCENES.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

GARDNER.—Amador *Ledger*, June 1: An Englishman named Stephenson is negotiating for the purchase of the Gardner property near Irish Town. He was up two weeks ago to look at the Kelly mine in Hunt's gulch, and while here, the Gardner mines were brought to his notice. He visited the ground, and after prospecting, took about 150 pounds of rock with him to San Francisco for treatment. The result is so far satisfactory that he has sent word for the necessary deeds of conveyance to be made out. It is believed that it will prove a sale this time. The price is $25,000. At the McKenzie mine it is expected to have the steam-power for the mill in running order this week. They have about 200 tons of rock accumulated on the dump for crushing.

KENNEDY.—Sinking at the main or south shaft of the Kennedy will soon be resumed. The ore bodies are small, and are soon worked out. At least this has been the case with the pay rock so far encountered. There is one encouraging feature about it, namely, that the ore is improving in quantity and quality as depth is reached. In the lowest level the ore is of better grade than the level above, and it is also noticed that the quartz shows a tendency to concentrate into a solid, well-defined ledge. It is hoped that the ore in the lower level is the top of an extensive pay chute or chimney, and that the mine is only commencing its career as a gold-producer.

AT SUTTER CREEK.—Grading for the additional ten stamps at the Wildman mill is about completed, and the material for the mill will soon be delivered. The mortars are cast and ready to be placed in position, and will be on the ground in a few days. Mr. Tregloan, the superintendent, has been below, and procured an air compressor, Burleigh drills and other machinery to develop the mine in good shape.

DRYTOWN CON.—*Dispatch*, June 1: Some very fine ore was encountered at a depth of 200 feet from the surface last Thursday. The rock is soft and of the ribbon character and will easily go $7 or $8 to the ton. Its extent at the present is unknown, yet it is said by those who were acquainted with the old mine when last worked, that sufficient rock to run a 20-stamp mill several months was left at this point in the shaft. The stock is strong and has an upward tendency. Charles Kellogg has struck a fine body of paying ore on Graham's ranch at Forest Home. A shaft 20 feet has been sunk on the ledge, which is but a few inches in thickness but exceedingly rich. It is probably a good fat pocket.

ACME.—Timothy Hanly, Jr., is still at work developing the Acme, which is situated near the Mokelumne river in Hunt's gulch. He has encountered a fine body of paying ore.

NEW LONDON.—The erection of the new mill on this property has been unavoidably delayed for some time, but will shortly be pushed to completion. The mine, under the efficient management of Mr. H. Reese, is progressing favorably.

COSMOPOLITAN.—Sinking at this mine is progressing, also running the drifts on the 300 and 400 levels. They have abundance of ore in sight, and will have their mill running by the 1st of August.

HENRY CLAY. — A contract has been let to run a crosscut or drain tunnel 300 feet. The contractors are in about 60 feet, and are making about five feet per day.

GOVER.—This mine is running along in its steady old way. Since the rock-breaker has been placed at the ore chute at the mine, the ore is distributed more evenly at the mill.

VOLCANO.—This company is engaged in its clean-up on a whole winter's run. Water is very scarce and the indications look anything but favorable. It is doubtful whether the company will run next winter.

CLEVELAND.—A French company is hard at work on this claim, formerly known as the Sam Bono, near Volcano. The ore is a hard cement gravel under a lava bed. They are erecting a small mill on the property and will no doubt make it pay well, as it prospects high.

DANE.—This claim, owned by Cassinelli Bros. of Volcano, has been sold to J. Sallie of San Francisco for $2500.

Calaveras.

FULL HANDED.—*Mountain Echo*, June 1: The mines in and around Angels now in operation are all running full handed, and as nearly as we can ascertain are yielding good returns. The monthly shipments of bullion from this town give evidence that our mines are productive and profitable ones.

El Dorado.

RICH ORE.—San Jose *Mercury*, June 1: J. J. Jermyn, who is largely interested in coal mines at Scranton, Penn., owns a gold mine at Kelsey, El Dorado county. Last evening he showed samples of ore which assayed 3230 and $410 per ton. The specimens shown were completely seamed and studded with free gold. Mr. Jermyn, in speaking of the prospect, said: "I believe the gold is there. These specimens were taken from the mine by my own hands, and I know the hole is not 'salted.' We traced and tapped the ledge for 450 feet. It is three feet wide. Water can be secured within a mile, and it is my intention to start a tunnel in the side of the hill and tap the ledge and thus secure the ore with greater facility. There is already a shaft sunk 75 feet in depth. As soon as I see that the output will warrant it, I shall erect a stamp-mill. Mining in the vicinity of Kelsey is awakening a greater interest than it has heretofore done, and many old and abandoned shafts are being re-prospected."

Nevada.

RICH ORE FROM THE W. Y. O. D.—*Tidings*, June 1: It is with pleasure we record another important strike in the W. Y. O D. mine. This strike consists in that the eight-inch solid ledge uncovered in the shaft at a depth of 500 feet, and developed in the north drift from that level, has been cut in the south drift and rich ore extracted. Pieces of the quartz brought to town are ribbed with coarse gold, and there is in addition heavy galena sulphurets that will yield $400 or $500 a ton. As noted by the *Tidings* several days ago, a test crushing of ore from this ledge, extracted in the shaft and in the north drift, returned very remuneratively. In the upper drifts the ledge was decomposed. That now referred to is solid and of high grade, and as above stated is found in the shaft and in both the north and south drifts. From indications, the plucky Work Your Own Diggings Co. now have a mine.

A COMING MINE.—*Tidings*, June 1: An old, half-filled shaft on the Good Hope claim at Cabbage Patch, near Spenceville, has been cleaned out this week to satisfy a gentleman who is negotiating for the property that the ledge is something more than "a pocket of quartz." This work was done by Wm. Eddy, Sr., father of one of the three owners of the claim, and a practical miner of 25 years' experience. He had never before seen the mine and was somewhat skeptical as to its value, but his inspection and the developments made under his own eyes have changed his opinion. Although the deepest shaft is down only 30 feet, a strong, solid ledge ranging from 10 to 16 inches in size, showing free gold and liberally sprinkled with sulphurets and lead, has been drifted on a distance of 50 feet. So solid is the ledge even at this superficial depth that blasting is imperative. Fifty pounds of the ore, brought to town yesterday, is undoubtedly of a higher grade than that crushed recently and which paid $46 a load, exclusive of sulphurets. Mr. Eddy is now as enthusiastic in regard to the property as are the owners, he declaring that the quartz "is the prettiest milling ore I have ever seen." The price to be paid for the Good Hope, if the pending sale is consummated, is $15,000, but the owners are no longer anxious to sell for that sum.

PITTSBURG MINE.—Grass Valley *Union*, June 1: The prospects of the Pittsburg mine are now very encouraging. Within a short time the north drift from the No. 9 level has improved remarkably, the ground becoming much easier to work, and the ledge increasing to 2½ feet in width, carrying largely in heavy sulphurets and galena, and showing in free gold. This opening of the ledge is the best exhibit made in the mine in years, and goes to establish the theory that has been entertained that the old pay shoot would be found to the north of the shaft. The striking of this new ore body has determined the company to continue the sinking of the main shaft to the 10th level (1100 feet), and this work is to be prosecuted diligently, in order that the new ore body may be opened up with extensive backs as soon as possible. A London mining expert, who has examined the new ore body within the last few days, has expressed the opinion that it is going to prove extensive and very valuable. The encouraging prospects of the Pittsburg will be received with much satisfaction locally, as the Pittsburg Company has shown much enterprise in developing the property and erecting a mill upon it of the most substantial character and with all the latest improvements.

THE COE MINE.—Grass Valley *Union*, May 29: The water below the 300 level of this mine is now being pumped out, and a heavier pump is to be put in. The water does not make as fast now as it did when the upper levels were being drained. A fine-looking ledge is showing on the 300 level.

Inyo.

NEW MINING DISTRICTS.—*Index*, May 29: If the Utah Central railroad builds southward through this county near our eastern boundary, as now seems quite probable, it will open up a new and very promising field for prospectors—several of them in fact. A veritable mining boom may be looked for in Eastern Inyo with the advent of the new railroad.

Placer.

GRAVEL.—Placer *Herald*, June 1: At the Eureka Con. mining gravel claim, located between the Hidden Treasure and the Hogsback, two tunnels have been run, one 860 feet and the second 300 feet. The latter tunnel is expected to tap the main channel at the depth of 1300 feet. Messrs. A. Clark and F. Chapellet are largely interested in this mine, and have every reasonable expectation that it will be equal in richness to any mine ever opened on the Forest Hill divide.

Shasta.

STACY CREEK.—Shasta *Courier*, June 1: A. C. Ellis says the Stacy Creek mines on Upper Clear creek are the richest discoveries made in the county for years. In ledges, well defined, where from $50 to $100 per day can be and has been taken out by a couple of men, there is cause for enthusiasm.

ACTIVE.—The amount of mining machinery and appliances hauled through town for various camps northward is immense, and shows the great activity prevailing in mining circles.

San Diego.

HELVETIA.—Julian *Sentinel*, May 30: Messrs. Murray and Smith have commenced work on the Helvetia. This is another mine that has been idle so long that the shafts have all caved, and work will have to be prosecuted from the surface. They are well pleased with the camp and propose to push work on their property and lend a helping hand in the development of the camp. We hope soon to see the Washington, Eagle, High Peak and Tom Scott working. They are all paying mines, but are in about the same condition that the San Diego was a few weeks ago, and the Stonewall was considered no better in 1884. The Stonewall, Owens and San Diego mines have proven to be good; why not others?

SAN DIEGO.—Messrs. James and King are pushing things at the San Diego mine. The shaft is down 90 feet, and they have a four-foot ledge of $40 rock. Mr. James informed us Tuesday that they have $10,000 worth of ore in sight. While we were there they brought up some quartz that would make a 49er's eyes water. It was literally covered with free gold. They are hauling this rock to the Owens mill and turning it into cash as fast as ten stamps can crush it. Perhaps it would be of interest to miners to know that this mine lay idle for 11 years. The old shafts had all caved in, and the present development work was commenced on the representation of old miners in this vicinity. It bids fair to become a second Stonewall.

STONEWALL.—Excavating is in progress at the Stonewall mine for a new 40-stamp mill.¶

Siskiyou.

NEW MINING PROJECT.—Yreka *Union*, June 1: Mr. Harry Pugh, an old-time and experienced miner and bricklayer, has started an enterprise which, if successful, will solve a problem that has long vexed miners of low-grade ore, and do more to develop the mineral resources of the county than any other project we have yet heard of. It is to work low-grade ore by water-power. He has purchased a tract of land extending from the Old Shasta road to Kanaka gulch, covering the whole of Salt creek, and comprising about 40 acres. His design is to build a series of dams to catch the rain-water that goes to waste in the winter and hold it for the dry season. At the first dam there will be a current-wheel that will throw the water into a reservoir on top of a hill, for the purpose of irrigating such land as he will not need for milling and road purposes, and where he will make his home with orchard and garden attachment. Then the water will be turned back by means of ditches into the second dam, where there will be a turbine-wheel which will operate the first quartz-mill of five stamps. After passing through the first wheel it will be carried on to the third dam, where there will be a second five-stamp quartz-mill, after which it will fall over into the creek, where, in the course of time if things work all right, there will be a third mill, thus allowing the water to be used four times. He will also have side gates on the dams that will work automatically for their relief in case of a cloudburst or unusually high water from other causes. The material for the dams, except cement, are all on the ground. The mills are intended to work low-grade ore with which the neighborhood abounds. He figures out that he can afford to work ore at $3 a ton, so that a miner having five or six dollar ore can have it worked at a profit, which is impossible by steam.

Sierra.

YOUNG AMERICA.—*Mountain Messenger*, June 1: The Young America Co. will soon put an air compressor and power drill into No. 4 tunnel, the rock in which is costing them about $25 a foot.

KENTUCK.—The little mill at the Kentuck quartz mine was started last week, and report says that in less than three days' run cleaned up 42 ounces of amalgam.

Trinity.

THE OZARK.—*Journal*, June 1: John Day was in from East Fork Thursday and informs us that work is progressing satisfactorily on the Ozark. There is plenty of ore on the dump and the arastra is running on good ore. As soon as lumber can be obtained, a tunnel will be run to tap the ledge at a depth of 300 feet. Work is now being done on the upper level; the incline is in 175 feet and taps the ledge at a depth of 100 feet; there is a year's work in sight in the upper level.

NEW RIVER.—Cor. *Northern Advocate*, June 1: The miners have all resumed work in a very promising condition. John Colby is foreman in the Excelsior, and Jack Leas in the Mountain Boomer. John Thyng has taken the contract for running the 700-foot tunnel in the Ridgeway, and, as he is a good pusher, the work will go on rapidly. There are several buildings going up around the new tunnel.

Tuolumne.

CLOSED DOWN.—Tuolumne *Independent*, June 1: The Platt and Gilsen mine shut down on Tuesday, until further developments are made, by putting the shaft down 100 feet deeper. The work will be commenced at once. Mr. Pine, the new superintendent, is a thorough miner, and was a pioneer of the Tuolumne in the ancient days of '49. He will show up the true inwardness of this valuable mine.

MILL.—The Tuolumne river mine, formerly known as the Mary Ellen, will have a 10-stamp mill in a short time. Wm. Sharwood of Soulsbyville will go down next week to commence operations. Only five stamps will be used until the mine is more thoroughly developed.

KANAKA.—The Kanaka mine, on the Tuolumne, northeast of Groveland, is being developed in a systematic manner, and the outlook is most encouraging. Water being obtainable, at present, only a part of the year, arrangements are being made to put in steam-power.

NEVADA.

Washoe District.

UTAH.—Virginia *Chronicle*, June 1: On the 600 level, east crosscut No. 2 from the end of the main south drift is advanced 78 feet; formation, vein porphyry. Raise No. 2 above the south drift is up 20 feet, the top wholly in quartz, showing value.

OCCIDENTAL CON.—On the 550 level, 115 feet on the slope below this level, in the winze connecting with the 650 level, a north drift is out 16 feet in quartz from which ore is being saved.

NORTH OCCIDENTAL.—On the 300 level west crosscut No. 2, 70 feet from the main tunnel, a north drift is advanced 7 feet. Formation, quartz and porphyry, from which ore is saved.

SIERRA NEVADA.—On the 520 level from the shaft station, an east drift is advanced 461 feet and is in porphyry and clay showing some water.

UNION CON.—On the 1465 level at a point in the north lateral drift, 220 feet north from the south line of the mine, west crosscut No. 1 is advanced 182 feet and continues in a formation of porphyry and clay with some water.

MEXICAN.—On the 1465 level west crosscut No. 1 from the north lateral drift is extended 379 feet, showing streaks of quartz and porphyry in the face.

OPHIR.—On the 1465 level, operations confined to cleaning out the southwest drift from No. 2 upraise, 36 feet above the track floor of this level.

GOULD & CURRY.—On the 300 level the north drift is extended 45 feet. Formation, porphyry and quartz. On the 400 level, at a point 50 feet north of the south line, directly over the upraise above 625 level, an upraise is carried up 25 feet. Formation, porphyry, clay and quartz.

CON. CALIFORNIA & VIRGINIA.—The usual quantity and grade of ore is being extracted from the various openings on the 1400, 1435, 1500, 1600, 1650, and 1950 levels. On the 1400 level, from winze No. 2, 91 feet down, a southwest drift is advanced 30 feet, and will be advanced to connect with southeast drift from the stopes below the 1435 level. On the 1650 level: The stopes on the seventh and eleventh floors above this level continue to show ore of fair quality. At a point 70 feet south of upraise No. 1, upraise No. 5 is up 23 feet. During the week 1104 tons and 420 pounds of ore were shipped to the Morgan mill, 1792 tons and 1510 to the Eureka. The average assay value of all the ore worked at these mills during the week, according to battery samples, was $31.82. Bullion valued at about $54,000 on hand in the assay office.

BEST & BELCHER.—On the 625 level the southwest drift, 175 feet above the 625 level, is extended 126 feet. Formation quartz giving low assays. On the 1000 level the west drift is cleaned out and repaired a distance of 468 feet.

SCORPION.—The joint east drift from the 520 level of the Sierra Nevada shaft is out 590 feet.

ANDES.—Advancing No. 2 upraise above the 350 level.

SAVAGE.—Shipped during the week 486 tons o ore showing a value of $20.22 a ton from battery sample assays. Bullion valued at $8847.91 shipped since last report.

HALE & NORCROSS.—During the week shipped 1125 tons of ore showing a value of $27.04 by battery sample assays. Bullion valued at $8360.84 was shipped during the week.

CHOLLAR.—Shipped to the Nevada mill 440 tons of ore during the week, battery sample assays showing a value of about $20 per ton.

POTOSI.—The 750 level north drift and 850 level south drift are both in porphyry and low-grade quartz.

BULLION.—Explorations still in progress in the quartz belt on the 760 level.

ALPHA.—The joint 500 level east crosscut at the Imperial line is in 142 feet.

EXCHEQUER.—The north drift on the 500 level is now in clay and porphyry.

IMPERIAL.—A substantial house is being erected over the hoist plant.

CONFIDENCE.—A joint Challenge east drift on the 1200 level is in 72 feet, showing porphyry and quartz.

YELLOW JACKET.—Shipping 125 tons of ore daily showing a value of $29.75 per ton. The 500 level west drift is being rapidly advanced.

CROWN POINT.—Shipped during the week 850 tons of ore.

BELCHER.—Ore streaks still showing in the raise above the 1100 level, west crosscut. The 1000 level south drift is still in soft porphyry.

SEG. BELCHER.—The raise above the 1300 west crosscut still showing ore streaks which are widening.

OVERMAN.—Shipped 298 tons of ore during the week.

BALTIMORE.—The crosscut from the south raise above the 338 level is still in ore.

NEW YORK CON.—A new cable has been placed on the reel and air pipes put in the mine. Work is resumed in the 800 level east crosscut.

JUSTICE.—The mill is in full operation on ore from the mine.

ALTA.—Mill temporarily shut down for repairs.

SILVER HILL.—The 116 level northeast drift entered quartz 325 feet from the shaft which assays well in gold.

Golconda District.

MANGANESE ORE.—*Silver State*, June 3: J. R. Jennings shipped a carload of manganese last Saturday from Golconda to San Francisco. The mine from which the ore was taken is situated about half a mile from the railroad, east of Golconda station. There is plenty of it, and it is probable that two or three carloads of it will be shipped weekly.

Paradise District.

RICH GOLD ORE.—*Silver State*, June 4: The Sadorus and Pratt mine in the Eden range is said to be looking remarkably well, and producing very rich, gold-bearing quartz. The mine is situated about 26 miles northeast of this place, and about 18 miles from Golconda.

Pioche District.

SOLD.—Eureka *Sentinel*, June 1: The Half-moon mine has been sold to the Yuba Co. for $14,000. There is said to be $50,000 worth of ore stripped in the mine.

Silver King District.

IRON MINES.—Virginia *Chronicle*, June 1: The iron mining locations in Silver King district, Lincoln county, have been bonded to San Francisco capitalists and development work on the claims will soon begin. A small working capital is to be put up at once, and before, or when it becomes exhausted, the San Francisco parties may erect a 40-ton furnace, and within three months after its operation may elect to purchase a half interest for $10,000 cash. Interested parties will handle the working fund and will make it go as far as possible. Silver King district lies 25 miles northwest of Bristol and is somewhat difficult of access.

Tuscarora District.

NORTH BELLE ISLE.—*Times-Review*, June 1: North drift, 500-foot level, extended 17 feet, showing seams of spar. No increase of water.

BELLE ISLE.—North drift, 250-foot level, extended 14 feet. North drift, west lateral, 150-foot level extended 9 feet.

NAVAJO.—West crosscut from the end of the south drift 350-foot level, extended 27 feet, passing through some vein matter giving low assays. South drift from the same crosscut extended 25 feet.

NORTH COMMONWEALTH.—Joint crosscut, 225-foot level, extended 9 feet; rock somewhat harder. East crosscut from the end of the south drift on the 100-foot level, extended 9 feet; total length, 58 feet. Still continue in vein matter with seams of high-grade ore in the face.

GRAND PRIZE.—400-foot level: The following extensions have been made during the past week. West drift old vein 14 feet, west drift from north crosscut 17 feet, and showing improvement in the face.

NEVADA QUEEN.—Winze from north drift, 450-foot level, has been sunk 6 feet; total, 13 feet. Crosscut from north drift, 350-foot level, has been advanced 20 feet, cutting seams of low-grade ore. Stopes above 350-foot level continue about as last

reported. South drift from 150-foot level of Commonwealth has been advanced 17 feet, 200 tons of ore have been sent to the concentrator.

DEL MONTE.—East crosscut from the end of the north drift, 100-foot level, extended 17 feet; total length, 49 feet. The crosscut continues in vein matter, showing high-grade ore seams. Considerable ore is now showing in the face.

COMMONWEALTH.—Stopes throughout the mine all look well; 245 tons of ore have been sent to the mill, which is running nicely and doing fine work. Bullion shipped Monday, $11,803.92.

Tybo District.

NEW LEDGE.—Eureka *Sentinel*, June 1: A new ledge has been struck in the Dimmick mine which is yielding large quantities of rich ore.

ARIZONA.

THE UNITED VERDE COPPER MINES.—Cor. Prescott *Courier*, June 1: In the tunnel run by W. A. Clark to drain the United Verde Copper Co.'s mines, work has been suspended for the present. The tunnel has been looked upon as a kind of a mystery and many questions made about it since the flow of water; and for the satisfaction of your many readers I would say after the flow of the vast amount of water in a few hours the tunnel was filled with sediment and sulphuret ore, while the gulch extending to the Verde river was strewn with the same, which after the exposure to the air and sun now carries all the beautiful hues the corroding copper sulphurets can produce. It is hard to tell the amount of sulphuret ore that passed out of the tunnel in the flow in a few hours; some might estimate it at 500 tons and it might have been many thousand. Soon after the flow had ceased, men were put to work cleaning out the tunnel, which took from four to five weeks, and arriving near where the cave took place, J. L. Geroux had heavy timbers placed in the drift to save the face of the tunnel; he went in after to take a look and saw everything was on the move, and ordered the men to get out, and he at the head made for the incline, followed by the men catching hold of the ropes just in time to save themselves, for the cave followed close after them, crushing the timbers like pipestems, and they had a very narrow escape with their lives. The face of the tunnel soon filled with slag and stuff that came from the cave, 200 or 250 feet above, stopping up everything, and being of a coarse nature, it allowed the water to flow through it, draining the mine. J. L. Thomson, superintendent, and J. L. Geroux, overseer, were well pleased to think it drained this mine, which will be a great benefit to the company. About 150 inches of water now flows from the tunnel to the Verde river; some are complaining that it affects the river water so it is unfit for use and believe it will destroy vegetation. A few days sinking on the hoisting shaft they found a cave about 100 feet in length, which I have been told is a grand sight. There are a great many heavy pieces of sulphuret ore found below the north end of the tunnel. The opinion of many is that the copper and sulphur left a solution, which, with the cave, had formed an acid which dissolved the sulphuret ores and a heavy body of water broke through the surface, causing the cave. The shaft is now being sunk and some very fine ore found. The United Verde Copper Co. is running with good success. Its ores carry considerable silver, gold and copper. Its mine is one of the finest properties in Arizona. There are other mines joining the United Verde copper mines and vicinity, which are showing some very fair grades of ore, which will soon come to the front, and any one wanting mining property would do well to examine the United Verde Co.'s mines. The company has two smelters running; no idle men in camp; about 50 to 60 men at work; no place for bummers around the works of the company.

ORO BELLA MILL. —*Journal-Miner*, May 30: Mr. Sarle, the millwright under whose direction the Oro Bella M. Co. has constructed a fine stamp-mill at its mines in the Bradshaw mountains, while here informed the *Journal-Miner* representative that the company's mill started up on the afternoon of the 15th, and when he left camp was running very successfully. The mill is solidly and substantially built of the best material, the structure being inclosed and covered with heavy corrugated iron, the machinery consisting of stamps and Frue vanners, with power necessary for a 20-stamp gold and concentrating mill, and is from the well-known manufacturers Messrs. Frazer & Chalmers of Chicago. The cost of the plant is about $40,000, and $13,000 have been expended in the construction of a fine wagon-road from a point near Minnehaha Flat to the company's camp, which is known as Bayard. We understand that nearly $50,000 more have been expended in developing the company's mines and in making internal improvements, and that the mines and mill are arranged with the special object of enabling the company to mine and handle its ores cheaply and economically. The two mines, Oro Bella and Oro Bonita, are opened quite extensively by tunnels, the lower, or sixth, level opening the ground to a depth of 600 feet. All the tunnels are run on the lead, following a continuous vein of ore from one to five feet wide. The concentrates are sufficiently rich to bear the cost of shipment to smelters and yield a good profit, but we understand the company contemplates adding a chlorination plant to its other works and treating its concentrates on the ground.

SILVER KING.—*Alta*, June 1: No. 1 winze below 1200-foot level, 22½ feet sunk during the week. Total depth, 181½ feet. Formation, porphyry and quartz. Miners in this winze will now be put to work opening the 1200 station. No. 2 winze, total depth below 1080 level, 73½ feet. Progress, 13½ feet. Fair headway is being made in moving hoisting engine from the King to the Bilk shaft.

WELDON.—Fair progress has been made in shaft No. 3 during the week, with the vein showing strong in the bottom and ore of good grade in bunches through it, which is being saved.

PEERLESS.—Continue to take out ore of good quality from the stopes on the 200-foot level, but at other points through the mine, owing to some of the stopes lowering in grade and others that need further prospecting to get ore in shape for breaking, after this month will not be able to keep up a sufficient supply of ore of milling grade for running the mill until further development is made. During the week 140 tons of ore were crushed, which samples, according to battery, $20.43 per ton. Continue to make repairs at the well in the way of recribbing and timbering.

CROCKER.—During the week work was suspended for the present in the south drift from west crosscut No. 2 on the 300-foot level. The face still shows four feet of milling ore. In the south drift from upraise No. 1, on the 300-foot level, 75 feet above the track floor, good progress has been made during the week, with the face showing five feet of ore of good milling grade.

BRITISH COLUMBIA.

SMELTER.—Donald *Truth*, May 28 The claim-owners of the mining districts along the line of the Canadian Pacific have long complained of the lack of smelting facilities. These facilities are about to be furnished them at the Revelstoke. Now the claim-owners are called on to prove that they really needed what they claimed they lacked. If they have ore, let them begin getting it to the front.

TOAD MOUNTAIN.—All reports received from the Toad mountain country are of the same tenor—that the camp is a good one; another thing that all are agreed on is that the trail from Sproat's Landing to Nelson is a bad one for the money expended. A gentleman who arrived from there last week gives it as his opinion that the Government should adopt *Truth's* suggestion, and expend the money appropriated for roads, trails and bridges in the west division of Kootenay district in starting a wagon-road from Sproat's Landing.

COLORADO.

SENATOR.—Georgetown *Courier*, May 29: A large force of men is now employed on the Senator mine on Capitol mountain, and it is stated that there is an abundance of ore of a good grade in sight. Shipments are being made regularly from this property. The Ashby tunnel is being pushed ahead as rapidly as power drills can do the work. The Dunkirk vein may be intersected by the tunnel any day, when it is thought a fine body of ore of a good grade will be opened up. A vein of nearly solid ore 13 inches in thickness was uncovered in Harris & Co.'s workings on the Mineral Chief mine, Republican mountain, on Saturday last. The Keith tunnel on Mill creek is being pushed into Keith mountain. The indications in the heading show several feeders which indicate the near approach to the first lode, namely, Monongahela, which shows a very large outcropping upon the surface. Hall's tunnel is being driven steadily ahead. Its value to this section is unquestionably great. Clear creek's output from Old Leavenworth will make itself felt when this tunnel is complete. The Colorado Central mine makes a fine showing, its dividends are unfailing, and its ore reserves are constantly increasing, as well as the large cash surplus that the company always carries. The respective lessees on the Pelican, situated on Republican mountain, have splendid showings in their workings. Ear-marks point to extensive development work being prosecuted on this property this summer.

DAKOTA.

PLACER MINING. — Deadwood *Pioneer*, May 29: Placer mining on an extensive scale has commenced on the Norton-Balsley grounds below Fink's Flat. The water-wheel to drain the shaft and tunnel is working satisfactorily, and miners are making good headway. Good cleanups are looked for.

CHLORINATION WORKS.—Roasters were charged and fires started at Keith's chlorination works yesterday. Leaching begins within a few days, and it is anticipated that definite results will be obtained by, if not before, June 10th.

EL REFUGIO AND ONTARIO.—Prof. Zahn, Geo. V. Ayres, Judge McLaughlin and E. R. Collins visited the El Refugio and Ontario mines, Galena, yesterday. Both were found looking most favorably, and at each a shift of men was working. Both properties are now shipping ore to Omaha.

IDAHO.

RICH COPPER DEPOSITS.—Cor. *Oregonian*, June 1: There is a region of country along the Snake river beginning some 20 miles above Lewiston and extending for 30 miles on both sides of the river that offers the best field for prospectors after mineral wealth. This region abounds in innumerable ledges of copper, carrying paying quantities of silver and gold. Almost any of these ledges are quite rich in copper. Several of them have been assayed and found to carry from 30 to 70 per cent of copper, showing this as rich in that metal as the famed Seven Devils country. This region has the great advantage over that of being accessible by steamers on the Snake river. The Seven Devils country is being taken up and the mines developed, and capitalists from Montana are eagerly investing their money and making that investment pay them well where they have to haul the ore 90 miles with ox teams. Here these rich deposits lie untouched by any one except by the enterprising owners of the Butcher Boy mine, who are now pushing ahead with commendable vigor. Their ore runs 65 per cent copper, $23 silver and $7 gold per ton. Counting copper worth 10 cents a pound, this makes their ore worth $160 per ton, which looks like there was something in it. The only disadvantage holding this district back from immediate development is the crying want of a copper smelter in Portland. There is plenty of copper ore in this region alone to supply such a smelter with all the ore needed.

CLEANUP.—Cœur d'Alene *Record*, May 28: The product of the last cleanup at the Mother Lode was purchased by R. Mackenzie. It is a fine bar about one inch thick, three wide and five long, and weighs but a few pennyweights under 100 ounces. Its mint value will probably vary but little from $1700. A very rich placer discovery was made a few days ago on the hillside near the mouth of Fancy gulch. It can be worked at almost any season of the year, and with very little water. At present all the water is being utilized in the hydraulic operations in the main channel. Monday the Simmonds Co. finished the season's cleanup, which included considerable ground washed last year. They were able to get water only a few days this year on account of the extensive Missoula and Dream gulch operations in which the owners of the California ditch are largely interested. The California ditch water was turned into Dream gulch yesterday, and hydraulic operations commenced on the Niagara and Rosa Hill claims, on which little but assessment work has been done since 1884. The old wash which has never been uncovered on the east side of the gulch will probably be found to cross one or both of these claims. The product from another arastra cleanup at the Baby Fraction was brought to the Bank of Murray, Wednesday. A much smaller run was made than heretofore on account of a lack of quicksilver. Nine and a half tons yielded 19 1-15 ounces, or a little over two ounces to the ton, worth, according to the Government certificate for the last bar, $16.20 per ounce. The property is certainly making a splendid showing.

SILVER CITY.—Cor. Idaho *Statesman*, May 29: For many years this camp has not enjoyed such prosperity as now. Within the past year not less than 20 mines were bought and placed with a strong English syndicate in two separate groups, both of which have been producing for months. Several other, though smaller sales, have been made during this time, and altogether there must have been several hundred thousand dollars paid as purchase-money, mostly to citizens of this place, making this, as a community, so much better off and correspondingly happy. The mines are all looking well and those being worked are doing well. All the mills in town are running, and this camp is producing more bullion than at any time for several years. The Oro Fino mines (limited) are working a large force of men at their mine and are keeping 10 stamps of their mill constantly employed with a good grade of ore. The arastra is working on ore from the Phillipps & Sullivan mine on Florida mountain. This ore is rich and is the second crushing taken out by the lessees, Alf Hicks and others. Leonard's mill is kept busy on small lots from various mines taken out by private individuals during the past winter and spring. Bailey's new mill has been running on the Nellie Stoddard ore, but just now is testing ore from various mines, as Mr. Bailey wishes to prove his ability to work these ores cheaper and as effectually as by the old pan process. Much interest is taken in these experiments. The Poorman group has been shut down for a few weeks, but will start up again next week. The last crushing from this famous mine yielded $180 per ton. The old Golden Chariot has been leased to Mr. Lamb, Mr. Matthews and the Exner boys, and is looking as well as old-timers say it used to look before it took its prolonged bath. The pumps in the Oro Fino have lowered the water in the Chariot 100 feet and opened to the boys ore that has been out of the reach of chloriders for many years. They had their first crushing a few days ago and from 45 tons of ore obtained over $6000.

LOWER CALIFORNIA.

ALAMO.—*Lower Californian*, May 30: Great interest was noticeable last week over the visit of Gov. Torres to give legal possession of the Aurora and Quinota mines. After due consideration Gov. Torres and Engineer Sanchez effected a compromise by dividing the line between them, giving the Quinota 20 meters on the north side instead of 25 meters which they wanted, and obliging the Aurora to take 28 meters on its north side while they wanted but 20. This gave to the Aurora all of its workings by 12 meters, and the Quinota all of its work by one meter. The question between the Suerte and Baby mine, both locations covering the same ground, was amicably settled by Engineer Sanchez, who called Col. D. K. Allen to act as referee. Col. Allen has a full force of men at work setting out the center and boundary of each of the company's mines, as surveyed by Government Engineer Sanchez, who is assisted in his work by Engineer Scott. Supt. Sutherland effected a settlement with the jumpers of the Spider mine by paying them for their possession work, which now answers for the possession of the Spider. The Spider is said to open up splendidly and may become equal to any here. A rich strike was made in the Moran mine at eight feet, which promises something good yet to come. The Texas, owned by Baines & Co., adjoining the Cocinero, made a wonderful strike last week. The vein is not large, but is one of the richest in Alamo. Some truly dazzling specimens were taken out, the ore for awhile running $20 a pound. The owners were compelled to put it in sacks to prevent its being carried off. The men at work in the placers uncovered the Cocinero vein in the gulch where it crosses it, and found it to be very rich. The Princesa comes to the front with very rich ore at the depth of 22 feet in the new shaft. The Brooklyn is also reputed to be turning some very good ore. Very rich sulphurets were struck in the Penelope mine at the depth of 23 feet. This shows that the mills and machinery necessary to reduce the ore and save the gold must be very different from that used to save free gold only.

VALLEDARES AND JUAREZ DISTRICTS.—Some months ago this paper announced that the General Government had conceded to Col. Castro de Beraza two districts containing gold workings, both placer and quartz, besides other valuable minerals. One district embraces the old Juarez diggings, situated some 65 miles northeast of Ensenda, which have been successfully worked since 1874. The other district is in the Valledares and Socorro region, northeast of San Quintin. The Bonanza mine, owned by the J. W. Blundon Co., is located within a mile of this concession, in Santa Cruz canyon. There is no doubt that the Bonanza is the equal of anything yet discovered at Alamo. Since receiving his concessions, Col. Beraza has been busy organizing a company to develop the concessions.

MONTANA.

DRY GULCH.—*Mining Review*, May 29: A movement is on foot, we understand, to give the name South Helena to the mining camp at the head of Dry Gulch, and the indications now are that it will soon be a very important suburb to the city.

CLEVELAND MINE.—This mine is located at the head of Dry Gulch, and is owned by Dave O'Rear, now being worked under lease by Marks & Harrah, lease to expire in August next. Last fall about 60 tons of ore were worked by Schaffer in his little five-stamp mill, yielding on the average about $52 a ton in gold. Another batch of 26 tons, a few months later, was sent to the Helena smelter for treatment, netting about $145 per ton. Work has been constantly prosecuted on this property by two men, and there are now about 600 tons of ore on the dump.

GRANITE MOUNTAIN. — About 300 feet south of the Cleveland the same parties are working the Granite Mountain lode, under one year's lease. The Granite Mountain is owned by a stock company of Helena capitalists, and has been allowed to lie idle for some years past. Work was actively commenced on this property last April by the lessees, and has been constantly moving since that time by a force of five miners. About 150 tons of ore are now on the dump awaiting treatment.

VANDERBILT.—Work still progresses on this property, though development has not yet progressed far enough to show up much. The owner, Mr. Horton, informed your correspondent that the indications were daily getting better.

NEW MEXICO.

CARLISLE.—*Bullion*, May 31: The Carlisle Gold Mining Co. (limited) is operating its Carlisle mine and 60-stamp mill and 36 Frue concentrators, and now employs 75 men. When to this number the teamsters and others are added, over 100 men are upon the payroll. The ore body of this property is of phenomenal width and continues in depth 550 feet, the depth now attained by the development shaft. From the character of the ore now being extracted from the work performed in the excavation of 200 additional feet shaft work, it is generally believed that high-grade ore bodies will be intersected. The company has decided to sink a new triple compartment shaft, 200 feet from the main vein and 300 feet west of the present opening. The shaft will be sunk 1000 feet with the view of more economically reaching the deep ore bodies. The mill treats on the average 160 tons of ore daily and produces six tons of concentrates every 24 hours. The management is not running through its base ore. A careful computation by Prof. Clayton of Salt Lake City placed the amount of low-grade ore now blocked off and in sight in this property that will pay to work, at 200,000 tons. When the 1000-foot shaft has been completed, and the necessary tunnels and drifts, the mine will have no less than 600,000 tons of ore in sight that will pay to extract and treat. For the first four months of 1889 the Carlisle mine produced $61,500 gold bullion; $9500 net value of concentrates; $5000 various profits; a total of $72,000. Cost and total expenses, $48,000, which leaves a net profit for four months of $24,000.

BULLION.—Silver City *Enterprise*, June 1: The shipments of bullion for the past week have been rather light. Thos. B. Pheby of the Mimbres Consolidated Mining Co. shipped about $8000; the Key, $2400; and the Deep Down, $2100. An accident which occasioned some delay occurred at Tom Knott's mill in the Burros last week. The boiler-head blew out, but fortunately no serious damage was done. The mill is being regulated, and will soon be running on regular time.

PINOS ALTOS.—The west crosscut on the Aztec at the 300 level is in good ore, and the pay vein is one foot in width. The latest deal is the bonding of the Night Bird, one of the prominent mines in the district. The claim is 1500 feet in length by 450 feet in width. On the location there are three distinct veins all well defined, and each carries ore which, if milled, would give a handsome net profit over all expenses attendant upon the operation of a mine.

OREGON.

THE SANTIAM MINES.—Cor. *Oregonian:* The Santiam mines, better known as the Quartzville Mining district, Linn county, Oregon, were discovered in 1855, or near that time, and were worked and scratched over for free gold, not knowing anything of the silver ores of to-day. Later they were worked some in tunnels and open cuts. These mines and prospects are lying on both sides of the north fork and of the south fork of the Santiam river, and run in a southeast and northwest direction, parallel veins or lodes of quartz between granite and white porphyry and black slate and about one mile wide; length unknown. There is gold and silver on the west side of the belt or zone, and galena on the east side. On the southeast side of the Santiam, the mountains and ridges run nearly east and west with the rivers, yet small spurs run in various directions, forming deep canyons, and are covered with heavy timber of cedar, hemlock, sugar-pine, and red fir, sprinkled with larch, making thick undergrowth. The ledges or veins cross these ridges at right angles, and crop out on the steep points covered with moss. The Galena mining camp is about four miles southeast, direct line, or seven miles by trail from Quartzville, and is a fine group of mines, mostly gray carbonates; yet some of them contain galena and low grade of ores. The Queen has old marks of works many years ago; shows very fine blue galena and red oxides; has also a large tunnel about 280 feet long, through granite, porphyry and a body of blue-gray quartz, partially crystallized, bearing galena, lead, chloride of silver, gold (native) and pyrites of iron and sulphur. About one-half mile southeast from the Queen is a natural tunnel about 30 feet long which contains lead carbonates similar to Leadville, Col., and ore rich in silver and galena. The old Quartzville and burnt mill are on the west side of the Santiam, and the northwest side of the parallel range with the river, known as the White Bull mountain, is the center of the gold belt. Some of the finest ledges of quartz in Oregon are found in this district, containing gold, silver, lead, and tin. The White Bull mine was patented about eight years ago; has several tunnels with black sulphurets of silver, blue galena, pyrites of iron and copper. Assays average $100 in gold per ton, and silver $60, though some assays run very high; about $10,000 per ton have been found. The extension of the White Bull on the northwest is called the Golden Ridge mine, located in September, 1888, by Dr. E. O. Smith of Portland. Old tunnels with trees growing in their entrances have been discovered. One tunnel, 250 feet long, 4 feet wide, in solid quartz, assays $100 in gold per ton and an average of $60 in silver. The camp has been run over and located without regard to the mineral until 1888. Visitors from Cœur d'Alene and Arizona state we have a fine camp of good ore. We have had a mine meeting and made a camp named Golden City Mining district, No. 3, Linn county, Ogn.

MECHANICAL PROGRESS.

Wooden Beams Displacing Iron.

In view of the largely increased production of structural iron and steel, it is interesting to note that in many so-called fire-proof buildings there is a tendency not to use iron or steel in the long floor beams, but to return to wood. The reason given is that while the wood is, if exposed to fire long enough, destructible, it will stand a greater heat for a longer time without giving way and ruining the structure. It is asserted that iron and steel beams, though they will not burn, expand and contract so under the influence of heat and water that is thrown into the building, are much more liable than the wooden beams to destroy the building, the expansion and contraction being made greater.

In regard to the substitution of wood for iron, E. M. Show of the London *Architect* says: The contents of a building have undoubtedly much to do with its safety or danger, but in estimating the whole risk the materials of which the building is constructed must never be put out of consideration. Every building cannot be erected with brick columns and groined arches, but there is a vast range between these and the miserable cast-iron posts too commonly to be seen, many of which have been put in without having been tested for strength, even at the ordinary temperature of the atmosphere, much less at that of fire.

The following, from *Fire and Water*, may also be given in support of the above: A fire recently occurred in a warehouse of enormous proportions, and raged with great fury for five hours, at the end of which time it was extinguished and a very large portion of the building and its contents saved. The warehouse was constructed of brick walls, it had wooden floors supported on wooden beams, which, in their turn, were carried on wooden story-posts about 12 inches thick, and, although serious damage was done, not one portion of the heavy woodwork was destroyed.

After the fire the proprietors allowed the Chief of the Fire Brigade to remove one of the story-posts, with a section of the beams and other parts surrounding it above and below. This post had been subjected to the full action of the fire during the whole of its duration, as already mentioned, or, making full allowance for everything, including the delay of the fire attacking the particular spot on which it stood, and the time at which the cooling process commenced, certainly not less than four and a half hours. As large quantities of water had been used, and it was probable that everything had been saturated, the wood was carefully dried before a strong fire until not a trace of moisture remained in it. It was then set on end in an open yard, exactly as it had stood in the warehouse, with the pedestal underneath, the cap above, and the beam across the cap. More than a ton of shavings, light wood and heavy wood were placed around it, and after the whole heap was saturated with petroleum a light was applied to it, and, after this, large quantities of petroleum and turpentine were pumped on it.

At the end of two and a half hours the post, beam and other parts were withdrawn from the fire, and within a few minutes from the time they were withdrawn they ceased to burn. A few feet were then sawn off horizontally, at that part which suffered most from the flames, and afterward the same place was split longitudinally with steel wedges in order to examine its condition. The post was of pitch pine, about the most inflammable wood known, and yet after exposure for seven hours to fires, the fury of which could not be exceeded except in blast furnaces, it contained within a quantity of perfectly uninjured and apparently fresh wood, probably capable of supporting the whole weight which the original post was designed to carry. Immediately after the saw-cut, and again, after the cleaving with steel wedges, the center was carefully examined, and found to be just perceptibly warm to the touch, but nothing more, thus proving that the fiber, in which the strength lay, was quite uninjured.

A LINK GRINDING MACHINE.—Messrs. Pedrick & Ayer of Philadelphia, Pa., have just brought out an interesting new piece of machinery. It is a tool designed to quickly fit up hardened links and blocks. After the links are planed up they are case-hardened and always spring some. This makes it necessary to grind the space and the block. When ground free hand, the usual way, the space and block being ground so as to work freely, the true radius is always lost as the curve straightens. With the machine in question any radius, it is claimed, can be quickly ground true, either the block, link or face of the link. It consists of a frame, carrying an arm mounted with an emery-wheel. This has an automatic feed up and down, exposing all the surface of the wheel to the work, keeping the wheel true. It has also an automatic swinging movement over the arc of the circle to be ground. It is driven by an overhead countershaft and occupies small floor space.

THE TOBIN BRONZE—A NEW METAL.—The Tobin bronze is a metal recently placed on the New York market, which is said to possess many remarkable characteristics, among which are great torsional and tensile strength and high elastic limits. Chief Engineer Hine, U. S. N., says the *Scientific American*, after making tests, found the metal to withstand the action of certain acids with a loss that was infinitesimal. It can be forged into bolts with great facility, and is used in large quantities for this purpose in several of the naval steamers now in course of construction for the navy, and for various other purposes, such as dyehouse and sugar machinery. It has been used successfully for cylinder linings and pump rods by some of the leading pumpmakers of the country. Owing to its non-corrosibility and high torsional elastic limit, which is equal to that of the toughest grade of machinery steel made in this country, it is being generally used for steam launch and yacht propeller shafting. Another important feature is that it can be drop-forged in the same manner as steel, making it essentially valuable where strong and intricate bronze pieces are required that cannot be obtained by casting. It has been carefully tested and found to withstand the action of sea-water in such a manner as to commend it to favorable notice for sheathing ships and piles. The ingot metal is adapted for railroad car journal boxes and bearings of all kinds, for land and marine machinery, and in point of endurance and anti-frictional properties, has given results equal to the best in use.

ENGLISH AND AMERICAN IRON WORKERS.—We see from a report just published on the production of steel in Great Britain and the United States, 1048 hands in the latter country produced 4500 tons of Bessemer rails in a week, which would average 4.3 tons per man; In Great Britain, on the other hand, 600 workmen produced 1500 tons in the same time, or only 2½ tons per man. The average wages in America were, however, fully 35 per cent higher than in Great Britain, which nearly equalized the cost of labor per ton in both cases. The difference in the actual cost of production in the two countries must then principally be attributed to the great distances from which the American works have to obtain their supplies of raw material for the manufacture of Bessemer steel, and this obstacle to the development of the rail industry in the United States would be obviated if the basic process were introduced into this country, since in many instances suitable mineral could then be found in close proximity to coal-fields. There is, however, no probability of the manufacture of Thomas steel being developed in America at present, since a group of the Bessemer works has bought up all the patents referring to the product, and can consequently prevent all new works from producing it.

IRIDIUM ANTI FRICTION METAL.—An anti-friction metal has recently been introduced into use in this country to take the place of babbitt metal and other similar alloys. We do not know why it is called iridium metal, unless from the fact that it does not contain a particle of iridium. Perhaps, however, it is because iridium is a very hard metal, and this is thus named from the fact that it is a hard alloy, though with a low melting point. It can be cast around journals in the same manner as babbitt metal. It can also be cast and machined in the same way as gun metal. Our object in this note is to call attention to the fact that this metal is now being introduced in England. The London *Builders' Reporter* speaks very favorably of it.

FIRE-PROOF IRON HOUSES.—The *Societe Central d'Architecture* of Paris has just received a very curious communication. A system of building houses entirely of sheet iron has been devised. The walls, partitions, roofs and wainscoting are composed of double metallic sheets, separated by an air mattress, which is surrounded by different substances non-conductive of heat. The great merit of this discovery is the non-combustibility of this building. The metal employed allows of the most varied forms of ornamentation, so that the general aspect may be made as pleasing as that produced by any materials hitherto in use.

THE STRENGTH OF STEEL is reduced by being hardened in water, but both its hardness and toughness are increased by being hardened in oil. Iron heated, and suddenly cooled in water, is hardened, and the breaking strain (if gradually applied) is increased, but it is more likely to snap suddenly. It is softened and its breaking strain reduced if heated and allowed to cool gradually. Iron if brought to a white heat is injured if it be not at the same time hammered or rolled.

A SQUARE-HOLE BORING MACHINE.—It is said that Mr. Young, a telegraph operator at Charles City, Iowa, has invented a square-hole boring machine. His patent has been granted in 15 countries, and he is backed by two manufacturers of that town. An exhibition of the machine was recently given before prominent mechanics, and it was pronounced a perfect success, the machine boring an even square hole of any desired dimension.

CASTING A BIG INGOT.—A 75-ton ingot was recently cast at the Parkhead Forge, Glasgow. It is the first of a set of crank shafts for the London Electric Supply Corporation, Limited, and is 20 feet long. The shaft into which it is to be forged is 25 feet long by 36 inches diameter, being for the largest electric-lighting machine in the world. This shaft, with a 12-inch diameter hole through the center, will itself weigh 23 tons when completed.

SCIENTIFIC PROGRESS.

Contrast of Colors in Nature.

Nature is very sparing of showy contrasts of warm and cold colors. Red and blue are very rare, and of yellow and blue the cases are but few, and black and blue are found in lepidoptera more often than white and blue are seen in our flora or fauna. It is not uncommon for one of two strong colors to be overcast with a tinge of its fellow, or for both of them to be reconciled by a common touch of black or of some third color, or for one of them to be lightened by a dash of white, while the other is lowered by as much black, and so red, off-hued with black—russet and green unbrightened with white—often meet in the autumn in dead and dying patches of fading leaves. It may be shown, I believe, by the refractions of light in crystallized gypsum, that brown is the complementary color to lavender gray; and how true to herself is Nature we may go forth and see in the fall of year, in the dead and curled leaves of the mugwort, or meadow-sweet, which are beautiful even in their death, with one side brown and the other the brown matching gray; and if brambles be cut in the leaf-greeny season, their two surfaces soon wither into the harmony of gray and brown.

And what use are we to make of these hues of Nature? They are warrants for a gray mantle under locks of brown hair, or a brown bonnet or trimmings, or a gray room wall with brown furniture; and if, on a hot summer's day, I see the dark leaf shades playing on the gray bark of a young beech, I can boldly lay darkish leaf shades on a wall of the beech-bark's hue; or if, after the winter rains, I find a barkless pole in railings, tinted with the palest blue-gray, and on breaking off a splinter of it I find its inner wood of its true color of pale brown-yellow, why should I not take the inner tint for my wall and the outer one for the skirting? Or if I pick up a piece of lichen of dull green on one side and dull gray on the other, why should I not bind my book in one color and lay on it a lettering piece of the other? Nature is the best school of art, and of schools of art among men those are the best that are Nature's best interpreters.

All colors have their complementaries, which add to or detract from the beauty of the adjoining colors, according to what they may be. Thus, the complementaries of red are green; blue are orange; yellow are violet. If you cut out pieces of gray paper in an ornamental form, and stick a piece on each of the three colors I have named, you will find, in a shaded light, the gray will be fully tinted by the complementaries of these colors. But you cannot lay down precise rules. An experienced artist can bring any two colors together by properly modulating them. Nothing is so charming and so refreshing to the eye as a harmonious arrangement of colors. They are "like a sweet chord of music to the sense." The hand of Nature never errs, whether it brings together scarlet and crimson, as in the cactus; scarlet and purple, in the fuchsia; yellow and orange, as in the calceolaria; or the colors in the varied plumage of exotic birds—the harmony is always beautiful, ever perfect. The laws of harmonious coloring are a necessary part of the knowledge of the manufacturers of colored fabrics. I will suggest a few contrasts: 1. Black and warm brown. 2. Violet and pale green. 3. Violet and light rose-color. 4. Deep blue and golden brown. 5. Chocolate and bright blue. 6. Deep red and gray. 7. Maroon and warm green. 8. Deep blue and pink. 9. Chocolate and pea-green. 10. Maroon and deep blue. 11. Claret and buff. 12. Black and warm green.—*J. G. Grace, London Architect.*

Peculiar Motions of Lightning.

Photographing lightning and making good pictures, representing the forked and irregular light as it shoots across the sky, or from cloud to earth, has become quite common and is easily done in a dark night; having first focused the lens for distant objects, one has only to point it in the direction he expects the flash to appear, expose the plate and wait for the lightning. If the night is dark, one can obtain several flashes of lightning on the same plate, as they often occur near together. The only difficulty is to have the flash come within the field of the lens.

Photographing the current itself so as to get detail in the track, showing how the electrical currents travel, is quite another thing; this we have been able to do.

From such photographs we see that the electrical current may travel without dividing, or it may divide and sub-divide, twist and meander in its passage from cloud to earth, its image on the negative presenting such a variety in form that many names have been given descriptive of its general appearance, without any reference to the real motion of the current itself. Three of these motions have been observed, viz., the twisted, the curled and the straight-forward.

The twisted motion resembles a loosely twisted rope; it twists both ways, usually from left to right, as the twining vine winds around its support. There are exceptions to this rule in the electrical as well as the vegetable kingdom, for we find it twisting not only both ways (*i. e.*, from left to right and right to left), but it reverses its motion in the same course.

The curled motion resembles a twisted ribbon or shaving as it curls from the carpenter's plane, and in some respects is most remarkable.

The straight presents straight lines in its track, and is evidently traveling with great force.

PROGRESS OF INDUSTRIAL CHEMISTRY.—It has only been within the last 30 years that the manufacture of chemicals and the study of chemistry as a powerful auxiliary to the arts attained any eminence whatever in this country. Industrial chemistry has had its largest development in France and England, where general manufacturing has also attained large growth, and Germany has also made marvelous strides in this field of progress. In France alone, the annual production of chemicals has reached the great value of $300,000,000. By the side of this giant development the chemical manufacture of the United States seems mere boy's play; nevertheless the progress of the last 20 years in this country has been very striking. The manufacturers have ventured to undertake something besides the staple products of sulphuric acid, soda, vegetable dyes, and medicines, and they have, within the period named, entered upon the production of a large variety of rarer chemicals, and have evidently planted the foundation of a great industry. The exigencies of home manufacture will give an impetus to this industry from which the largest results may be expected and which will place it on a par with the older and more firmly established manufactures.—*Pittsburg Pottery.*

THE ANCESTORS OF THE DOG.—Mr. M. Boule, in a note to the French Academy on the predecessors of the present Canidæ, shows that, in the Miocene epoch in France, there were animals that offered some affinities with the dogs. In the Quatenary epoch numerous species are found, and these seem to be identical with the present species. The deposits between the middle Miocene and the Quaternary furnish but a small number of data. Upon studying the remains of dogs taken from the Pliocene formation of Puyde-Dome and Velay, Mr. Boule has found that, far previous to the Quaternary epoch, the Canidæ offered a large number of species, and that these latter already realize the types of the present wolves, foxes, jackals and dogs. The *Canis Borbonicus* of Perrier, while offering some affinities with the civets, may be considered as an ancestral form of the foxes. The *Canis Etruscus* was a very near relative of the present wolves. Another species had the dental formula of the coon. Finally, a jaw from the Pliocene near Puy exhibits the character of certain races of domestic dogs. In the presence of such facts as these, it becomes difficult to admit, as has often been done, that all our races of domestic dogs are but artificial modifications of their congeners, the wolves and jackals.

PHOTOGRAPHING BY HEAT.—Prof. John Trowbridge in May *Scribner* says: It may be said that photographs can be taken by heat as well as by light. The action of the shorter waves of energy, which we call light, is quicker and sooner manifest to the eye than the action of the long waves which we call heat; but the invisible heat rays in the solar spectrum have been photographed. The slow action of heat in changing the molecular state of bodies is well known. It is probable that an emulsion could be formed which would give an image of a hot black kettle in a dark chamber. The element of time, however, would probably be an important one. Indeed, we are often presented with evidences of the picture-making facilities of the heat rays. A fern-leaf upon ice is soon represented by the difference of molecular action. A stationary carriage-wheel standing in the sun upon the frozen ground is found to have left its photograph upon the ground when it moves on.

A LAMP FOR THE MICROSCOPE.—A new lamp for the microscope, specially constructed for use with that instrument, has been invented at Bonn by the Doctors Wolz and Kocks. Mirrors, condensers and other usual accessories are not needed, and it has the advantage of being completely covered. The light can be cast on any portion of the object under examination; it is very suitable for the illumination of opaque objects, and its chief claim as an invention of practical utility lies in the fact that it adapts the law of total reflection to microscopic purposes. Light, says the *Chemical Trades Journal*, in a review of this interesting patent, is totally reflected by its passage through glass into air, so long as the angle of incidence does not exceed 40 degrees, and, by means of a bent rod, a soft, diffused radiance is transmitted from the paraffin lamp to the under side of the stage. As no light is transmitted laterally by the rod, the eye of the observer is not taxed by extraneous rays.

WATER DISCHARGES.—The quantities of water discharged in the same time through different sized apertures, under different heads, are to one another in the compound ratio of areas of the apertures, and of the square roots of the hights of heads above the centers of the apertures.

VOLATILE HYDRO-CARBONS.—The application of volatile hydro-carbons in lieu of water for producing power is just now attracting considerable attention in London. Mr. Yarrow was to have read a paper on this subject at the Society of Arts on the evening of May 22d.

GOOD HEALTH.

Lager Beer.

Lager beer, says the *Scientific American*, from its name, implies a beer that has been kept for a certain period. A year or six months, at least, is the time given by authorities as that which should elapse before such beer is tapped. The German and Austrian Governments impose both fine and imprisonment for any infraction of this rule, because of the deleterious effect of such drink before such lager or keeping shall have expired. There is not any such law here, and, as everybody knows who has had the time and inclination to investigate the subject, many of our brewers have greatly curtailed this time of keeping and constantly seek for expedients and processes for cutting it down still more, so eager is the market, so uncritical the consumer. Indeed, the American beer-drinker has little regard for his liver and kidneys, or he would have stoutly protested long ago. He takes his beer unsuspectingly, and without inquiry, till a time comes when, the liver being affected, or the kidneys, or both, nature protests, and the beverage once so pleasing to his lips is like so much acid. A chemist recently investigating this matter says:

"Brewers are using materials other than malted barley, such as corn and oats, etc., mixed with barley and hops, by which they accelerate its manufacture, making a sweetish, pleasing, heady beverage, but alcoholic, and people using this kind of beer in large daily quantities, with the idea that it is innocuous, have brought on a marked increase of renal complaints."

This statement was shown to a medical inspector of the Board of Health of this city. He could not say if these particular ingredients were used, but the general charge, he said, was undoubtedly true, neither colored as to the intent of the brewers nor exaggerated as to the effect on the health of the consumer. The Health Department, he said, had not sufficient force to look into this matter just now, so full were its hands with the routine of inspection.

If it can be shown that beer is injurious to health, the makers can be held and punished.

Buttermilk as a Medicine.

With the rapid growth of reconstructive medicine comes opportunely the reintroduction of old and well-known domestic remedies, among which buttermilk demands a respectable place.

A young lady patient of the writer was suffering from a severe consumptive cough. None of the usual anti-spasmodics, expectorants, etc., seemed to do any good, simply because her stomach was too weak to bear enough medicine to effect the purpose. Finally I suggested to her mother the use of hot buttermilk. It was adopted at once. Her first night's experience was one of comparative freedom from cough and pain, and a pleasant slumber for hours. It was continued for a long time with an unvarying relief of all her previous distressing symptoms, and an almost perfect freedom from cough for several hours after each draught of the hot buttermilk.

Lingering at one time for weeks from an attack of congestive fever, dosed with calomel and quinine almost beyond endurance, the writer began to desire buttermilk to drink. The physician "didn't believe in humoring the whims of patients," as he expressed it; besides, he contended that a single drink of the obnoxious fluid might produce death, as acids and calomel were incompatible dwellers in the same stomach. But I was a good persuader and my mother was a susceptible subject. The buttermilk "fresh from the churn" was procured and drank. No evil resulted; instead came perspiration and speedy recovery.—*Dr. S. F. Landrey.*

ORANGES FOR HEALTH.—While the orange was so highly esteemed by the ancients for its medicinal qualities, it is surprising how little attention the present generation gives to the many virtues inclosed in this little golden ball of fruit. A prominent physician once remarked that were his patients to eat an orange or two every morning they would require but little medical attention; for throughout the entire range of fruits that have attracted the attention of the medical profession as a means of alleviating many of the ills of mankind, there has been found none has so many diversified uses as the luscious orange, particularly in cases of low fevers and malarial complaint, and it should more largely take the place of unpleasant drugs so extensively used, to the great disgust of the patient. No fruit compares in cheapness with the beautiful and luscious orange, and particularly so now that our own country is raising the finest oranges in the world, the fruit selling at a price within the reach of the most moderate purse.—*American Grocer.*

A PRECIOUS PRESCRIPTION.—Dr. Henry Gibbons, Jr., recently closed a lecture at the Cooper Medical College with the following valuable advice: In conclusion, let me reveal to you a great professional secret, through which you will be able to diminish your doctors' bills at least one-half. It is this: Be cheerful; avoid despondent thoughts and gloomy forebodings; your labor will be light in proportion as your spirit is in it, or it may be magnified to corresponding proportions. Make exercise your nurse, diet your apothecary, and cheerfulness your physician, and the days of the years of your life will be better and your pockets will be fuller.

DEGENERATION OF THE HUMAN TEETH.—The law of retardation exhibits itself in the teeth of the higher races of mankind in a highly inconvenient manner. The greatly developed brain requires all the available room in the skull; there is no space left for the attachment of muscles of a powerful jaw. There is consequently no room left for either the wisdom teeth or the upper incisors; the wisdom teeth are retarded, often cause great pain, and decay early. The second incisors appear in startling and unexpected places, and often (in America especially) do not cut the gum at all. Prof. Cope says that American dentists have observed that the third molar teeth (wisdom teeth) are in natives of the United States very liable to imperfect growth or suppression, and to a degree entirely unknown among savage or even more civilized races. The same suppression has been observed in the outer pair of superior incisors. This is owing not only to a reduction in the size of the arches of the jaw, but to successively prolonged delay in the appearance of the teeth. In the same way men and the manlike apes have fewer teeth than the lower monkeys, and these again fewer than the insectivorous mammals to which they are most nearly allied. When this difference in dentition has been established, civilized man may claim to place himself in a new species, apart from low savages as well as from high apes.—*Popular Science Monthly.*

REMEDY FOR PALPITATION OF THE HEART.—Mrs. O. Thiessen of Pleasanton sends us the following: Take the lower part of the leaves of the century plant and peel off the green part and then squeeze out the juice. One teaspoonful taken in water several times a day will cure it.

RESULT OF A BASEBALL HIT.—A curious result of being hit with a baseball is reported from Philadelphia. A stuttering man was struck in the mouth, and when he got well the impediment in his speech had disappeared.

DANGER IN OCEAN AND RAILROAD TRAVEL.—Out of 100,000 people who cross the Atlantic from New York to Liverpool, the loss of life is not as great as among 100,000 who travel between New York and Pittsburg by rail.

USEFUL INFORMATION.

Cellular Clothing.

A new cellular clothing is coming extensively into use in England. It is the utilization of one of Count Rumford's ideas, expressed a century ago, but its value is now for the first time recognized, as in the case of so many of his theories. The manufacture of the material for this clothing is claimed to be based upon strictly scientific principles, and the fabric claims to fulfill all the requirements of a perfectly healthy clothing.

Rumford, in his essay on the propagation of heat in various substances, affirmed that clothing to be healthy must not only be light and warm, but allow the slow passage of a constant current of air to and from the skin, thus permitting the vapors which are constantly being exhaled from the pores to be carried off, and keeping the body surrounded with fresh air, instead of air made impure by waste products. This idea the material in question carries out by being closely woven in cells, as its name indicates. Silk (for more expensive fabrics), wool, cotton and wool (merino), cotton and silk, and pure cotton (for cheaper grades), are used, the distinguishing characteristic of the goods in each case being simply the cellular form in which they are woven. The common objection against cotton, which is the material most used (the aim being to reach the masses), viz., that its use for clothing is productive of chills, colds, etc., it is asserted, is removed as soon as it is manufactured in the cellular form. The evaporation and escape of the perspiration, and the passage of gases and air, then go on without impediment, while the customary feeling of chilliness wholly disappears.

The cellular fabric, of whatever material it is woven, consists of small cells—a network which, while open, is covered with a thin film or fluff, allowing the air to pass in and out, slowly and gradually, giving it time to become of the same temperature as the skin before it reaches it, and thus obviating all danger of catching cold. It is claimed to be equally satisfactory for summer and winter wear, to be durable, warm, to wash with less trouble and expense than almost any other material, and to be of all the cleanliest. It is made up chiefly into underclothing, the theory being that, so long as this is porous, impervious outside garments may be worn with impunity, since they are usually loose enough to allow an envelope of air inside of them. It is also made into night garments, sheets, counterpanes, and cricket and tennis caps and jackets. Ladies are beginning to use it for dress linings, and it claims to be equally well adapted for linings to men's coats and waistcoats.

A NOVEL CAR.—J. M. Toucey, superintendent of the New York Central & Hudson River railroad, has one of the most ingenious, comfortable, and speedy cars in existence. Substantially it is a Wagner palace car on top of a locomotive, filled with easy-chairs, the front seat being on a line with the smokestack. The passenger receives the impression of being the driver of a very fleet horse. As a matter of fact, this horse was recently driven 180 miles in four hours. It followed ten minutes behind the Chicago Limited, running up to Rhinebeck in two hours without a stop, and leaving there on the return trip at 2 o'clock, was in New York at 4.

CLOTHES-CLEANING.—Soiled and faded black cashmere may be made to look almost as good as new by washing in soapsuds, rinsing in water, and then putting in water with so much bluing in it that it looks black. The cloth is to lie in this for some time, as long as over night if it is much faded. Do not wring the cloth after taking from the water, but hang up to dry in a shady place. If the gown is elaborately trimmed, the trimming may better be ripped off and treated in this separately. Dark-blue cashmere can be made to look beautiful if renewed in this way. For silk cleaning, paper and a hot iron is the old and best method. Put brown paper under the grease-spot on a board, and over the spot place several sheets of the paper. With a medium heated iron press firmly on top and several times renew the sheet of paper next to the silk on top. The paper will finally absorb all the grease. This method is applicable to any unwashable cloth except velvet, plush, etc. Ammonia is a favorite substance for cleaning clothing. The ammonia should be well diluted with water. A piece of flannel is saturated with this dilution and rubbed on the grease-spot until it is removed; after which, that place on the cloth is sponged off with clear water. Dry somewhat and iron when damp. Ammonia-water is also recommended to remove the shiny look from a black coat, but it is not good for much for this purpose. Strong black coffee, to which has been added a few drops of ammonia, is said to be good for cleansing a black coat that needs a thorough renovating.—*Good Housekeeping.*

A QUEER KINK, which has been brought out in the technical press of late, is that a hogshead or barrel filled with water may be prevented from bursting, even though frozen solid, if a stick of wood be inserted in the water. A correspondent of the *American Machinist* tells of a new hogshead which was preserved in that way: "We had no faith in it," writes the correspondent, "but thought we would risk a bottom, so we put in a stick 3x2 inches or 4x3 inches, I have forgotten which. The upper end rested on one side, and the lower wherever it happened to strike. When winter came, the hogshead froze solid, and the ice bulged up in a great hump all around the stick. Neither the bottom nor any of the staves started. We used that hogshead six or seven years, and it was all right then."

GRAIN GAMBLING OUTLAWED IN ST. LOUIS.—On April 27th the Missouri Legislature passed the "Grain Option" bill, prohibiting the sale of grain, stocks or bonds when the seller does not actually have the full amount of the article sold in his possession. The Governor signed the Act May 9, and the dealers in "options" are panic-stricken. The statute is so worded that the issue cannot be dodged, and the St. Louis grain-gamblers are said to favor closing the Merchants' Exchange and opening a "Board of Trade" over in Illinois, at East St. Louis.

A CHEAP ICE-CHEST, says *Invention*, is made as follows: Take two dry goods boxes, one of which is enough smaller than the other to leave a space of about three inches all around when it is placed inside. Fill the space between the two with sawdust packed closely, and cover with a heavy lid made to fit neatly inside the larger box. Insert a small pipe in the bottom of the chest to carry off the water from the melting ice, and you have a very cheap and tolerably effective ice-box for family or grocer's use.

THE CHANGES OF TRADE.—An old experienced stove and tinware dealer, in speaking of the changes and mutations in trade, says: The small tin shops in large cities are now only repair shops. If to-day I was going to start a shop I would seek a frontier town, for that would be the only place I could make money. A quarter of a century ago there was more profit in making $10,000 worth of tinware than there is in selling $50,000 worth of stoves to-day.

A NEW ADVERTISING DODGE.—A firm of great genius has offered the British Government an immense sum for the use of the national postage stamp for advertising purposes. The advertisement is to be printed on the back of the stamp before the gum is put on, so that the purchaser of every stamp must see the announcement before he moistens the gum. This is an Australian idea.

A CORRUGATED STEEL BARREL HOOP has been invented, which is said to be elastic and firm, hugging a package tightly. Four steel hoops will take the place of ten wooden hoops on a flour barrel. They are made at Worcester, Mass.

STEAM VS. POWDER.—It is stated that a pint of water thrown into a redhot boiler has 75,000 times the explosive power of a pound of powder.

ENGINEERING NOTES.

A GIGANTIC RAILWAY BRIDGE.—Arrangements are being made to begin the erection shortly of a gigantic railway bridge at Quebec, which will very materially affect the traffic of the two great railways of Canada—the Grand Trunk and the Canadian Pacific—as well as an important part of the railway system of the New England States. The great depth of the St. Lawrence river, opposite the ancient city of Quebec, has hitherto been an effective argument against the building of a bridge, but engineering skill has overcome this obstacle with a scheme to build a cantilever bridge which will cost close upon $10,000,000. The width of the current from shore to shore is 24,000 feet. The two main piers will be constructed of solid granite in 40 feet of water, about 500 feet from each shore. These two piers will support a cantilever bridge of 1442 feet. The total length of the bridge, with the approaches, will be 34,000 feet. The top of the bridge from high-water mark will be 408 feet, and the masts of the largest ocean steamers will be able to pass under it. The principal object in building the bridge is to connect the Intercolonial railway from Halifax and St. John to Quebec, which is run by the Canadian Government at a great annual loss to the country, with the Canadian Pacific railway. This is the only link uncompleted necessary to give the Canadian Pacific railway an uninterrupted line from the Atlantic to the Pacific oceans through Canadian territory.

OUR COMING SHIP CANAL.—An effort is being made at Pittsburg to have a committee of competent gentlemen appointed by the Governor of Pennsylvania to investigate the practicability of building a ship canal from Lake Erie to Pittsburg, and if the investigation will warrant the expenditure, the General Government will be asked for sufficient aid to complete the work. The Pittsburg *Gazette* has the following in reference to the proposed canal: "The Northwest will be especially benefited, because ore can be transported to Pittsburg and coal can be taken back to the Northwest at a cheaper rate than it is now done by the railroads. If the lake cities, such as Erie, Cleveland, Chicago and Milwaukee, can only be interested in the canal, there will not be much trouble in bringing the matter prominently before Congress.

A PREHISTORIC FIND.—A mine of scientific material is opened in Spain by the excavations of Belgian engineers along the coast from Carthagena to Almeria. Abundant remains of the stone age are found, in which is no trace of metal; polished axes, perforated shells, pottery, grinding-stones, chipped flints and primitive stone walls are the features of the prehistoric neolithic period. In some places, bronze and copper implements are found. Evidences that cremation was practiced and smelting of ores understood are also apparent.

ECONOMY IN STEAM USE.—At the last meeting of the American Society of Mechanical Engineers, Prof. R. H. Thurston predicted the early attainment in the steam engine of a horsepower with the expenditure of 12 pounds of steam per horse. The quadruple expansion engine at Warren is said to be running on a consumption of less than 13 pounds of steam per indicated horse-power per hour, and its builders are now at work upon the triple expansion engine for the Narragansett Electric Lighting Company on a guarantee of 12½ pounds.

THE PANAMA CANAL SCHEME dies hard. Report says that the French Government will revive the work, a measure that, under the Monroe doctrine, the United States will not allow. A heavy subsidy to a private corporation to complete the canal, however, would meet with no objection. The old corporation is a bursted concern, and dead, but the works instituted by De Lesseps are valuable, and an effort to utilize them will undoubtedly be made as soon as the necessary capital and enterprise can be combined.

HIGH WATER PRESSURE.—France claims the honor of utilizing a higher water pressure than that recently put in operation in the Chollar shaft on the Comstock lode in Nevada. At Brignoud, two kilometers from the valley of Gresivaudad, near Grenoble, a turbine 9 feet 10 inches in diameter was put in operation in the year 1875, utilizing a head of 1638 feet. It is still working and gives a force of 1500-horse power with a flow of 300 liters of water per second.

POPPIES ON EMBANKMENTS.—It has been discovered that the planting of poppies on embankments proves a great protection to such works. They form a network of roots that can be exterminated only at the expense of great difficulty. Eminent French engineers are said to have made successful experiments in this direction.

UNSAFE DAMS.—A civil engineer who has been inspecting the water-powers of Massachusetts says there are no less than 13 dams in that State liable to give way at any hour and cause great loss of life and destruction of property.

PROF. AYRTON estimates that the power wasted at Niagara Falls exceeds that which could be produced by the annual consumption of 150,000,000 tons of coal.

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TABLE OF CONTENTS.

EDITORIALS.—A Frame for Dumping Cars; Buffalo Duplex Compound Steam Pump, 413. Passing Events; The Exposition at Detroit; Every Man His Own Assayer; The Idaho Mine Fire, 420. The Great Disaster in Pennsylvania, 421.

ILLUSTRATIONS.—Main Building of the Detroit Exposition; Buffalo Duplex Compound Pump; Behr's Car-Dumping Frame and Car for Gravel Mines, 413. California Rural Views and Recreation Scenes, 415. The Conemaugh and Adjacent Valleys—Scenes Amid which the Great Accident Occured, 421.

CORRESPONDENCE.—Northern Counties of California—No. 3; The 13-14-15 Puzzle; Mexican Lead Ores, 414.

MISCELLANEOUS.—Paper for Building; Salt-Making in England; Improvement in the Otto Gas Engine, 414. New Silver Region; Care in Using Forced Draft; A United West; No Escape from Labor, 415.

MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 416-7.

MECHANICAL PROGRESS.—Wooden Beams Displacing Iron; A Link Grinding Machine; The Tobin Bronze—A New Metal; English and American Iron Workers; Iridium Anti Friction Metal; Fire-Proof Iron Houses; A Square-Hole Boring Machine; Casting a Big Ingot, 418.

SCIENTIFIC PROGRESS.—Contrast of Colors in Nature; Peculiar Motions of Lightning; Progress of Industrial Chemistry; The Ancestors of the Dog; Photographing by Heat; A Lamp for the Microscope; Water Discharges, 418.

GOOD HEALTH.—Lager Beer; Buttermilk as a Medicine; Oranges for Health; A Precious Prescription; Degeneration of the Human Teeth; Remedy for Palpitation of the Heart, 419.

USEFUL INFORMATION.—Cellular Clothing; A Novel Car; Clothes-Cleaning; The Changes of Trade; A New Advertising Dodge; Grain Gambling Outlawed in St. Louis; Steam vs. Powder, 419.

ENGINEERING NOTES.—A Gigantic Railway Bridge; Our Coming Ship Canal; A Prehistoric Find; Economy in Steam Use; High Water Pressure; Poppies on Embankments; Unsafe Dams, 419.

OUR LUMBER INTERESTS.—A Theory of the Redwoods; Durability of Timber; Disease in Wood; Mississippi Lumber; Oregon Lumber, 422.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 428.

Business Announcements.

[NEW THIS ISSUE.]

Water-Wheel Governor—Loftus Bros.

☞ *See Advertising Columns.*

Passing Events.

Public attention is absorbed in the awful disaster which occurred at Johnstown, Penn., and which destroyed thousands of lives and millions of dollars worth of property. No such overwhelming catastrophe ever before happened in this country. It will have the effect of causing an immediate and very thorough inspection of all large dams which are in situations where damage would ensue in case of their breakage. It seems that the Conemaugh dam was by no means considered safe, even under ordinary circumstances, and the sudden cloudburst caused its collapse. The possibility of overflow does not seem to be properly considered in these large dams.

There is trouble brooding up in the Yukon river region, Alaska, over the boundary question. The jurisdiction of the American Government to certain mining ground is questioned.

The transmission of electricity, a distance of 15 miles from falls on the river to Portland, Oregon, has been satisfactorily accomplished. Light and power both will be supplied. The idea is not new, but the practical carrying out of the project is of interest.

The Exposition at Detroit.

On September 17th a World's Fair and Exposition will open at Detroit, Michigan. It is to be a combination of agricultural and industrial fair and exposition, and cash prizes of $100,000 are to be given. The main building, of which we give a cut on page 413, has a frontage of 500 feet, and the exhibit area is 200,000 square feet. The great central tower over the main entrance rises to the elevation of 200 feet, and is, therefore, one of the very highest towers on the continent; indeed, but six towers in the United States surpass it in magnificence of elevation. The sunlight streams into the great structure through unnumbered panes represented by 20,000 square feet of glass, an amount sufficient to cover 4½ acres, or bound a surface one foot wide and four miles long. The aggregate exhibit surface contained in all the buildings is over 14 acres. The Art building has a frontage of 150 feet, and the stock buildings are very extensive.

Detroit's situation is in the highest degree favorable toward building up an immense metropolitan center. She has over 200 incorporated companies, engaged in a great variety of industry, and annually turning out products that are valued at millions. She has one of the largest seed industries in the world. In the manufacture of fine-cut tobacco, her position is unrivaled. Her car-shops and wheel foundries are among the most extensive. She is the center of the stove industry. Her drug and chemical trade is very extensive. Two hundred thousand dollars per year for public gas and electricity implies that she is one of the best lighted cities in America. Three millions have been expended for parks and public buildings. Her avenues are broad, beautifully shaded with oak, elm and maple, and scrupulously clean; and travelers are loud in their praises of the long and delightful drives. Belle Isle park, the gem of the lakes, attracts hosts of strangers. The broad Boulevard encircles the city from Belle Isle bridge to Springwells, over 12 miles in length. The water and sewerage systems are estimated at over six million dollars. The vast commerce of the Great Lakes passes through her beautiful river, with a greater aggregate tonnage than enters the river Thames, or in six months surpassing that of the Suez canal for one year. On an average, a lake craft passes Detroit every 7½ minutes throughout the season. The coming exposition will be one of her greatest undertakings, as everything is to be carried out on a grand scale. The admirable site, 70 acres in extent, is bounded by two streams, and is but a thousand yards beyond the city's western line. The grounds are penetrated by street car, electric railway and railroad, while the river offers the delightful diversion of a water trip to the fair and exposition. All exhibits can be unloaded from the cars or steamers directly into the buildings.

THE BARNARD COMET.—Prof. E. S. Holden, Director of the Lick Observatory, in speaking of the comet discovered by Mr. Barnard in September last, says: While observing the comet on June 3d at 3 A. M., Mr. Barnard noticed that the normal tail of the comet, which should be directed away from the sun, had disappeared. An anomalous one, a degree long, was visible, however, directed toward the sun in the position of an angle of 90 degrees. This is an interesting and somewhat rare phenomenon. The explanation probably is that the comet is now so far past its perihelion that the sun is no more able to exert a force on the body sufficient to cause the formation of a tail of the usual type; at the same time the comet is probably breaking up from the effects to which it has previously been subjected, and is leaving behind it fragments of its original mass, which will doubtless go to form a stream of meteors. These doubtless constitute the tail which has been observed.

S. SHIROSI, one of the solid men of Japan, arrived in this city Saturday by the Arabic. He is accompanied by a suite of eight persons. Mr. Shirosi is worth over $1,000,000, and is president of three big copper mines near Osaka, whose output is 3,000,000 pounds of pure copper per annum.

AT the Great Eastern quicksilver mine, near Guerneville, about 35 men are now employed, turning out about 100 flasks of quicksilver per month.

"Every Man His Own Assayer."

EDITORS PRESS:—At your request I have investigated the powder recently advertised by Prof. Herman, under the heading of "Every Man His Own Assayer," and the professor has kindly applied it to two samples of silver ore in my (and your) presence, as follows:

Sample A, consisting of chalcopyrite, tetrahedrite, zinc blende and antimonial galena containing (by the assay previously made) 52 ounces of silver per ton, the gangue being quartz. Prof. Herman assigned a value of 100 ounces per ton by his test.

Sample B. The same mixed with one-half its weight of calcite, therefore containing 41.3 ounces silver per ton. The professor's estimate of the value of this sample is 50 to 75 ounces per ton. The professor said these samples should be roasted.

The powder in question consists of a mixture of salt and bluestone, or some other soluble compound of copper producing cupric chloride when dissolved in water. A black substance, which seems to be manganese dioxide, is added, apparently for the purpose of disguising the nature of the mixture, as it is quite needless. The quantity of the powder sold at $2 is actually worth about three cents.

This method of testing silver ores is fully described in a little book, published by Messrs. Dewey & Co. in 1876, and still on sale under the title of "Testing and Working Silver Ores;" also in a pamphlet published some years earlier, and it is remarkable that the printed directions accompanying the professor's powder are couched in almost the precise language of those publications. The method is also mentioned in "Assaying Gold and Silver Ores," by C. H. Aaron.

The test is useful to prospectors, enabling them to ascertain whether the ore which they may find contains silver or not; but, in order that it may be effective, the powder must be added until the hot pulp gives a distinct coat of copper to a knife blade dipped in it and then washed without rubbing, after which the copper strip is used in the same way and receives a white coat of silver if any considerable proportion of silver is present.

My attention has been called to the fact that an ore containing arsenic may give a gray coating to the copper, which may be mistaken for silver.

The test is nothing more than a test; that is, it is not even an approximately quantitative assay, though it may enable very rich ore to be distinguished from poor ore by the character of the silvery deposit. The prospector who may wish to use it needs only to provide himself with a few ounces of powdered bluestone mixed with twice its weight of salt, a strip of sheet copper, and an enameled cup in which the powdered ore may be mixed with water and heated. I am not sure that it is in any case absolutely necessary to roast the powdered ore, with or without an addition of salt, but it is safer to do so if much sulphuret is present. The ore may be roasted on a piece of sheet iron smeared with moist clay and dried. It should be stirred during the operation, and the heat gradually increased to dull redness until no odor of sulphur is perceptible. Unroasted ore containing cinnabar will yield a deposit of quicksilver on the copper which becomes brilliant by rubbing and is driven off by moderate heating. When the test is applied to pan tailings, it is capable of showing whether or not the tailings still contain extractable silver; in this case the pulp should be thinned with water enough to enable any quicksilver it may contain to settle, and the copper strips must not be dipped too deeply.

The instructions state that this test is the invention of a practical man. This is true. I made it myself, and published it many years ago for the benefit of poor miners.

C. H. AARON.

ELECTRIC TRANSMISSION AT PORTLAND.—The Willamette Falls Electric Company started up on one of its Brush arc dynamos on Monday, and one of the systems in Portland, Or., was lighted by electricity sent 15 miles. The experiment proved a grand success, the loss of electricity in transmission being much less than was anticipated. The company has now six large copper wires strung and intends to supply power for running all kinds of machinery at once.

Buffalo Duplex Compound Steam Pump.

(*Continued from page 413.*)

The compound arrangement of steam cylinders in these improved duplex pumps is for the purpose of using steam expansively, the same as in regular cut-off steam engines, thereby saving nearly one-third of the fuel necessary to operate a plain duplex pump, and, consequently, requiring proportionately less boiler capacity.

The steam, after being used in the high-pressure steam cylinder, is expanded into the low-pressure steam cylinder without complication of the working parts or the use of expensive valve gear.

Owners and occupants of large buildings, managers of public institutions, officers of city, town or village water works, those who are interested or contemplate becoming interested in mining or irrigating enterprises, will appreciate the advantages necessarily gained by the use of the compound system, as the saving in the cost of fuel will amply justify the expenditure of the additional primary cost over and above that of the ordinary duplex steam pump.

These pumps are very compactly and substantially constructed, all working parts being made extra strong and of the best material, and are interchangeable, so that in the event of accident to any part, or by reason of wear a replacement is rendered necessary, the parts can be duplicated without delay.

This form of pump is particularly desirable for use when the required duty is constant or economy of operation is important.

The Joshua Hendy Machine Works of Nos. 39 to 51 Fremont street, this city, are the agents for the sale of these pumps, and carry a large stock of all the usual sizes or numbers. The considerable sales which, as we are assured, have been effected since their appointment as agents, is evidence of the superiority of these pumps, and the favor with which they have been received for different requirements of use attests the same; and it affords us pleasure to note that the Tulare Water Company of Tulare, Tulare county, this State, have recently purchased from them and placed in operation a No. 66, 12x18½ compound duplex steam pump, having a capacity of 1000 gallons per minute, or 1,440,000 gallons per day of 24 hours.

The Idaho Mine Fire.

On Monday evening, at 5 o'clock, the Idaho mine, Grass Valley, was discovered to be on fire. The night crew were just going on, and had got to the 1000-foot level, where the fire was, when the alarm was given. All the working is below that level, and so the night men did not get below the fire. All escaped except two, Thos. Dunstan and John C. Ralph. They fought the fire in the level until they were overcome by gas and the rescuing parties could not reach them. The fire occupied a small space. It caught at the head of the incline, 500 feet east of the main shaft in the 1000 level. The smoke and gas went up from that level to the next above, and then into the main shaft and down to the 1000-foot level again, and took the workers in the rear and cut them off from the hoisting cages.

Brave men went into the deadly gas, and by using precautions dragged out all the men excepting the two named. Soon the gas got as high as the 800-foot level, and then the air shaft, 1000 feet from the main shaft, was closed on the surface, and the main shaft just below the 800-foot level.

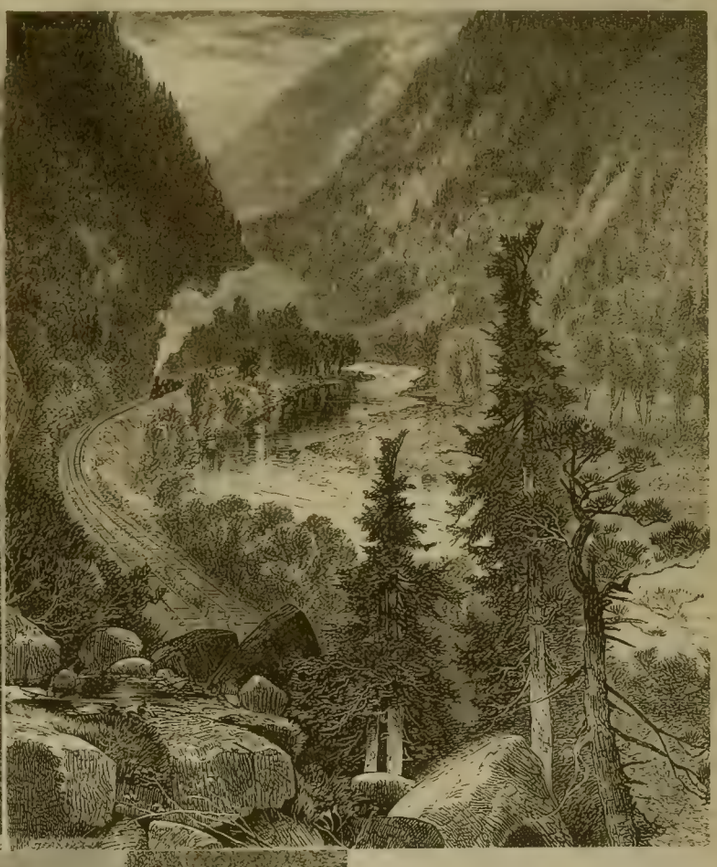
Frank Carter, an engineer, was beyond surgery when he reached the surface, for his head was taken off between the ascending cage, on which he lay unconscious with his head projecting over, and the descending cage that was going to the rescue of the men overcome in the 1000-foot level. Every effort has been made to rescue the two imprisoned miners. Carbonic acid gas is now being generated in the shaft so as to put out the fire, and professional divers in submarine armor will go into the mine.

THE Colton Sampling Works are running day and night on ore from the new mines in San Bernardino county.

ONE oil well in Cholame valley, Monterey county, 540 feet deep, is said to be yielding 120 barrels a day.

The Great Disaster in Pennsylvania.

Amid such charming natural scenery as is portrayed in the engravings on this page has just occurred a calamity which the London *Daily News* describes as the "saddest and most striking and most overwhelming misfortune that ever befell the people of the English race." At five o'clock on Friday morning, May 31st, a tremendous reservoir at the headwaters of the Conemaugh river, Pennsylvania, burst its retaining dam under the pressure of an unusual fall of rain upon its watershed and precipitated its immense volume of water upon the valley through which the river flows. This reservoir, the accounts say, was maintained for the pleasure of a Pittsburg club, who were supposed to have given bonds of three million dollars as a surety to the dwellers along the river bank who protested against the maintenance of a body of water three miles long, one mile wide and 70 feet deep as a constant menace to life and property in the valley below. The bonds had not been signed, however, it has since been ascertained. When the floods came the water was thrown into the Conemaugh, a bright little stream which empties into the Alleghany river about 30 miles above the point where it joins the Monongahela to form the great Ohio river. One of our engravings shows the Conemaugh at what is termed the "Packsaddle." The other engravings are of scenes in the same vicinity and similar to those through which the roaring waters passed until they reached and destroyed the villages and towns in the broader valley below.



THE CONEMAUGH AND ADJACENT VALLEYS—SCENES AMID WHICH THE GREAT ACCIDENT OCCURRED

Governor Beaver of Pennsylvania, in his account of the disaster which is telegraphed as an appeal for aid and succor for the distressed people, says:

The valley of the Conemaugh, which is peculiar, has been swept from one end to the other as with the besom of destruction. It contained a population of 40,000 to 50,000 people, living for the most part along the banks of the small river, confined within a narrow limit. The most conservative estimates place the loss of life at 5000 human beings and the property loss at $25,000,000.

Whole villages have been utterly destroyed and not a vestige remains. In the more substantial towns the better buildings to a certain extent remain, but in a damaged condition. Those who are least able to bear it have suffered the loss of everything. The most pressing needs, so far as food is concerned, have been supplied. Shoes and clothing of all sorts for men, women, and children are greatly needed. Money is also urgently required to remove the debris, bury the dead, and care temporarily for the widows and orphans, and for the homeless families.

Other localities have suffered to some extent in the same way, but not in the same degree. Other accounts place the loss of life at far higher figures, even as high as 12,000, summoned into eternity almost in the twinkling of an eye by the relentless waters. The river was so filled at places with the wreckage of buildings, etc., that the raging waters beneath could not be seen. In this debris were hundreds of people, and as burning lamps and stove fires were borne along on the flood the accumulating masses of debris took fire and a conflagration completed the destruction of life and property which the waters had begun. The scenes are altogether beyond description and still the peril is great. Bodies are found by dozens and scores all along the banks of the streams to which the waters have taken their course. Hundreds more are held in the debris which chokes the channels, and the cities below which depend upon these streams for their water supply fear the pestilence which will follow unless the waters are freed from their burden of the dead.

Relief work is progressing as rapidly as possible. The General Government, the people of other States and of foreign countries are telegraphing large sums of money to aid in giving food and shelter to the homeless, and in rescuing the unburied dead from the places into which the waters have hurled them. It will be weeks before the full extent of the disaster can be known.

The collapsed reservoir was originally built by the Pennsylvania Canal Co., and was used as one of its feeders, and was generally known as Conemaugh lake. It is from 200 to 300 feet above the level of Johnstown, in the mountains. It is about 3½ miles long and from a mile to a mile and a quarter in width, and in some places it is 100 feet in depth. The lake has been quadrupled in size by artificial means, and was held in check by a dam 700 to 1000 feet long. The dam was 90 feet in thickness at the base and its hight was 110 feet. The top had a breadth of over 20 feet.

The dam has been a constant menace, and its owners have watched it closely and believed it to be secure. Its breaking, they contend, must have been caused by a cloudburst, but the feeling against the company is nevertheless intense, the disaster being attributed to their negligence.

The breaking of the dam and the sudden letting loose of so large a volume of water would have been disastrous in a level country, but much more so in a mountain gorge. The course of the torrent from the broken dam at the foot of the lake to Johnstown was almost 18 miles, and with the exception of one point the water passed through a narrow-shaped valley. Four-fifths of it has been swept away.

The dam broke in the center at 3 o'clock, and at 4 o'clock the lake was dry, that great body of water having passed out in an hour.

An effort was made to avert the disaster by digging a sluiceway on one side to ease the pressure on the dam, but without avail. The water passed over the dam about one foot above its top, beginning at 2:30. Whatever happened in the way of a cloudburst took place during the night. There had been but little rain up to dark, and by the morning, when the workmen woke, the lake was full and kept on rising, until at 2 o'clock it began pouring over the dam and undermining it. Men were sent three or four times during the day to warn the people below.

When the final break came it was with sounds like tremendous continued peals of thunder. Trees, rocks and earth shot into mid-air in great columns, and then the wave started down the ravine. A man named Maguire said he was standing on the edge of the lake when the walls burst. The water was rising all day and was on a level with a pile of dirt which he said was above the walls of the dam. All of a sudden it burst with a report like a cannon and the water started down the mountain-side.

A mine-owner who had property near the reservoir had the dam examined by his engin-

eers, and says the embankment was principally of shale and clay, and that straw was used to stop the leaking of the water while the work was going on. The engineer who had charge of the construction says, however, that the masonry was solid granite and limestone, and was believed to be as enduring as the pyramids of Egypt

J. B. Montgomery, the railroad contractor, in explaining the bursting of the Conemaugh dam, says if it is true, that the waste-gates were never opened after the Pittsburg men leased the lake, the explanation of the bursting of the dam is found right there. It may be that the dam had not been looked after and strengthened of late years. It was undoubtedly weakened in the course of 25 years, during which the lake had not been used. Montgomery was one of the party of engineers who inspected the dam when it was leased by the Pennsylvania Co., five years ago. It then needed repairs, but was in a perfectly safe condition if water was not allowed to flow over it.

On Wednesday a coroner's jury proceeded to South Fork and investigated the cause of the breakage of the reservoir dam. Witnesses testified that slight breaks had appeared in the dam several times in past years, but had each time been clumsily repaired with straw, sticks, and rubbish. The general impression is that the jury will declare that the Pittsburg Fishing Club, that owned the reservoir, was guilty of gross negligence. In that event many suits for damages against this millionaire club will doubtless follow.

It is impossible at this time to estimate either the loss of life or property. Some 6000 men are engaged in the work of removing the rubbish in order to take out and bury the corpses in the wreck at the bridge where the fire occurred among the houses that lodged there. There are fears of a pestilence being caused by the decomposing bodies.

The Cambria Iron Works alone met with a loss of between two and three million dollars. At Williamsport 200,000,000 feet of logs and 40,000,000 feet of sawed lumber were carried off and the mills destroyed. Thousands of miners are thrown out of work in Pennsylvania. At Mount Carmel ten mines have indefinitely suspended, and 6000 men have been discharged. The wreck of the Chesapeake & Ohio canal is the most serious result of the flood in the Potomac. The canal cost more than $11,000,000. Since its commencement the total expenditure has reached nearly $40 000,000. Senator Gorman says the canal will have to be abandoned, as the company will be unable to raise means with which to make the repairs needed.

The body of the man who rode down the valley Friday morning, warning the people of the approaching danger, has been recovered. It was badly disfigured. The features were almost unrecognizable. The name of the rider was Daniel Peyton, son of the millionaire, Jno. W. Peyton. He knew when he started that the dam was about to burst, was pursued by a wall of water down the valley, overtaken and destroyed at the bridge.

All over the United States subscriptions are being collected for the surviving sufferers of this catastrophe. San Francisco has forwarded $20,000 and more money is coming in for the same purpose.

THE PROGRESS OF THE RUSSELL PROCESS.—A private letter from Mr. Russell says: "The works now running on the process are the Marsac, Yedrass, Lake Valley, Chloride, and I think it is still running on tailings at Silver City." The letter also states that works are about to be built at several other points in Colorado and in Arizona. At the Bluebird, in Montana, the change to leaching is to be made if the cleanup of a four months' run at the Marsac is satisfactory, a carload of roasted ore having been tested at the Ontario mill and yielded 29 per cent more than was got by amalgamation of similar ore at the Bluebird mill. A carload of ore from Idaho is also on the way to the Ontario to be tested. Mr. Russell says: "The prospects are very favorable."

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

GLACIAL MOVEMENT.—The Virginia *Chronicle* says: The great glacier on the northern flank of Mount Lyell in Mono county, near Lundy, has moved at least ten feet within a year. Last May parties built two monuments of rocks five feet high, one being placed at the edge of the ice and the other at a distance of 15 feet. The upper monument has disappeared and the lower one is cut five feet from the ice. Accurate measurements from several permanent points show conclusively that the glacial movement northward has been considerable all along the line.

WE WANT HIM HERE.—There is said to be a dog in Americus, Georgia, that lives on English sparrows, which he catches by slyly creeping upon them. Such a quadruped *Vedolia* would be welcome here in California. "May his tribe increase."

OUR LUMBER INTERESTS.

A Theory of the Redwoods.

Theories and explanations in regard to the question why redwood should only be indigenous to a limited portion of the Pacific Coast, have been promulgated and answered ever since redwood lumber became an article of general consumption. Mr. Belleisle, a gentleman connected with the Southern Pacific railroad, has made a study of the question and gives his ideas as follows:

One of the matters over which I have pondered for many long years is the cause of the difference between the trees in the three districts comprised within the redwood belt—Santa Cruz, Mendocino and Humboldt. I have a theory of my own, which I think is both original and correct. You are aware, of course, that so far as is generally accepted, the belt I have mentioned practically contains all the timber redwood of the State. Occasionally, however, are to be found a few scattering trees along the coast ranges. Upon the latter fact I base one portion of my theory. To carry it out, we must go back almost into the mystic dreamland of ages and ages ago. My firm belief is that in times primeval the whole of the Coast Range and the mountains, as far away down south as they stretch, were covered with gigantic redwoods and other forest trees, recalling Longfellow's opening lines in his poem of "Hiawatha." I believe that very ancient buildings, if they could be unearthed, would substantiate this. How they were destroyed, who but the Omniscient knows? Scarcely to any immense extent by man, unless the mortals who used them have passed away, leaving no greater trace behind them than the grand old trees themselves. If the trees died a natural death, beaten and buffeted by the over-warring elements, and finally succumbed to old age, gout in the roots, rheumatism in the branches, neuralgia in the heart, and a feeble brain, what marvelous climatic and physical changes must they not have witnessed, but caused. To their death or destruction—presuming this portion of my theory is correct—may we not attribute to a very marked degree many of our sterile plains, deserts and barren mountains down south? Forests destroyed prevent the moisture and the fertile leaf-mold requisite for agriculture. The absence of traces of these trees—except occasionally, as I have said—may be attributed to the tender shoots being dried out and poisoned, as it were, for lack of protecting cover. Gradually, too, the ground would become too arid for even the support of the roots and stumps, and they, in the course of ages, would disappear.

Now, then, the next step will be to Monterey. You have seen those grand old cypresses between Monterey and Carmel Mission, festooned with their garlands of trailing moss; with their gnarled and contorted trunks golden green with lycopodiums and a thousand and one species of mosses; silvery gray with many-hued lichens and other parasites, and with the poisonous mistletoe pendent from their branches—all sapping away the life-blood from these venerable and gloomy-hued patriarchs. They have lived for thousands upon thousands of years, but are now fighting a fearful battle for bare existence; they are like a brave warrior in the agonies of death, and praying only for a brief respite to settle his worldly affairs and make his peace with God. They are doomed—although they may exist for centuries—for the pitiless elements are waging an irresistible war against them. They appear to have a stronger vitality than the redwood, for they have outlasted them, as comparatively few are to be found here, while the other trees are of much younger and more rapid growth, and of a different character.

Now we cross the bay to Santa Cruz, without discussing what geological changes may have happened in the eras of the past. Here we find that, although still somewhat protected by the Monterey forest belt, the redwoods are getting ready for their final fight with nature's forces. We leave man and his invasion into their domains out of the question. Do you see how closely the grain and fiber cling together, as if the tree shuddered and shivered, as a man does in a chilling, icy-cold wind, which contracts closer every nerve in his body? As with the man, so with the tree—both feel the advance of decay and death.

Mendocino comes next, more vigorous in youth than Santa Cruz, and consequently slightly more open in fiber, but already beginning to feel the threatened attack. Last comes Humboldt, younger and lustier, and of more rapid growth, fostered by the greater moisture and better protective influences. Consequently the wood is softer and more readily worked for many purposes than the harder of the southern woods.

Another portion of my theory, and resulting from what I have said, is that the redwoods have, as it were, crept up from the south, slowly driven from there to a more congenial climate. As to the manner in which this grand army of evergreen leviathans marched into our State, this must be left to be discovered by wiser heads than ours, although the student of forestry can find many similar examples among forest trees. We must be thankful that we live in our age, when they are with us to enrich the grand resources of our State, and in our gratitude we should treat them as kindly as we can—utilize them, but not willfully and wastefully destroy them. Hitherto it has been the practice to waste the butts and stumps, and hundreds of serviceable logs are lying idly on the ground; but ere long it will be found that they will all become very valuable, and perchance the most valuable.

Before many years have passed away, there will be no more blasting, by dynamite, of roots to make a potato patch, for it will be found that half a dozen such roots are worth more than an acre of potatoes. No; economy in redwood will soon necessarily be the order of the day. The demand for it in this State, to say nothing of the rapidly increasing demand for it outside, will enforce a careful use of it. We do not yet know to how many uses this invaluable wood can be put. There scarcely seems to be any restriction upon its availability and adaptability to modern demands. Each day brings forth some newly discovered merits. The latest, and perhaps one of the most important, discoveries is its use as an ornamental wood for paneling purposes. It takes a very high polish, or can be polished to any extent desired. It is most durable, and not liable to split or warp, and has a grain of most beautiful texture and beauty, of varying and innumerable designs.

Durability of Timber.

We condense from the report of the Commissioner of Agriculture at Washington, D. C., in relation to the above subject, as follows: With proper after-treatment of the wood, the time of felling seems not to affect its durability. Early winter (December) should have the preference, because there is then less fermentable sap in the trees, and the timber will season with less care, more slowly, and more evenly, and before the temperature is warm enough for fermentation to set in. If the wood is cut "in the sap" it is more liable to fermentation and to the attacks of insects, and more care is necessary in seasoning; for the rapid seasoning, due to the warm, dry atmosphere, produces an outer season coat which envelops an unseasoned interior liable to decay. When cut in the leaf it is advantageous to let the trees lie full length until the leaves are thoroughly withered (two or three weeks) before cutting to size. With conifers this is a good practice at any season, and, if it can be done, all winter-felled trees should be left lying to leaf out in spring, by which time most of the sap is worked out and evaporated.

Always remove bark from felled timber to aid seasoning. Never allow the log to lie directly on the moist soil.

If dried too rapidly, wood warps and splits, the cracks collect water, and the timber is then easily attacked and destroyed by rot.

With sawed lumber, sufficient thorough seasoning for most purposes is obtained in from 12 to 18 months, while for the special work, according to the size, from two to ten years is required.

The best method of obtaining proper seasoning without costly apparatus in shorter time is to immerse the prepared timber in water from one to three weeks, to dissolve the fermentable matter nearest the surface. This is best done by running water—if such is not at hand a bath may be substituted, the water of which needs frequent change. Timber so treated, like raft timber, will season more quickly and is known to be more durable.

Never apply paint or any other coating to green or unseasoned timber, for if the wood was not well dried or seasoned, the coat will only hasten decay.

DISEASE IN WOOD.—There appears to be such a thing as a diagnosis of disease in wood, and the botanical physicians profess to know that it may be contagious or sporadic. Dry rot is called contagious, and it is said that the germ of that disease may be communicated to sound wood by tools which have been at work in diseased. It is thought possible that the theory accounts for many incomprehensible breakages of timber. The suggestion is that sound lumber should not be cut with the same saw that has passed through stuff affected by dry rot without cleaning.

MISSISSIPPI LUMBER.—The Minnesota State Deputy Surveyor estimates that during last winter 290,600,000 feet of lumber in the log were cut in the Mississippi river camps, or 69,400,000 feet less than in the previous winter. The stock of logs, both old and new, on hand last spring was estimated at 375,600,000 feet, against 480,000,000 feet a year ago—a decrease of 95,000,000. The prospect is for a lighter production of lumber this year than last.

OREGON LUMBER.—Lumbermen from Oregon tell of trees there 180 feet to the first branch that will scale 12,000 feet, and say there are thousands of acres of just such timber along the valley of the Deep river, which is being rapidly taken up at the Government price, $2 50 per acre for quarter-sections. This land will soon be very valuable.

ASSESSMENT NOTICE.

Gray Eagle Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Placer County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 16th day of May, 1889, an assessment, No 13, of Five Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, 327 Pine St., Room 9, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 26th day of June, 1889, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 16th day of July, 1889, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

O. H. BOGART, Secretary.

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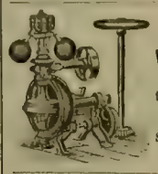

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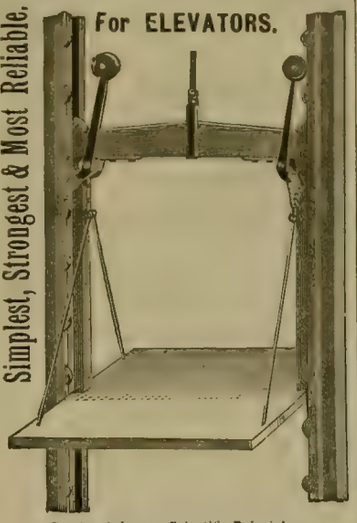

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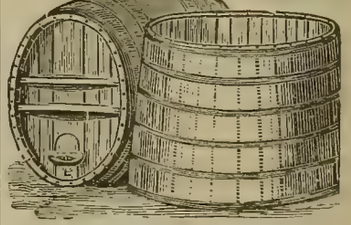

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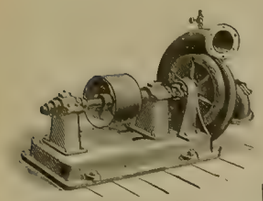

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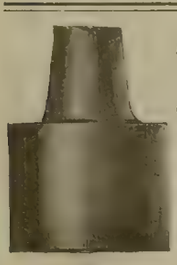

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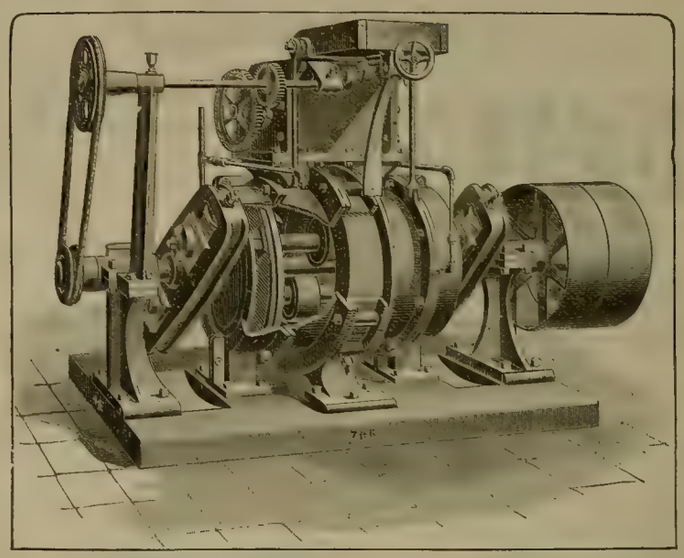

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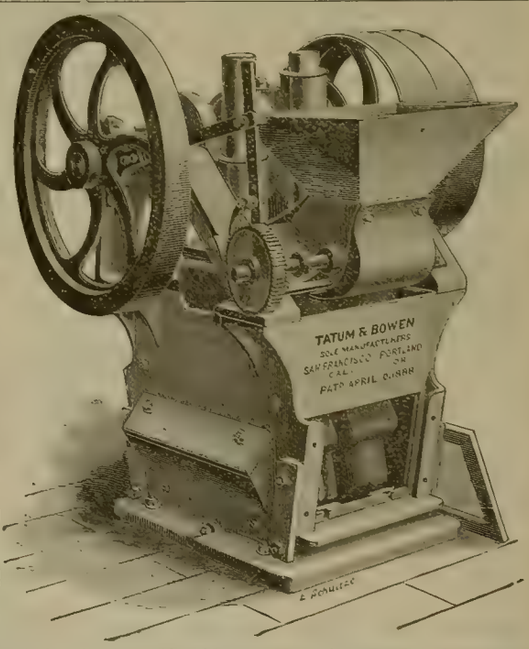

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING MAY 28, 1889.

404,249.—PEN—H. Beichling, Wilkeson, W. T.

404,155.—BUNDLE BINDER—Berry & Lambert, Crescent City, Cal.

404,167.—CARRIAGE JACK—E. F. Curtis, Sacramento, Cal.

403,928.—HAND-BAG—F. Emeric, S. F.

404,222.—HAY STACKER—T. H. Palm, Sacramento, Cal.

403,959.—FIRE-ARM—J. H. and S. H. Redfield, Linkville, Ogn.

404,305.—MICROMETER GAGE—J. Richards, S. F.

404,080.—LOCK—H. C. Frost, Farmington, Cal.

403,999.—GRAVITY CLOCK ESCAPEMENT—F. Gundorph, Portland, Ogn.

404,200.—TENSILE STRAIN-TESTING MACHINE—Samuel Jump, S. F.

404,202.—VALVE—Samuel N. Knight, Sutter Creek, Cal.

404,235.—SLOT-MAKING ATTACHMENT FOR BOLT-HEADING MACHINES—Stephen Uren, Sacramento, Cal.

404,326.—NUT LOCK—C. O. Vinyard, Navajo Springs, A. T.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

HAY-STACKER.—T. H. Palm, Sacramento. No. 404,222. Dated May 28, 1889. This is an apparatus for taking hay from a wagon or other vehicle and transferring it to a stack. By the mechanism employed the inventor is enabled to unload wagons at one point and build a stack of any required length and hight from that point without changing the setting after it is once placed.

BUNDLE BINDER.—Eugene Berry and Homer Lambert, Crescent City, assignors of one-third to J. Marhoffer. No. 404,155. Dated May 28, 1889. The invention relates to the class of binders for confining and holding bundles of any kind, and the invention consists in a novel and peculiar expansible and contractible frame. The particular object is to bind bundles of "shooks," a term applied to the parts of boxes in a "knocked-down" condition, and which are usually tied with manila rope and so shipped from the mill to the manufacturer of boxes.

TENSILE STRAIN TESTING MACHINE.—Samuel Jump, 426 Kearny St., S. F. No. 404,200. Dated May 28, 1889. The object of this invention is to simply and accurately arrive at the strength of any material by dead weight. Its uses, primarily, are for testing by such strain the strength of metallic substances, such as iron or steel bars, wire, springs, spring-balances and ropes, whether vegetable or metallic, it being also applicable to organic substances, all of which can be tested more accurately than by the known hydraulic appliances with less liability to error in calculating the results, the dead-weight system removing it practically beyond errors.

CARRIAGE JACK.—E. F. Burtis, Sacramento. No. 404,167. Dated May 28, 1889. This is one of that class of carriage or wagon jacks in which is employed a bowed arm having a bearing at one end on top of the axle and having in its other end a rod or bar forming an inserted continuation of the spindle of the vehicle axle; and the invention consists in connection with a carriage jack of this description of a novel nut-remover. The object is to provide, in connection with the bowed arm and inserted continuation of the axle spindle of jacks of this description, a simple and effective device for readily removing the nut from the end of the axle spindle whereby the wheel may be moved off the spindle on to the continuation bar of the jack.

AUTOMATIC VALVE ATTACHMENT FOR POWER MECHANISMS.—Samuel N. Knight, Sutter Creek, Amador Co. No. 404,202. Dated May 28, 1889. This invention relates to an automatic mechanism whereby a power-producing engine or water-wheel is stopped or started by variations in the pressure of the air which it is used to compress. It consists of a valve controlling the wheel or engine, pistons of different diameter secured to the stem of the valve so that by the varying pressures upon one or the other of the pistons the valve may be opened or closed. The invention is applicable to any form of motor which drives air-compressors, the increase or decrease of the air-pressure serving to stop or start the engine through the medium of an unequal pressure upon pistons of different diameters and a valve actuated by said pistons. When applied to air-compressors driven by momentum water-wheels, the regulation is effected by the variation in the pressure of the air from the compressor, which acts directly upon a piston moving within a cylinder, which piston is counterbalanced by a smaller piston fixed to the same rod and subject to a counterpressure of water under a high head or other medium. The stem or rod to which these pistons are secured connects directly with the valve which controls the passages supplying water to move the piston by which the water-wheel gate is opened and closed, thus making the supply of water regulate itself.

SLOT-MAKING ATTACHMENT FOR BOLT-HEADING MACHINES.—Stephen Uren, Sacramento. No. 404,235. Dated May 28, 1889. The invention relates to that class of bolt-heading machines in which the bolt is confined and gripped between opposing dies, while a reciprocating plunger operates against the end of the bar and upsets it so as to form the head of the bolt; and the invention consists in novel arrangement of parts whereby a keyway or slot is punched in the end of the bolt while it is clamped between the dies. The object of the invention is to provide a simple and effective attachment for bolt-heading machine, whereby a slot may be formed in the end of the bolt at the same time said bolt is being headed so that but one operation is needed to head the bolt and make the slot or keyway in its end.

Naturalists in Lower California.

Walter E. Bryant, one of the curators of the Academy of Sciences, has returned from an expedition to Lower California. The party consisted of Walter E. Bryant, ethnologist; T. S. Grandegee, botanist, and C. D. Haines, entomologist. They were accompanied by two Mexican guides and packers, and had a pack-train of ten mules. They traversed a space of 500 miles never before explored by naturalists, and after 3½ months' travel, embarked at San Quintin, Lower California, for home. At the meeting of the Academy on Monday evening, Mr. Bryant spoke of the results of the trip. He reports that the expedition succeeded in bringing back 100 specimens of small mammals, 200 birds, a collection of small reptiles in alcohol, a number of birds' eggs and 1000 specimens of plants. It cannot be stated how many of these specimens are new until they are compared with known specimens, though there will be many. The explorations covered most of the territory on the peninsula from Magdalena bay to Cape St. Lucas.

"Three weeks," said Mr. Bryant, "were spent in and about Magdalena and in going up the estero (a slough) 120 miles north of Magdalena to San Jorge. From San Jorge we went to Comondu, almost to the gulf shore of the peninsula. From Comondu we traveled 500 miles in 40 days with pack animals, following the mountains northward, and emerged at San Quintin, on the Pacific shore, about 140 miles south of San Diego.

"Some of our specimens were shot, but our most valuable aids we had in the way of collection were the boys at Comondu. While preparing for the expedition I got the boys in the neighborhood to bring in squirrels, foxes, mice and rabbits. I told them I would pay 5 cents apiece for each animal and 25 cents for large ones, such as foxes and squirrels. I also loaned the boys steel traps, with which to catch the animals. This plan I followed throughout the entire campaign, and by that means we were enabled to collect more animals than we ourselves could have done in a whole year."

Among the specimens are a large number of lepidoptera, many of which were new to naturalists.

At Comondu the ground squirrels were found a little larger than the California squirrel and much blacker, to which the name *Spermophelus grammurus atricapillus* (black-cap ground squirrel), was given. A male and female civet cat of a new species are among the collection.

Mr. Bryant says the country in that section is not inviting. The coast is low and sandy, and there is much mesa land, covered with thick, thorny brush and various species of cactus. There is little or no timber.

"About the only thing that would ever populate the country," he says, "would be the discovery of mines. There are indications of mineral wealth. If a population once got into the country, through a mining craze or otherwise, no doubt agriculture would receive some attention, and, perhaps, like it was in California, uses would be found for the broad wastes of land now condemned by the natives as useless."

BELTING AND PACKING.—Messrs. W. D. Allen & Co., Chicago, who represent the New York Belting and Packing Company in that city, have just issued a new and attractive catalogue containing full description of their large line of vulcanized rubber goods. The cover, which is of a good quality of paper, is of a buff tint and printed in red and bronze, a view of the company's warehouse and salesrooms, 151 Lake St., being shown on the back. It is a pamphlet of 40 pages profusely illustrated, and great care and much labor has evidently been bestowed in its preparation and production. Its perusal cannot fail to be of benefit to those interested in the line of goods which Messrs. W. D. Allen & Co. handle.

THE Napa Consolidated Quicksilver Mining Company has declared a dividend of 10 cents per share, payable July 1st to stockholders of record June 15th.

Manufacture of Mummies.

Mummies are now manufactured to order in Egypt by the cheating Arabs. Kings, queens and princes are furnished at reasonable prices. These mummies are made from honest cadavers, which are bought or stolen and treated much in the same way as bodies were treated in the days of the Pharaohs. The process is thus described by an eye-witness, Zenas Madden of Berlin and a correspondent of the Detroit *Journal*:

The body was put on a slab and the entrails were removed. The brain was drawn through the nostrils in precisely the same manner as Herodotus describes the embalming process in his Euterpe. After that the corpse was thrown rudely into a large vat of brine. After remaining there for a period of 15 days it was removed and hung by the heels from a rafter. A small brazier was put under the head and filled with some sort of sweet-smelling wood and fired. After this all the doors were closed, and the corpse was smoked like a ham.

In ten hours this operation was completed, and I beheld a most remarkable change.

The body had turned almost black. It was shrunken fully one-third. The features were pinched, just like those of a mummy, and it bore the appearance of great age. Some aromatic drugs, the nature of which I did not learn, were then prepared, and the corpse was filled with them, and by the same process that the brains were removed the skull is filled with a gummy substance smelling like sandalwood. A mummy case made the day before, but looking ready to fall apart from very age, was produced, and the corpse of the peasant, previously painted and gilded, was put in it, and a long scroll of parchment was prepared by one of the rogues, giving a history of the dead man's deeds some time during the reign of Thotmes, about 1450 B. C., when, in fact, he was a few days before gasping out his last breath on the burning sands near Gournah. The body I saw prepared, sold, I think, for $200 to the Academie des Sciences in Paris.

The Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

	Cash.	Debt.
Alta	$42 652	$.....
Alpha	7,127	.....
Andes	4 411	.....
Bodie Con	39,·05	.....
Benton Con	94,323	.....
Belcher	8,723	.....
Belle Isle	233	.....
Best & Belcher	.....	5,235
Bulwer	16,210	.....
Bullion	18 229	.....
Challenge Con	7 606	.....
Caledonia	10,115	.....
Chollar	.....	16,612
Con. Cal. & Virginia	201,645	.....
Confidence	23,498	.....
Con. Imperial	12,512	.....
Con. New York	.....	9 704
Commonwealth	.....	61,884
Crocker	921	.....
Crown Point	.....	16,412
Del Monte	.....	9,613
Diana	4 041	.....
Exchequer	22,892	.....
Gould & Curry	1,194	.....
Grand Prize	.....	29,911
Hale & Norcross	50,438	.....
Holmes	.....	4,299
Independence	1,500	.....
Kentuck	1,709	.....
Lady Washington	22,888	.....
Locomotive	4,164	.....
North Belle Isle	.....	29,323
North Commonwealth	.....	7,493
Mexican	9,479	.....
Mono	23,410	.....
Navajo	14,500	.....
Occidental	36,618	.....
Ophir	.....	5,613
Overman	8,140	.....
Peer	717	.....
Peerless	10,934	.....
Potosi	6,856	.....
Silver Hill	17,741	.....
Sierra Nevada	3,740	.....
Silver King	47,554	.....
Standard	7,871	.....
Union Con	.....	1,648
Utah	8,172	.....
Weldon	.....	1,130

The cash balance of the California mine embraces a value of $133,400 in unsold bullion on hand, besides the cleanup for May to hear from.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, *or beyond the time he intends to pay for it*, let him not fail to write us *direct* to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

ARRANGEMENTS are being made by the employes in the machine-shops and ship-yard of the Union Iron Works for a proper celebration of the completion of the United States cruiser Charleston. The affair will take place at Odd Fellows' hall on June 10th, and the leading feature of the occasion will be the presentation of a fine silk banner to Irving M. Scott, president of the works.

AT Alamo, Lower California, somebody put giant powder into the tubes of the boiler of Butler's mill, so that when the fireman started the fire the whole country was aroused by a terrific explosion, which utterly ruined both engine and boiler.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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There are few men in this day and generation who have the hardihood to decry the utility—nay, the glory of our public schools and free system of education. But while there are millions who could testify to an all-round education fitting them for the ordinary vocations of life, there are many special occupations requiring special training and preparation, which for obvious reasons are not to be found in our public schools, and it is to supply this want that such institutions as the Pacific Business College have been established. To the perfect system and thorough course of instruction given in this establishment thousands of successful business men in this city and all over the Pacific Coast owe their start in life and all the prosperity which has attended them since. In response to the invitation of the president, an attache of this paper called and was courteously shown through the college, and its system of education explained to him, from the primary to the finished course. For terms, etc., see advertisement.

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Table of Contents:

reface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

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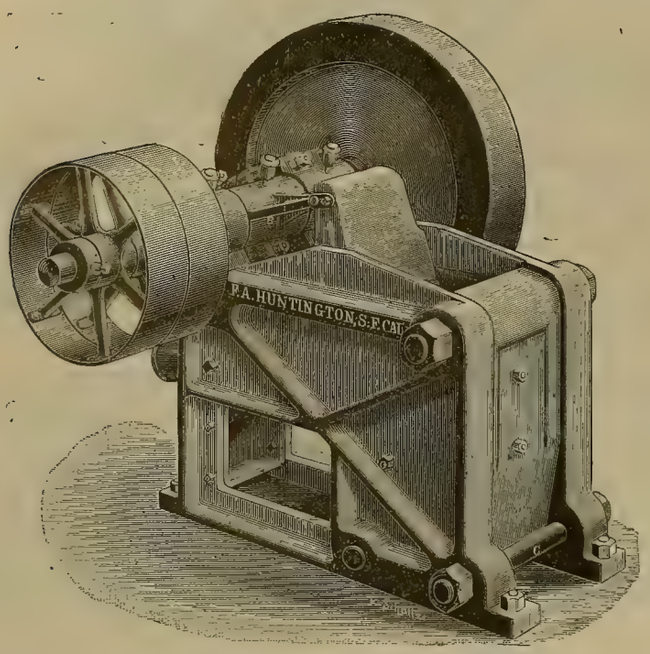

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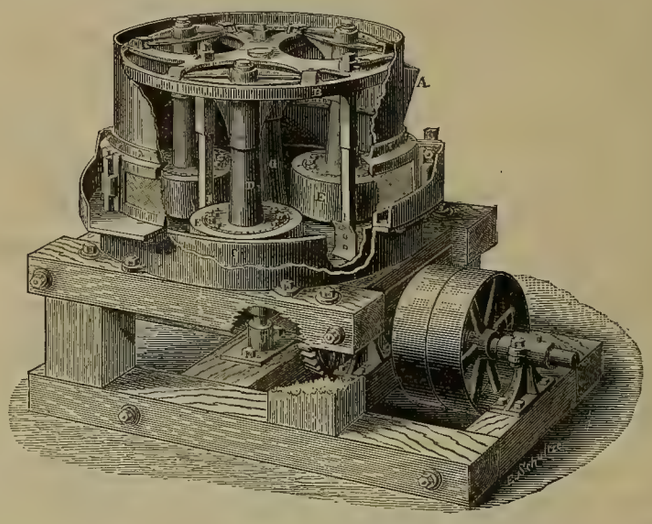

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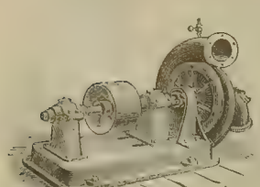

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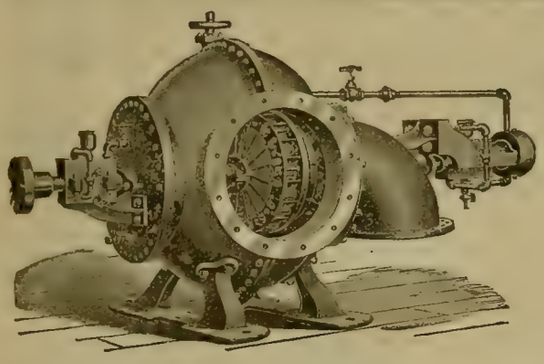

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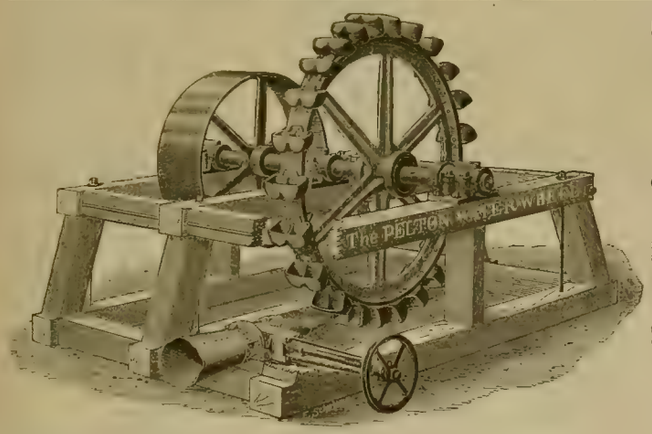

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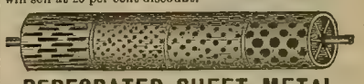

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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, June 6, 1889.

General trade the past week was fairly active for the season. Rarely have merchants and all others engaged in business been animated with so hopeful a feeling as is now clearly discerned on all sides. Labor is well employed, for very few idle hands are to be seen, while employment for capital promises to be fairly remunerative. So far as our advices go, more farm or harvest hands are given employment, and at better prices, than have obtained for several seasons past. The banks report money easy, with only a fair call ruling. A more active inquiry is expected to set in toward the close of this month and continue well into August and September.

The imports by sea of treasure the past week aggregated as follows: Coin, $8667; Mexican dollars, 105,913.

The steamer City of Peking hence June 4th for China, took out treasure as follows: To Hongkong, Mexican dollars, 233,850; silver bullion, $51,000; gold coin, $4195. Total, $289,045. To Japan, silver bullion, $141,000.

The following is a summary of the local dividends paid in May:

	1888.	1889.
Gas and Water Co.'s	$112 750	$117,100
Insurance Co.'s	10,000	16,500
Power Co.'s	27,000	27,000
Street R. R. Co.'s	26,250	25,000
Mining Co.'s	437,920	303,369
Miscellaneous Co.'s	48,750	62,750
Totals	$662,670	$556,719

The coinage of the local mint for May amounted to $1,540,000, including $1,180,000 in double eagles and $360,000 in eagles. The total for the same month last year was $1,613,000. The descriptions coined from July 1, 1888, to May 31, 1889, compare as follows:

	1887-88.	1888-89.
Double-eagles	$11,380,000	$16,417,000
Eagles	6,390 000	5,547,000
Half-eagles	2,995 000	4,500
Standard dollars	2,065,000	108,000
Quarter-dollars	114,000	112,000
Dimes	396,285	155,455
Tota's	$23,319,285	$22,343,955

The mint will be closed some time this month for the annual cleanup and settlement for the fiscal year of 1888-9.

The following was coin on hand in sub-treasury in this city on May 31st: Gold coin, $37,437,931; standard silver dollars, 18,346,428; fractional silver, $6,791,663. There was shipped during the month to interior points the following: Standard dollars, 186,195; fractional silver, $47,060.

The operations of the San Francisco clearing-house in May were as follows:

May—	Clearings.	Balances.
1889	$70,651,204	$11,350,096
1888	70,592,543	11,407,696

New York mail advices report that the April exports of specie and bullion to foreign countries was $6,803,821, and imports $2,254,544, and this, too, in the face of a large trade balance in our favor, as the following comparative statement of the exports and imports for the first ten months of the year show:

	1887.	1888.	1889.
Total exports	$656,397,612	$635,034,387	$699,262,411
Total imports	628,316,869	657,328,261	639,630,812
Excess of exports	$27,580,743		$59,631,599
Excess of imports		$22,289,874	

Commenting on the above, a leading New York financial paper says: "With a balance of trade in our favor for the last ten months amounting to nearly $60,000,000, the continued shipments of specie, which in May have already reached nearly $9,000,000 from this port, may well attract attention. Some explain it on the ground that American securities have been sent out from London to be sold for British account. Others insist that as the specie has been shipped in a great measure to the continent, the course of the London trade can have nothing to do with it. But that is mere sophistry. London is a great financial center, and bills of exchange payable there will settle a debt in any part of the world. It is true that transfer drafts are not yet high enough to call gold from London to Paris, but they are sufficiently high to make it wise for our bankers to ship specie directly to the continent from this port, both to cover their account and to prevent a further rise."

SILVER—The light receipts, or rather light obtainable supplies, of silver bullion in this city is a source of considerable surprise. Take Selby's Smelting Works, which are probably the largest handlers of bullion, the stock is kept small by an almost continuous shipping or other demand. The supply is not only light, but promises to be still smaller, for advices from the Comstock mines point to a more general movement to extend their working into the gold-bearing lode which lies west of the lode (chiefly silver) that has been worked so many years. The inquiry for silver has kept prices here above the New York parity, ranging from 92¼c to 92½c. The last sale is reported at the last-named price. At the close the market is strong at 92¾@93c.

MEXICAN DOLLARS—The market continues to be well held, which allows good prices to be obtained. The call is said to be only fair. It is very generally conceded that after the crops have been secured, freer shipments to China will be inaugurated by Chinese laborers. The market closed strong at 73½@74c.

QUICKSILVER—Receipts the past week aggregate 170 flasks, and shipments by sea 25 flasks to Australia and 30 flasks to Mexico. The market continues very strong with a good home and export demand ruling, although at the higher prices buyers confine their requirements as much as possible.

IRON—The imports the past week aggregated 300 tons from Irondale. While holders speak confidently, yet the tone of the market is not so firm for either spot or to load. The European and Eastern markets are easy. In the latter markets close competition between the northern and southern iron companies has brought prices so low that many of the Pennsylvania furnaces will probably go out of blast. Steel rails recently sold in the East as low as they were sold in Liverpool at the same date.

COPPER—The market is reported "feverish and unsettled." The impression prevails among consumers that prices must go lower, and in consequence they confine their buying as much as possible. Quotations in our market are of a more or less nominal character.

LEAD—The market at the East is stronger and higher in sympathy with the belief that the ruling of the Treasury on silver and lead ore will be favorable to the home interest. With us the market is strong at full prices.

BORAX—Receipts continue light. Last week they aggregated only 364 centals, while the exports to New York by sea aggregated 2080 centals. The market holds strong at full figures.

LIME—Receipts the past week aggregated 4999 barrels. The demand continues active and prices fairly steady.

TIN—Pig is barely steady, while plate is easy. The demand is quiet for the season. The receipts aggregated the past week 3060 boxes by overland railroad, and shipments by sea 300 boxes to Victoria, B. C.

COKE—Under freer offerings both spot and for prompt loading are cheaper.

COAL—Imports the past week were as follows: From Seattle, 10,483 tons; Nanaimo, 5485; Coos Bay, 860; Departure Bay, 6968; Tacoma, 6750; and Baltimore, 1650; total, 32,136 tons. The market for spot is held with much difficulty at current quotations. There is a belief with large consumers that prices for Australian coals must go lower. This opinion is grounded on the following: The Southern Pacific Railroad Company's wants are supplied by their coast mines; the San Francisco Gas Company's wants are met by the recent purchase of 50,000 tons of Australian; the other large local consumers have their immediate wants met and will not buy for future unless offered considerable concessions. They believe that this concession they will secure either from shipowners who will load coal for this port so as to get outward cargoes of wheat, or else from exporters of wheat who will charter ships in Australia to load with coal for this port and wheat here for Europe.

Eastern Metal Markets.

By Telegraph.

NEW YORK, June 5, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	—	—	$—	$—	$—
Friday	42	91⅞	12 25	3 90	20 50
Saturday	42	91⅞	12 20	3 90	20 50
Monday	42	91⅝	12 10	3 92½	20 40
Tuesday	42	92	12 10	3 95	20 25
Wednesday	42 11-16	92½	11 90	4 00	20 35

NEW YORK, June 5.—No positively open market exists for copper mining companies, central supplies naming 12c for Lake ingot and 11@11¼c for casting brands. At these rates they supply all inquiry, but customers are few. Pig lead is held rather firmly at $3.85@3 90. Short trading prevails in small refined petroleum barrels at $6.90 firm; plain cases, $8.80.

San Francisco Metal Market.

WHOLESALE.

THURSDAY June 6, 1889.

ANTIMONY	— @ 14
BORAX—Refined	7½@ 7⅝
Powdered	7½@ 7⅝
Concentrated	7 @ 7⅛
COPPER—	
Bolt	26 @ 27
Sheathing	26 @ —
Ingot	17¾@ 18½
Fire Box Sheets	— @ 26
LEAD—Pig	4½@ —
Bar	5 @ —
Sheet	8 @ —
Pipe	7 @ —
Shot, discount 10% on 500 bags Drop, ℔ bag.	1 45 @ —
Buck, ℔ bag	1 65 @ —
Chilled, do	1 85 @ —
STEEL—English, ℔	16 @ 20
Clanton tool	9@@ —
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Toe Calk	4½@ —
TINPLATE—B. V., steel grade, 14x20, P. S.	4 70 @ 4 75
B. V., steel grade, 14x20, spot	4 85 @ 4 95
Charcoal, 14x20	6 50 @ 7 00
do roofing, 14x20	5 37½@ 5 50
Pig tin, spot, ℔ lb	23 @ 23½
do, do, prompt shipment	— @ —
QUICKSILVER—By the flask	47 50 @50 00
Flasks, new	1 05 @ —
Flasks, old	85 @
COKE—English, ton, spot	16 00 @18 00
Do, do, to load	13 00 @13 25

IRON—	Spot.	To Load.
Glengarnock ton	27 00 @—	27½@ —
Eglinton, ton	26 00 @—	25½@ —
American Soft, No. 1, ton	— @31 00	31½@ —
Oregon Pig, ton	— @30 00	— @ —
Clay Lane White	— @24 50	25 @ —
Shotts, No. 1	28 50 @29 00	— @ —
Bar Iron (base price) ℔ lb	2½@ 3	— @ —
Chrome iron ore, ℔ ton	— @10 00	— @ —

Lumber.

Fine, Fir and Spruce.

	RETAIL.	JOBBING.
Rough Pine, merchantable, 40 ft	$19 00	$16 00
41 to 50 ft	20 00	17 00
51 to 60 ft	22 00	19 00
61 to 70 ft	26 00	22 00
1x3, fencing	21 00	18 00
1x4, "	20 00	17 00
1x3, 1x4 and 1x6, odd lengths	18 00	15 00
Second quality	16 00	14 00
Selected	23 00	21 00
Clear, except for flooring	30 00	27 00
Clear for flooring	1 00	.....
Clear V. G. No. 1 flooring	5 00	.....
Firewood	13 00	9 00
Dressed Pine, flooring, No. 1, 1x6	31 00	28 00
No. 1, 1x4	33 00	29 00
No. 1, 1¼x4, 1¼x6, and odd sizes	36 00	32 00
All sizes, No. 2	26 00	23 00
Stepping, No. 1	43 00	34 00
Stepping, No. 2	33 00	24 00
Ship timber and plank, rough	26 00	17 00
Selected, planed 1 side, at ⅛ to 40 ft	28 00	23 00
" " 2 " " "	30 00	25 00
" " 3 " " "	32 00	27 00
" " 4 " " "	34 00	29 00
Deck plank, rough, average 35 ft	34 00	31 00
Dressed, average 35 feet	39 00	34 50
Pickets, rough, B M	19 00	15 00
⅞x1½, 4 ft long, ℔ M	5 50	4 00

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T. LEVIED.	DELINQ'NT. SALE.	SECRETARY.	PLACE OF BUSINESS
Bella Union Quicksilver M Co	Cal.	7	20	May 21	June 24	July 15	A Halsey	328 Montgomery St
Belle Isle M Co	Nevada	12	10	Apr 19	May 23	June 13	J W Fee	340 Pine St
Buena Vista Petroleum Co	California	34	50	Apr 24	May 30	June 27	J Morizio	328 Montgomery St
Bulwer Con M Co	California	5	25	Apr 10	May 15	June 12	L Osborn	309 Montgomery St
Exchequer M Co	Nevada	27	25	Apr 2	May 7	May 28	C E Elliott	309 Montgomery St
Equitable Tunnel & M Co	Utah	34	5	May 14	June 20	July 15	C J Collins	1018 Market St
Gould & Curry M Co	Nevada	28	30	May 1	June 5	June 27	A K Dustron	309 Montgomery St
Gray Eagle M Co	California	13	05	May 15	Jun 25	July 16	O H Bogart	327 Pine St
Inyo Marble Co	California	6	5	May 14	June 24	July 24	G W Luce	305 Front St
Kentuck M Co	Nevada	18	30	Apr 26	May 29	June 19	J W Pew	310 Pine St
Locomovive M Co	Arizona	4	50	Apr 25	May 29	June 18	A H Fish	309 Montgomery St
Morgan M Co	California	13	15	May 9	Jun 17	July 8	O S Neal	230 Montgomery St
Nevada Queen M Co	Nevada	5	50	June 3	July 3	July 30	H Deas	309 Montgomery St
Ophir M Co	Nevada	55	50	May 11	Jun 16	July 2	E B Holmes	309 Montgomery St
Oak Con M Co	California	2	3	Mar 29	May 25	June 20	E J Ryan	230 Montgomery St
Pinal Con M Co	Arizona	8	13	May 15	Jun 21	July 12	A Cheminant	328 Montgomery St
Seg Belcher & Midas Con M Co	Nev.	3	25	June 4	July 8	July 29	E B Holmes	309 Montgomery St
Silver Hill M Co	Nevada	24	20	Apr 30	May 33	June 15	D O Bates	309 Montgomery St
Teirakoff M Co	California	2	10	May 18	Jun 18	July 18	W J Gurnett	308 Pine St
Trinity Riv Tun & M Co	California	1..7	1-2c	Apr 11	May 24	June 13	L H Parkman	Cor Bush & Montgy Sts
Union Con M Co	Nevada	38	25	May 13	Jun 19	July 10	J M Buffington	303 California St
Weldon M Co	Arizona	13	10	May 13	Jun 18	July 9	A Waterman	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Bodie Con M Co	California	B L Burling	309 Montgomery St	Annual	June 17
Found Treasure M Co	Nevada	J Stadfeldt	309 Montgomery St	Annual	June 20
Homestake M Co	Dakota	I C Stump	309 Montgomery St		
Live Oak Drift Gravel M Co	California	J Morizio	328 Montgomery St	Annual	Aug 20

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	May 10
Caledonia M Co	Nevada	A S Cheminant	328 Montgomery St	08	Apr 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Mining Share Market.

The market for the week under review has been tame, flat and unprofitable to the bull interest; but this interest appears to be growing beautifully less as each week rolls by. With so many fizzles in the past on the bull side, it will require a decided showing of ore in several different places to revive the market and draw in new blood for bleeding. The failure of the Tuscaroras and Quijotoas, under street points of large ore developments, is not calculated to inspire the outside public with confidence. Not only have the Tuscaroras and Quijotoas receded in price, but the Comstocks also have failed to respond in prices to street points of what is in store for holders of stocks. Of the Bodies, very little is expected by the general public, owing to the yearly liberal use of street points of a deal, proving a fizzle. What the new move, contest for election, has in store it is hard to say. All recent contests have left the outside public, who took stock in it, worse off than nothing. To give more color to the reported contest, Capt. John Kelley, it is reported, will be in the city at an early day to personally guard his interest against Archie Borland. Even if the Bodies do not pay dividends, they are rich in assessments, for Mono has contributed about $700,000 in the assessment, Bodie over $500,000 and Bulwer over $100,000, and may be worth contending for. Eureka Con. has shown considerable strength, but it is claimed to be purely manipulation based on a report of the mill starting up soon.

From the Comstock mines reliable news of an important nature is hard to get. A report is current of an improvement in Con. Virginia on the 1650-foot level (the same level the deal last fall was made on), an improvement in Mexican; while in Union, Crown Point, Belcher, Alpha and two of the middle mines the work is of a very interesting character. In the joint Alpha-Con. Imperial west crosscut work is being vigorously pushed. Several powerful drills have, so says report, recently been sent to the front to facilitate the work. There is no doubt but all important work now going on in the mines is toward the west, evidently to tap the Red (gold) lode at a greater depth. How long a time this will take is altogether problematic, for much depends on the dip of the lode and the character of the rock through which the crosscuts are to run. On the surface the distance between the Comstock and gold lode varies from 900 to 1200 feet. From the Tuscaroras and Quijotoas the usual large ore reports come to hand, while from the Bodies we are favored with statistical reports of the work going on. The New York *Financial News* of May 28th states that "a new Mining Exchange is to be established in London." In the English mining exchanges absolute merit, not talk, is a requisite quality in a mine to have its shares listed.

One dividend and several assessments were announced the past week. For particulars see tabulated lists elsewhere.

The market opened to-day (Thursday) with a steadier, firmer tone for the Comstocks, but with light trading. The strength of the market s no doubt due to stocks being well concentrated, the near approach to more interesting ground in several of the mines and a report that the California Pan-Mill will start up soon and also to eight-hour shifts in the mines instead of ten-hour shifts.

Baldwin Gardiner, formerly president of the Pacific Stock Exchange, is in the Exchange again, and it looks like old times to see his familiar face once more among the active brokers.

Coal.

TO LOAD.

	Per Ton.		Per Ton.
*Australian	$ 6 75 @ 7 00	Cardiff	9 50@10 00
Liverpool Steam	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	6 00
Scotch Splint	8 00	Seattle	6 00
West Hartley	9 50	Coos Bay	5 00
Greta	8 00	Cannel	10 00
Westminster Brymbo	8 00	Egg, hard	17 00
Nanaimo	9 00	Cumberland, in sacks	18 50
Sydney	$ 8 00	do, bulk	17 50

*For August-September loading $6.50@6.75 is reported asked and $6@6.25 bid.

COPPER MINING IN CHILI.—The *Atacameno* says that in consequence of the drop in copper 200 men are about to be discharged from Tierra Amarilla Works, and 30 from Potrero Seco Works. All the copper mines near Caldera have suspended work.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 15		WEEK ENDING May 22.		WEEK ENDING May 28.		WEEK ENDING June 6.	
Alpha	2.00	2.20	2.65	2.10	1.70	1.85	1.70	1.85
Alta	1.65	1.80	1.40	1.65	1.45	1.60	1.45	1.60
Andes	.75	.85	.50	.75	.60	.70	.60	.70
Argenta	....	....	....	....	....	....	....	....
Belcher	4.80	5⅛	3.75	4.95	3.80	4.20	3.95	4.30
Best & Belcher	3.80	4.30	3.50	3.90	3.65	3.95	3.70	3.95
Bullion	.90	1.00	.70	.90	.80	.85	.80	.85
Baltimore	....	....	....	.20	.15	.15	....	.20
Belle Isle	.20	.25	....	.30	.30	.30	.30	.35
Bodie Con	1.65	1.80	1.45	1.70	1.50	2.10	1.70	1.95
Benton	....	3.50	....	....	....	....	....	2.70
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.30	.60	.45	.50	.40	.55	.45	.50
Commonwealth	4.80	5.50	4.70	4.50	4.90	5⅛	5	5⅛
Con. Va. & Cal	7.75	8.50	7.50	7⅞	7⅞	8	7⅞	7¾
Challenge	3.50	3.65	2.70	3.30	3.00	3.15	2.80	3 10
Chollar	2.55	3.00	2.05	2.60	2.15	2.45	2 10	2.30
Confidence	7	8⅛	7	7⅞	7¼	7⅛	6.75	7⅛
Con. Imperial	.60	.70	.50	.60	.50	.60	.50	.55
Caledonia	.30	.35	.25	.35	.25	.25	.20	.30
Con. Pacific	....	....	....	....	.15	....	....	....
Crown Point	4.05	4.30	3.40	4.35	3.45	3.80	3.55	3.80
Crocker	.45	.50	.40	.45	.35	.40	.40	.50
Central	.10	.15	....	....	....	....	....	....
Dudley	....	.30	....	....	.20	.30	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	1.50	....	1.50	....	....	2.00	3.00
Exchequer	.90	1.00	.75	.95	.80	.85	.80	.85
Grand Prize	.70	.75	.70	.80	.65	.75	.80	.85
Gould & Curry	2.40	2.65	2.10	2.35	2.15	2.45	2 50	2.65
Hale & Norcross	4.25	4.75	3.75	4.30	3.90	4.25	3.95	4.05
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	.30	.35	.20	.30	.25	.25	.25	.30
Justice	1.30	1.40	1.00	1.20	1.05	1.15	1.10	1.15
Kentuck	1.50	1.70	1.10	1.20	....	....	1.45	1.70
Lady Wash	.35	.40	.25	.35	....	....	....	.35
Locomotive	....	.05	....	....	....	....	....	.10
Martin White	....	....	....	....	....	....	....	....
Mono	1.60	1.70	1.35	1.60	1.60	1.85	1.60	1.65
Mexican	4.40	5⅛	3.30	4.45	3.40	3.75	3.45	3.75
Mt. Diablo	....	....	....	....	....	....	....	....
Navajo	.75	.80	1.70	.75	.50	.60	....	.60
North Belle Isle	1.20	1.55	1.35	1.50	1.35	1.50	1.00	1.50
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	1.20	1.45	1.20	1.50	1.35	1.45	.90	1.50
North G. & O	....	....	....	....	....	....	....	....
Occidental	1.50	1.75	1.45	1.55	1.50	1.60	1.55	1.65
Ophir	4.80	5⅛	4.10	4 90	4.30	4.75	4.40	4.60
Overman	1.35	1.50	1.10	1.45	1.20	1.35	1 30	1.45
Potosi	2.45	2.60	2.00	2.45	2.20	2.45	2.10	2.30
Peerless	....	.60	.50	.60	.50	.60	.55	.60
Peer	....	.25	....	.25	.25	.25	.20	.25
P. Silverado	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2 60	3.25	2.30	2 60	2.45	2.75	2.50	2.65
S. B. & M	3 00	3.20	2.60	3.15	2.75	3.05	2.75	3.05
Sierra Nevada	2.45	3.80	2.65	3.45	2.55	2.85	2.60	2.85
Silver Hill	....	....	.35	.50	.45	.60	.40	.50
Silver King	....	....	....	....	....	....	....	....
Scorpion	.55	.60	.20	.55	.20	.25	.20	.25
St. Louis	....	.50	.40	.50	....	....	....	....
Syndicate	....	....	....	....	....	....	....	....
Union Con	4.50	5⅛	3.30	4.45	3.35	3.75	3.40	3.65
Utah	1.30	1.40	1.00	1.30	1.05	1.25	1.10	1.15
Yellow Jacket	4.25	4.45	3.80	4.65	3.80	4.00	3.80	4.00

Sales at San Francisco Stock Exchange.

THURSDAY, June 6, 9:30 A. M.

300	Belcher	4.05	
100	Best & B	3.65	
200	Belle Isle	25c	
50	Bodie	1.70	
100	Challenge	2.85	
50	Confidence	6.75	
200	E. S. Nevada	15c	
50	Eureka Con	2.75	
100	Grand Prize	85c	
150	Gould & Curry	2.60	
100	Julia	25c	
100	Justice	1.10	
50	Lady Wash	35c	
50	Mexican	3 60	
300	New York	47c	
100	Ophir	4 60	
100	Potosi	2.15	
300	Union	3.45	
100	Weldon	15c	
100	Yellow Jacket	3.80	

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

PACIFIC CARRIAGE CO., June 1. Capital stock, $50,000. Directors—A. D. Carvill, Oliver Hinckley, S. C. Walsh, M. W. Fox and M. Fallon.

STONEWALL EXTENSION G. M. CO., June 5. Location, San Diego Co. Capital stock, $100,000. Directors—Geo. W. Osborn, C. B. Tillig, S. M. Sprague, G. A. Sprague and H. P. Cohen.

STOREY COUNTY G. & S. M. CO., June 5. Location, Nevada. Capital stock, $10,800,000. Directors—C. M. Jennings, Geo. C. Luce, Nelson H. Bowne, L. A. Macdonald and R. A. Crothers.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Savage, May 31, $8847; Hale and Norcross, 31, $8360; Cons. California and Virginia, June 1, $54,000; Mt. Diablo, 1, $7487; Commonwealth, 1, $12,000; Chollar, 5, $9423; Bluebird, 1, $19,600; Moulton, 1, $8288; Alice, 1, $20,992; Butte and Boston, 1, $27,376; Hanauer, 1, $7700; 2, $4500; 3, $4400.

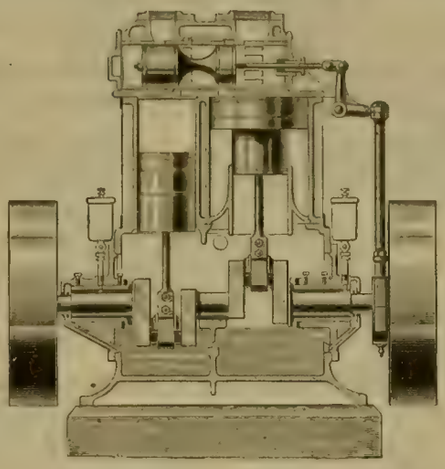
PARKE & LACY COMPANY

—— IMPORTERS AND MANUFACTURERS OF ——

MINING, MILL and GENERAL MACHINERY.

ENGINES, BOILERS, STEAM PUMPS,
AIR COMPRESSORS, ROCK DRILLS,
WALL'S CRUSHING ROLLS,
CONCENTRATORS, PULVERIZERS,
TURBINE WATER WHEELS,
ROCK BREAKERS, DRY JIGS

Golden Gate Concentrators,
GREATEST CAPACITY
OF ANY CONCENTRATOR MADE.
One Machine Taking Pulp from 10 Stamps.



SAW MILLS, MACHINE TOOLS,
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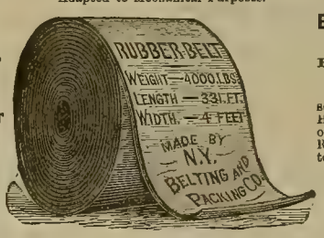

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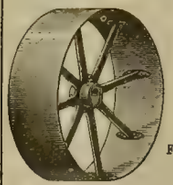

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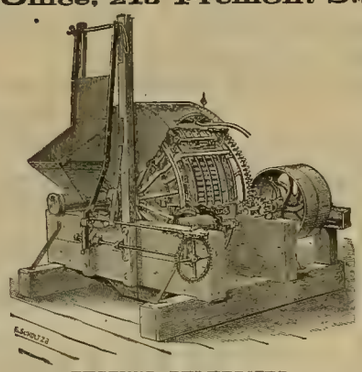
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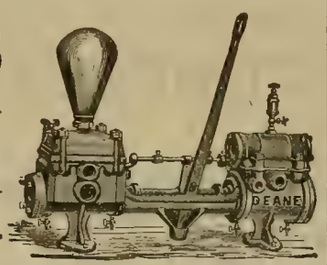

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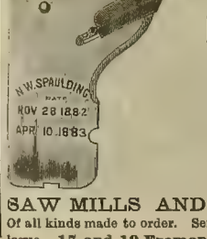

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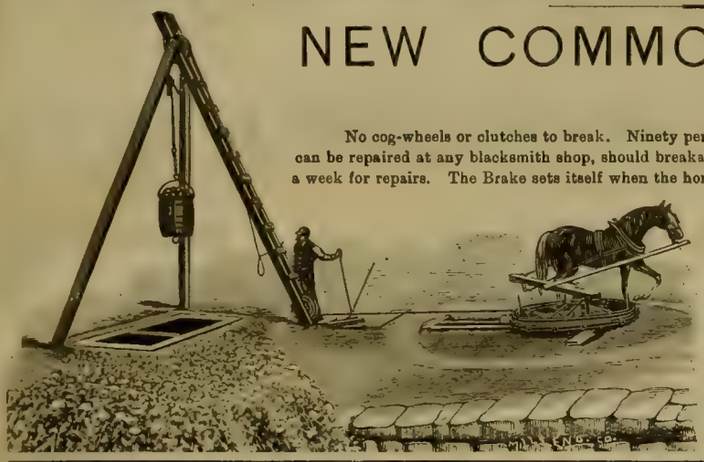

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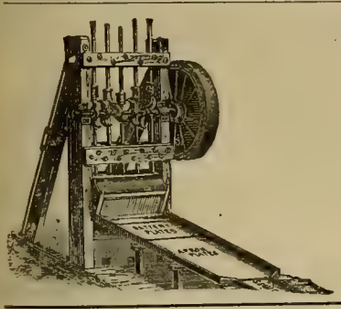

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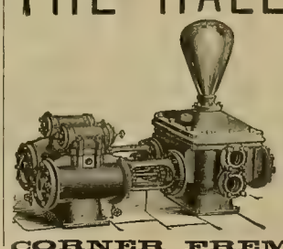

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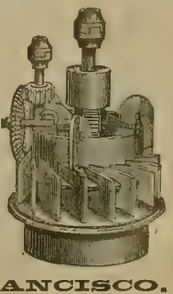

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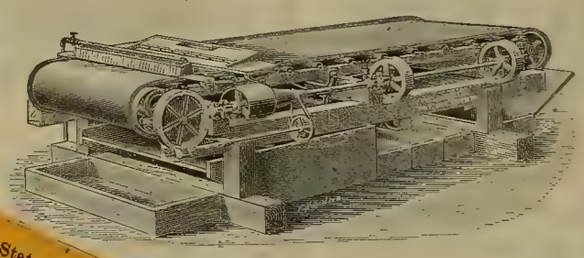

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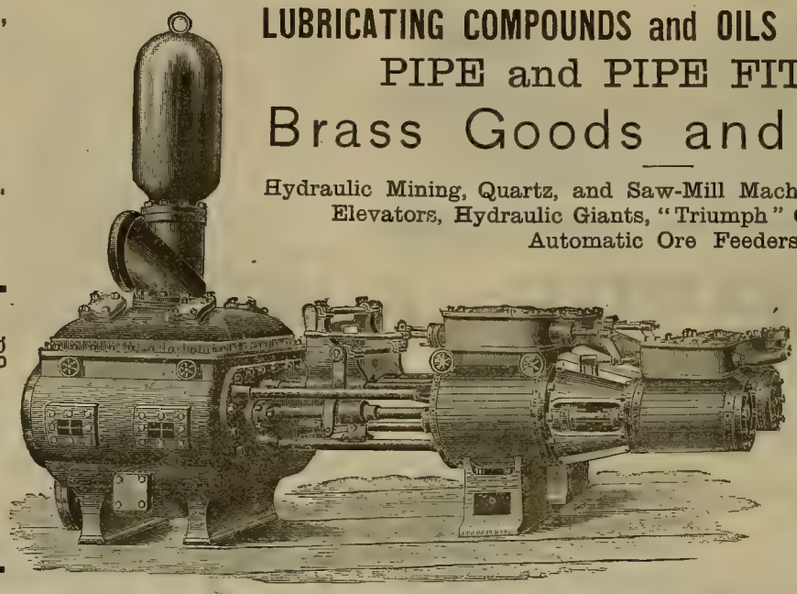

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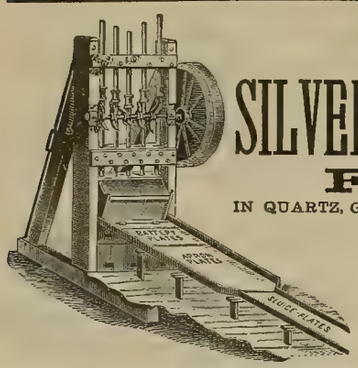

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An Open-Hearth Furnace Plant.

In the improved open-hearth steel practice the Lash furnace, illustrated on this page, is believed to be the best yet devised. Alfred E. Hunt of Pittsburgh, Pa., has described a complete plant on this system before the American Institute of Mining Engineers. It is peculiarly adapted to the use of natural gas, and there are, at the present writing, 12 furnaces now erected in Pittsburgh on the Lash system, four of 40 tons, five of 30 tons, one of 20 tons and two of 15 tons, and there are four 15-ton furnace buildings. (See Figs. 1, 2, 3, 4, 5, 6 and 7, in which the parts are numbered for reference.)

The hearth of the furnace (1) is made circular, or, preferably, elliptical, with major axis of 18 feet of hearth inside the linings and minor axis of 15 feet for a 15 ton furnace. This hearth is supported on beams, resting on suitable walls or piers, of such a hight that the charging-doors are accessible from the ground level. The retaining shell of ½-inch thick steel plates extends from the top of the side-walls down to a broad connecting-band (4) a short distance below the charging-doors; from this, the shell slopes inward to the bottom plates of the hearth.

The lining of the hearth conforms to the shape of the shell, and since the bottom-plates and supporting beams prevent any vertical movement downward, the conical shape of the outer walls of the lower portion of the melting chamber prevents almost all of the outward movement due to the expansion of the lining, thus preventing the rupture of the lower side-walls of the furnace.

The single flues (9) in natural gas furnaces at either end of the melting-chamber are five feet wide and are simply large passages inclined down toward the bath at a pitch of about four inches to the foot, to give the flame a strong guide downward upon the metal. In order to provide a firm support for the arched roofs of the melting-chamber and flues leading into it, a water-bosh, Fig. 7, made of ½-inch thick steel plate, is put in the form of a keystone in the arch of each roof, that of the melting-chamber (15), and that over the downtake flues (2) butting against the plates of the inclined sides of the water-bosh, which in this way acts as a double skewback or keystone. This bosh is one foot wide at bottom and five feet long. It is stayed inside at proper intervals by transverse bars, and though exposed on its under side to intense heat, works admirably. These water skewbacks are provided with one-inch pipes (16) feeding water at five pounds pressure, and leading out the waste water which is hardly lukewarm.

The side walls of the flues are held in place by suitable plates, angles, and buckstays (16, 17, 19) and the outer walls of the furnace are also stayed by plates and diagonal rods (18).

Natural gas is led into the sloping flues by wrought-iron pipes (10–17) which enter the brickwork near the "four corners" of the melting-chamber. The gas mixes with the air in its downward rush into the furnace.

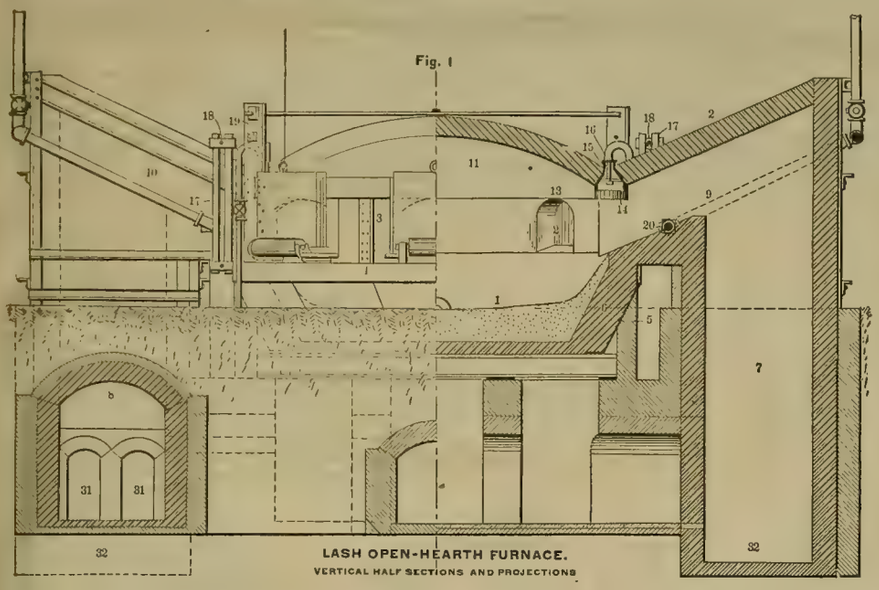
The stack (21) is placed in such a manner that the flues leading from each end of the hearth (22–23), which have checker-work in them, alternately act as regenerators to preheat the air before it enters the furnace. The lower end of the stack is connected by a short flue (24) with a four-way chamber (25), to which the flues (22–23) from each end of the furnace converge, and to which the air duct (26) delivers. This air duct (26) leads out from the ladle pit (27) and passes directly under the hearth, in this way not only heating the air, but giving a free circulation under the hearth and preventing an excessive heating of the bottom.

Along the middle of the flues (22–23) leading from the central four-way chamber (25) to the opposite ends of the furnace, is placed checker-work of fire-brick supported on tiles (28), so that the bottoms of the flues are clear openings (29), giving a stronger draught; but as there is a constant tendency of the heated air to ascend, there is a thoroughly uniform heating of the air entering the furnace by this arrangement.

The front portions of the flues are provided with a series of double arches, which not only serve to strengthen the sidewalls and tops of

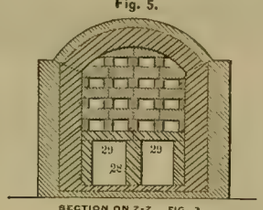
(*Concluded on page 445.*)

Fig. 1.



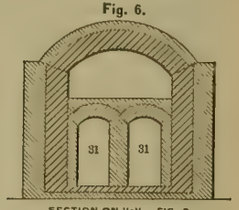
LASH OPEN-HEARTH FURNACE.
VERTICAL HALF SECTIONS AND PROJECTIONS.

Fig. 5.



SECTION ON Z-Z. FIG. 3.

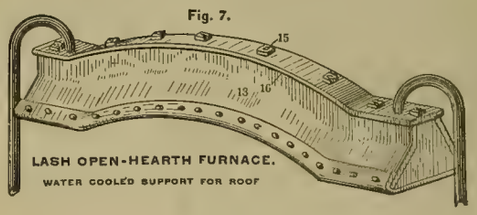
Fig. 6.



SECTION ON V-V. FIG. 3.

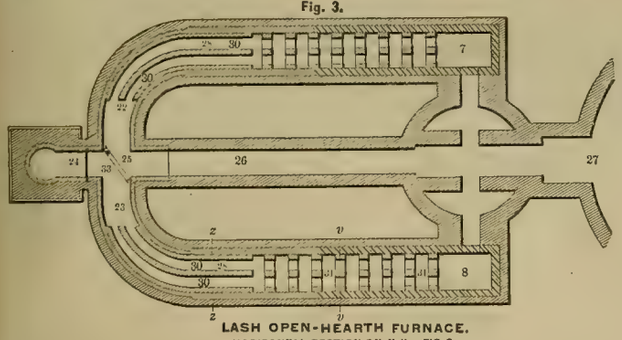
LASH OPEN-HEARTH FURNACE.

Fig. 7.



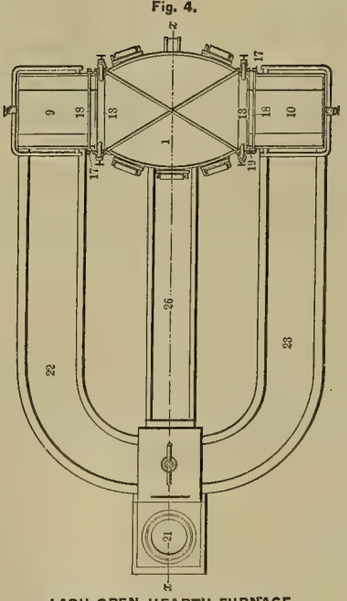
LASH OPEN-HEARTH FURNACE.
WATER COOLED SUPPORT FOR ROOF

Fig. 3.



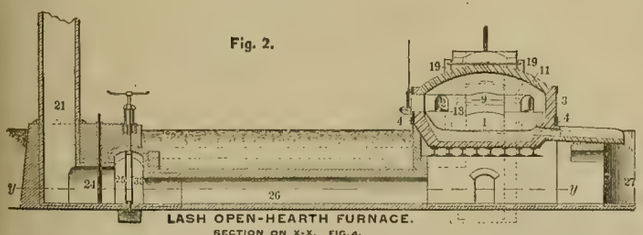
LASH OPEN-HEARTH FURNACE.
HORIZONTAL SECTION ON Y-Y. FIG. 3.

Fig. 4.



LASH OPEN-HEARTH FURNACE.
PLAN.

Fig. 2.



LASH OPEN-HEARTH FURNACE.
SECTION ON X-X. FIG. 4.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

The Oro Bella Mines.

[Written for the PRESS.]

Much interest is felt about Phœnix in the success of the Oro Bella Mining Company, whose mines are in the Bradshaw mountains, about 18 miles east of the Big Walnut Grove water-storage dam, and one mile south of the old Tiger mine and mill. The property includes the Oro Bonito mine, which was worked years ago by San Jose parties, who built and operated a number of steam arastras on the mine, by which process, however, they were unable to work the heavy sulphurets underlying the oxidized ores nearer the surface. From the latter a large amount of gold was realized, and the free-milling ores were by no means exhausted when work on the property was suspended by reason of the dishonesty of the superintendent.

In December, 1888, this mine and the Oro Belle, adjoining, were purchased by Mr. Isaac T. Stoddard of New York, who has done much during the last ten years to promote the mining interests of Yavapai county. A company was organized by him and he at once proceeded to reopen and extend the several tunnels and other work about the property, which has now been opened to a depth of more than 600 feet, with ore all the way, and from one to five feet in width. A good wagon-road has been built to the mines and a fine ten-stamp gold and concentrating mill, probably one of the best in the Territory, has just been completed at the mouth of the lowest of the tunnels and is now running successfully.

Both the structure and power are designed for double the present capacity of the mill, which may be run by water-power the larger part of the year, though steam-power is used at present.

More than $100,000 have been expended in improvements and development during the last year, and we understand that Mr. Stoddard, the president and general manager, intends adding a chlorination plant, which will enable his company to avoid the great expense of shipment to distant smelters and attain the best possible results from the ore concentrations by working the entire product on the premises.

Near Bayard, which is the name of the Oro Bella camp, are the Boaz and the Crowned King Companies' mills and mines. There is over 600 feet of development work on these properties, with a 20-stamp mill, and 20 stamps more will be added this summer.

A big strike has been made in the Occident, adjoining the well-known Peck mine, which is distant but nine miles from the Oro Bella, and several new and promising prospects are being worked in the immediate vicinity of the latter, where much activity prevails. Numerous parties, who have recently visited the camp, express the fullest confidence in the future of the enterprise, which seems certain to become a dividend-payer at an early day. The citizens of Phœnix and supervisors of Maricopa county are contemplating the expenditure of several thousand dollars in making a "cut-off" or shorter road from Phœnix to these mines. The new railroad from Prescott to Phœnix, which it is expected will be finished within a few months, will run within five miles of the camp.

Mr. J. D. Helm and Mr. Wm. Tyack, both of whom formerly filled, and most creditably, important positions with the old Tip Top Company, are connected with the Oro Bella. We learn that among the directors of the latter are Mr. Richard S. Barnes of the well-known firm of A. S. Barnes & Co. of New York, and Mr. Jesse R. Grant. G. W. I.

Phœnix, Arizona, May 29, 1889.

PACIFIC RAILROADS AND THE WEST.—Along the line of the Pacific railway and its branches more than 127,000,000 of acres have been brought into cultivation during the past eight years, or, as the *Bankers' Magazine* estimates it, the territory opened to cultivation by the joint efforts of the Government and the Pacific railway has an area larger than that of New England and the Middle States and South Carolina combined, or larger than that of Indiana, Illinois, Ohio and Michigan put together. Such a splendid showing in eight years justifies the wisdom of the men who planned and endowed the Pacific road. Its operation has opened an area greater than that of many monarchies to republican civilization. The census of 1890 is likely to reveal almost inconceivable progress, and to indicate even more wonderful events in the erstwhile "Far West," which now is not so far from Chicago as Chicago was from New York 30 years ago. The regions opened by the Government and the Pacific road are sure to be the granaries of the nation, and are likely to be important factors in its metallic industries.—*Chicago Inter-Ocean.*

PNEUMATIC RAILWAY TEST.—Citizens residing at the Mission have been much interested, and even mystified, over the work of track-laying in the lot of the Mechanics' Institute, at the corner of Sixteenth and Folsom streets. A temporary engine-house has been erected and ties for 1000 feet of track laid in a circle. Inquiry shows that the object of the preparations is the testing of an auto-pneumatic railway.

Old Mines in Honduras

Much has been told and written about the "old mines" of Honduras, both here and abroad, says the *Honduras Progress*, and it really seems that in the minds of many mining novitiates, an "old Spanish mine" naturally must be rich, as if it would have gained with the bygone centuries, in a similar manner as a good wine will improve with years.

Without attempting to go into ridicule, we state that outside of the interest which antique work usually presents, an old Spanish mine is full of information for the miner as well as geologist. In passing through the old works left to us by the old Spaniards, we cannot but admire their great pluck and endurance which they undoubtedly have displayed in discovering and working the ore deposits.

Our miners and prospectors know by experience that prospecting for veins and seams in most parts of Honduras is very difficult, owing to heavy undergrowth which usually covers the mineral-fields, as well as to the heavy alluvial and diluvial deposits under which veins and country rocks are hidden. On this account, viewing for example the mouth of an old mine, we are puzzled to find an explanation of the reason why the old work was first started on a place where no mineral outcrops were visible, but where, in spite of it, the old Spanish miner had succeeded in finding a rich vein within a few feet of work underground.

Undoubtedly the old and bygone prospectors displayed an intelligence and skill in finding out locations of veins which even now is not surpassed by the miners of the present period.

In entering the works we also find that most of the "mineros" understood how to "follow" the vein and to extract the mineral by a method which, at the time then, was cheap and economical.

The old "Ordenanza Minera Espanola" contains excellent mining laws; it prevented largely a too crude extraction; it contained laws which protected the mines from a superficial "gouging," and contained valuable inducements for miners and the mining industry, which latter at that time was comparatively more advanced than many other industries, and which same industries to-day in their development show greater improvements than the present state of our mining industry.

The present mode of prospecting for mineral deposits distinguishes itself from that used in olden times, that nowadays large ore deposits, though low in mineral yield, are considered of sufficient interest and value to be examined and eventually made the object of montanic enterprise.

In those olden times, milling and mining machinery was primitive and would not allow the handling of large quantities of ore, while on the other hand our new improved mining machinery, and principally as manufactured in the United States, has revolutionized all former methods of mining and milling. More, these new inventions have given great value to some large but low-grade ore deposits, which, up to now, were left unutilized. These same modern appliances have given to mining investments safety and done away with venture, with which mining enterprise was placed at level with any other gambling investment.

In visiting old mining camps in Honduras we find a certain number of mines deserted, as in their lowest workings the occurring water was too powerful to overcome with the "tanate" or leather bag with which, even up to now, native miners drain the mines, in climbing with their water-bags on notched poles from the depth to the surface.

Other mines we find abandoned as the former owners in their workings struck "horses" or barren places in the vein, which, to penetrate, they perhaps had neither hope nor capital, although we have often noticed that such barren sections in the vein are only of a limited extent and usually followed by large and rich bonanzas.

As it was the custom of the old miners to follow a pay streak in a vein without regard to systematic exploration of the mine, it thus happened that most of the old works are most irregular in their construction, and as soon as a certain depth was reached a decided want of air was experienced which prevented any further exploration. It will be also remembered that only the richest and easy milling classes of ores could be utilized, and thus we find a large portion of ores left in the old mines which are of a refractory character, and at those early times could not be reduced.

WORKINGMEN ABROAD.—One of the most extensive newspaper expeditions ever projected in this country is that which the Scripps League of Western newspapers will send out during the coming July. As Congress took no steps toward sending American workingmen to the Paris Exposition with a view to examining the advance of mechanical arts, this wealthy newspaper syndicate stepped into the breach and have undertaken the work which Congress overlooked. They propose to spend anywhere up to $25,000 in paying all the expenses of 50 American workingmen chosen from St. Louis, Cincinnati, New York, Boston, Detroit, Cleveland, Chicago and other manufacturing points. The details of choosing the men who are to accompany the expedition are now being arranged, and it is not unlikely that representatives from this city may be among those who accompany it. All trades will be represented, including iron-workers, car-workers, shipbuilders, carpenters, molders, printers, etc. Workingmen's organizations are invited to correspond with the Manager Paris Expedition, Scripps League, Detroit, Mich., concerning the selection of men.

A Refinery for Butte.

The Butte *Inter-Mountain* says: The past week has been a quiet one in mining circles in this camp. Mining men generally have found more food for thought in the visit of J. B. Haggin to Butte than in any other topic that has been presented during the week. Although there is no authoritative announcement of the fact, it is generally believed that the Anaconda Company is considering the proposition of refining its own copper, and that Mr. Haggin's visit to Butte had some connection with this scheme. With the practically unlimited capital of the Anaconda, and the manifest advantages to be derived from such a plan, the project certainly seems probable. In speaking of the matter last evening to a reporter of the *Inter-Mountain*, a well-informed mining man of Butte said: "I do not know, of course, the exact constituents of the Anaconda product, but estimating it to be somewhat similar to that of the Boston and Montana, with which I am familiar, I take it that their export from Butte does not contain more than 65 per cent of copper and silver. Their building of a refinery would mean that 35 per cent of the transportation charges on their metal would be saved. With the vast output of the Anaconda you can well imagine what a saving this means. Then, too, the refining, which, of course, would be done electrolytically, would increase the value of the copper manufactured at least three-quarters of a cent per pound, bringing it to within a fourth of a cent of the value of Lake copper. The refining would be done undoubtedly by water-power, which would also mean a wonderful saving.

"Such a plan opens a wonderful future for this country. When it is put into operation it will bring the jobbers and copper manufacturers out here, and the big companies will sell direct to the trade. It will do away with the enormous profits of the middlemen. I look to see the Boston and Montana and the Butte and Boston as well as the Anaconda take this step in the course of a very few years."

No Rail North of Ukiah.

Colonel J. Mervyn Donahue, president of the San Francisco & North Pacific railroad, said to a reporter, with reference to the likelihood of Lake county getting a railroad: "When the stage-road from Hopland (on the Ukiah extension) to Lakeport was to be built, I accompanied the engineers on the road and made a glancing survey. It was a rough country. The stage-road would be too steep for a railroad, but I think I could punch a hole through Ubank hill that would give an easy grade to Lakeport. That is my opinion from a hasty survey of the country. What change the theodolite would make I cannot tell. Instruments will soon be put on the line, and if it be practicable to tunnel through Ubank hill and get a reasonable grade, the company would not hesitate to build to Lakeport if the people would give the subsidy which they say they will. As to going north of Ukiah, nothing has been done. It would be useless to go any farther north unless we went to Eureka, and I candidly believe that it is a little too early for such an undertaking. We would have to do it on borrowed capital, and I don't like the idea of bonding a road heavily. Besides that, until some new people get into northern Mendocino and southern Humboldt counties, it might be uphill work. We find many persons who candidly believe that railroads are the ruination of a country, and I have known of persons, originally living in Petaluma, who have gradually kept moving northward as the railroad approached them until now they are a day's travel on mule-back north of Ukiah. If ever I force them to move again, they will have to pack their duds for Coos bay, for whenever we stick the picks in the ground north of Ukiah, we will not quit until we are in Eureka, on Humboldt bay. There is no hurry about that road, because I'm first on the ground, have made surveys, and can reach Humboldt as quick as anybody if necessary."

GUARD FOR DUMMIES.—The Sutter-street cable line has put wire nettings completely around the dummies and the cars in a number of instances, and contemplates doing so on the entire lot. A test was made last week upon the Sutter-street road of a guard invented and patented by H. P. Montag. This consists of iron rods, running completely around the dummies, barely above the track, over which is a wire netting connecting with the woodwork of the car. Each end runs on a couple of rubber rollers and is fastened in such a manner that it adjusts itself to the irregularities of the track. On the trial trip the inventor threw himself a number of times in front of the dummy when at full speed, and was neatly brushed aside without injury. There was some friction noticeable when the guard rubbed against the Belgian blocks on the rough road-bed, but not sufficient to jar the car or interfere with its progress. It is claimed that when the arrangement is properly adjusted the guard will be perfectly free from any inconvenience of the kind.

State Railroad Statistics.

The annual reports of 36 railroads of California will be due at the office of the State Railroad Commissioners on July 1st. Thus far but one railroad—the North Pacific Coast (narrow gauge) railroad—has made an acceptable report. The Visalia & Tulare railroad made one report, but Secretary Gaskill of the commission had to send it back because the company had failed to answer such important questions as the number of employes, wages paid, cost of fuel, kind and quantity of merchandise transported, average rate per mile on freight and passengers.

Secretary Gaskill said this morning to a *D. R.* reporter: "The Visalia company evidently thought that I had put those questions in my blank forms merely for fun. But every question propounded by me in my blanks has its use. The North Pacific Coast railroad answered every question but one, which was evidently overlooked. Looking over its report made according to my new blanks, one can tell what the company has been carrying, what it has earned, how much it pays to its employes, and, in fact, everything that is necessary for the commissioner's secretary to make a thorough report. Such reports will be valuable to the merchant and the tourist, to the farmer and the capitalist. By them he can see what portions of the State are producing certain kinds of merchandise in largest quantities. For instance, in the North Pacific Coast's report, the total merchandise shipped was 100 per cent. Of that the report shows that only one-fourth goes up the road from San Francisco toward the terminus at Ingrams, in Sonoma county. The remaining three-quarters came down. Of the shipments of the road, 27 per cent was merchandise, 30 per cent lumber, 25 per cent wood, 6 per cent tanbark, and 3.62 per cent potatoes. That tells from what portion of the State certain products come. When I get the reports of every railroad in the State I will know exactly how much goods have been transported, and from where. I flatter myself that it is the most systematic way of gathering valuable statistics, and I have not asked a question which is not authorized by the powers of the commission."—*S. F. Report.*

Mining Experts Not Discoverers.

"Have you ever noticed," remarked one of the pioneers of early '63, "how many mining experts we have in Austin who know it all, and yet have never made it stick when they prospected on their own layout? A number of past foremen, when working for the Manhattan Co. in years gone by, have taken to themselves the credit of discovering bodies or pockets of ore, when the truth is known, they had orders from the Manhattan office to drive for it, and were told about how far to go to get the ledge, as the surveyor had already measured the ground, taken the angles, and had handed in his estimate.

"We have had always plenty of men who jumped the honor as the discoverers of the ore and posed before their fellow-miners as the men who knew what they were talking about, but when it came down to giving their reasons and to estimate the distances, they were not there. For any man to work a mine successfully, he must think for himself and pay no attention to what this one and that one says, for if he does, he will surely go under. In mining on Lander Hill, it is not only the breaks one has to contend with, but the jealousies and heartburns of miners who did not succeed in their ventures. How much better it would be if all would strive for the success of every miner and prospector, instead of wishing he would fail and find nothing, because that is their opinion, and everything should be sacrificed to uphold it. An opinion, in their eyes, is of more consequence than the success of a man who differs in his knowledge of the ground."—*Reese River Reveille.*

The Slickens Question.

Major T. H. Hanbury, United States Engineer, has returned from California, where he has been attending a meeting of the Mining Debris Commission. The commission visited the mining regions in the northern portion of the State on the Klamath, Scott and Trinity rivers, and then went over to Nevada and Sierra counties and examined some of the large hydraulic mines which have been enjoined and are lying idle.

He was much interested in noticing the wonderful changes in the water systems of that section, the old river-bed from which gold was being mined being 2000 feet above the present river and running at right angles with it.

There is a great deal of gold yet to be got out, and in getting it out a great deal of dirt must be washed down, and the question for the commission to solve is what to do with this "slickens."

He saw in one place a deposit of pay dirt 10 miles long, 1000 feet wide and 200 feet deep, awaiting removal as soon as some plan is arrived at by which hydraulic mining can be resumed. He also saw where the slickens from mines had been deposited, covering farms and presenting a scene of desolation. In some places young fir plantations were growing on the slickens, but it takes a long time before this stuff can be fit for cultivation.—*Portland Oregonian.*

White Labor.

The State Board of Trade has issued the following circular, which should receive the careful consideration of the whole people of this State:

So much has already been said, discussions regarding the economic status of the Chinese upon our coast have been so prolific, and the agitation so constant, that it seems almost useless to begin it again; but the State Board of Trade, through its Executive Committee and manager, takes the liberty of again bringing the subject before you, believing that only through an honest agitation of the subject and a persevering reiteration its object will stand any chance of success; and this object is to supplant the teeming and cheap Chinese hordes of laborers with unemployed and equally as good white laborers.

To do this and to do it effectively needs not only your co-operation but your practical every-day observation of the principles and maxims that you, together with the majority of this great country, have laid down during the last twelvemonth. You gave your money, your energies and your time, during the last year and a half, when the principle of protection was struggling against that of free trade; and for what, gentlemen, may we ask, did you do this thing? Was it not that the products of your vines, your trees and your manufactured articles might not be brought face to face, in an open market, with the same products, the result of a cheap and often degraded labor in a foreign country? The labor of the country stood by you and with you in this struggle, helping you, and expecting, when your object was gained, help from you. The laws have thrown the mantle of protection around you and the products of your shops and your field; thanks to the highest legal tribunal of our commonwealth, the laborer is protected from any further invasion. But the fact stares the man of labor in the face that the horde already here is as ready, as willing as ever, to take the bread of labor that by right belongs to him. You gentlemen, employers of labor, asked for your protection from the results of cheap labor; asked that your goods, manufactured by home labor, might not come in contact with the same goods, the result of cheap and foreign labor. You vineyardists asked that the protective duty might not be taken from raisins; and a generous and fair-play loving people stood by you and gave you the protection asked. In view of this the State Board of Trade asks: Is it to be the fate of our white laborer to look into the doors of factories this summer and see the hands of his Chinese enemy busily engaged in labor? Must he sit on the fence this long summer, when the vines are hugging close to earth with their golden burdens, and see this yellow-skinned foreigner reap the reward of labor that by the bond of color belongs to the white laborer?

We truly and sincerely hope that such may not be the fate of the white laborer this summer or any longer. Already our books are becoming filled with the names of men and boys ready for the shop, the factory or the field. There is a principle lying beneath this question of deeper and more important significance than the idea of cheapness. And, gentlemen, that is the only reason why you ever think of taking a Chinaman in preference to a white man to work for you, because of a money cheapness, feeling that for a smaller amount you can get the same work, the same results. You must take into consideration that you are succoring a class of laborers that take all and return nothing; you must take into consideration that your money goes, never to return into your common circulation again; you must not keep alive a parasitic growth in your midst by sustaining it by feeding it; you must not help keep an alien class with you that will not assimilate, will not mix with you, will not traffic with you, and in death wishes his bones to be removed from your country. And yet you wish to build up your State, wish to see it prosper, wish to see family after family come here and locate. And you invite him for what? To seek labor among his own by the side of his own fellow white laborer? Oh, no! By the side of John the Coolie. And yet the cry continually goes out from California that we would do anything to get rid of our yellow countrymen. And we hold him tightly with one hand while pushing him desperately away with the other. There is indeed a principle in this, a principle of consistency if nothing more; and if we cry out against an evil and have the remedy in our own hands, and apply it not, we soon become the laughing-stock of the country, and when next we send our plaintive cries across the continent beseeching help, people will laugh as they do at the fable of "The Boy and the Wolf."

As we said at the start, this is an old subject, a worn-out subject, a subject of much discussion and more agitation and less practical observance than any in our midst. But the State Board of Trade has found in its career that only by indefatigable industry and persevering reiteration has it ever accomplished anything; and as for this subject, we will say that, though the echo and re-echo of the chestnut-bell sounds from all sides in our ears, we will probe this subject until we find whether the manufacturer, the vineyardist, the fruit-grower and labor-employer loves to talk a certain way to a white laborer when he wants his vote and a different way when he wants his labor. When we solve this problem we will drop the subject. JOHN Q. BROWN, General Manager.
J. M. DAVIES, Secretary.

GOLD IN UTAH.—There is great excitement at Grand Junction, Col., over the gold discoveries that have recently been made in Utah. Placer beds have been found in the Henry mountains, and are pronounced by parties who have been there as exceedingly rich, the gold being of a coarse quality and easily saved without the use of quicksilver. A camp has been located, called the Bald Eagle Mining Camp, and supplies of all kinds are being shipped there from this point. Mr. C. C. Moore, who has just returned from the camp, is exceedingly confident that a rich strike has been made, and he will return in a few days, taking with him a large party. Mr. Moore thinks that valuable quartz discoveries will also be made in the vicinity. Jack Butler, formerly of Leadville, is the discoverer. J. W. Carroll, an assayer of known ability, and several other gentlemen are on the ground. The location is a very inaccessible one, more than 100 miles south of Green river, Utah. Forty miles of this is over a barren, sandy desert, where the heat is intense and considerable hardship has to be experienced to reach the desired point.

MT. TACOMA AS SEEN FROM TACOMA, WASHINGTON.

A GLIMPSE OF THE HARBOR AND CITY OF SEATTLE.

SILVER IN ALASKA.—A correspondent of the *Chronicle* says: On the 17th, word came up of a big find on Holkham bay, on the mainland, some 60 miles south of here. Since then parties brought up specimens of this rock which assay about 600 ounces of silver to the ton, with 17 to 25 per cent copper. Great excitement immediately prevailed, and by Sunday, the 19th, everything that would float was hired, borrowed, or stolen. Acres of dislodged rock cover the beach on the spot traveled over by ex-Judge Henry States, formerly U. S. Commissioner, and hundreds of prospectors must have trodden over these very same stones during the past ten years. To him, however, good luck left it to break one accidentally, and have their riches revealed. The new find has been bonded for $100,000. Heretofore Alaska's mines have only produced gold to any considerable extent. Now silver is added to her products.

ANTELOPE AT WASHINGTON.—Senator Stanford has sent to the Smithsonian Institution a young antelope from California to add to the collection for the national zoo. It was 11 days on the trip and reached the park very weak, but is recovering, and Captain Weedin, the keeper, hopes to be able to save it.

Durability of Timber.

We condense from the report of the Commissioner of Agriculture at Washington, D. C., in relation to the above subject, as follows: With proper after-treatment of the wood, the time of felling seems not to affect its durability. Early winter (December) should have the preference, because there is then less fermentable sap in the trees, and the timber will season with less care, more slowly, and more evenly, and before the temperature is warm enough for fermentation to set in. If the wood is cut "in the sap" it is more liable to fermentation and to the attacks of insects, and more care is necessary in seasoning; for the rapid seasoning, due to the warm, dry atmosphere, produces an outer season coat which envelops an unseasoned interior liable to decay. When cut in the leaf it is advantageous to let the trees lie full length until the leaves are thoroughly withered (two or three weeks) before cutting to size. With conifers this is a good practice at any season, and, if it can be done, all winter-felled trees should be left lying to leaf out in spring, by which time most of the sap is worked out and evaporated.

Always remove bark from felled timber to aid seasoning. Never allow the log to lie directly on the moist soil.

If dried too rapidly, wood warps and splits, the cracks collect water, and the timber is then easily attacked and destroyed by rot.

With sawed lumber, sufficient thorough seasoning for most purposes is obtained in from 12 to 18 months, while for the special work, according to the size, from two to ten years is required.

The best method of obtaining proper seasoning without costly apparatus in shorter time is to immerse the prepared timber in water from one to three weeks, to dissolve the fermentable matter nearest the surface. This is best done by running water—if such is not at hand a bath may be substituted, the water of which needs frequent change. Timber so treated, like raft timber, will season more quickly and is known to be more durable.

Never apply paint or any other coating to green or unseasoned timber, for if the wood was not well dried or seasoned, the coat will only hasten decay.

PORCELAINE is the name given to a new material designed for the interior decoration of street and railroad cars. It closely resembles marble, but is not so heavy, can be made in thinner slabs, and is said to be entirely unaffected by atmospheric action or staining elements. It is molded in a melted state into ornamental shapes, and then tempered until it is strong and tough. It is colored all shades at will, and is readily adapted to designs in frieze, wainscoting and general decoration. It is not liable to warp, nor to be disorganized by the motion of cars.

The Seattle Fire.

On Thursday of last week the entire business portion of the thriving and prosperous city of Seattle, W. T., was destroyed by fire. Every bank, hotel, place of amusement, all the leading houses, all the newspaper offices, railroad depots, mills, steamboat wharves, coal bunkers, freight warehouses and telegraph offices were burned down. The fire began near the corner of Front and Pearl streets, in the Seattle Candy Factory building, at 2:30 P. M., and before midnight had consumed the whole business section of the city, northward to Stetson & Post's mill, along Front and Second streets to the water-front. The city is literally wiped out, except the residence portion on the high ground.

Seattle, though one of the early settlements on Puget sound, passed through many vicissitudes in its early history, and it is only within a few years that it has expanded under the impulse of a solid, steady growth. It has a large and rapidly increasing commerce. Its religious and educational facilities are justly famous, and its site all that can be reasonably desired, either for trade or residence.

The rapid growth of Seattle in the past two years has seldom been equaled, and no mining excitement or wildcat boom has caused it. It has been the steady development of a seaport which was the center of an immense coal trade, and was surrounded by one of the richest agricultural and lumber districts in the world. An idea of the rapid advance made by the city may be drawn from the following statements of the population of the city, as given by United States, Territorial and city census returns in the years named: In 1880, 3533; 1883, 6045; 1885, 9687; 1888, 19,116; 1889 (estimated from the returns of the directory canvassers), 28,350.

Seattle is the center of an enormous business trade with Puget sound ports, 87 steamers being engaged in bringing to her wharves the products of the sound country and carrying back supplies. This system of exchange, reaching to every city, town and hamlet, began 20 years ago, and has been of constant growth.

The city is also rapidly becoming one of the important railway centers of the country, and will probably within two years be the terminus of three great trunk lines. A sketch of the water-front of the city is given on this page.

Extensive Manufactures.

Of almost equal importance with railroads are the manufacturing interests of Seattle. Lumber, coal and iron now employ thousands of artisans, and only a beginning has been made. The coal output for 1888 was $2,235,725, and with new mines opened and old ones improved by the addition of the latest machinery, the product of 1889 will fall little short of $5,000,000. The output of 11 sawmills, great and small, is 350,000 feet a day. Foremost among the new enterprises now in progress is the Moss Bay Iron and Steel Company of America, located at Kirkland, on Lake Washington, seven miles from Seattle. The plant will cost $2,000,000 and the works will employ from 1500 to 2000 men. It will be the largest enterprise of its kind west of the Mississippi river. Works for creosoting piles, in which $150,000 has been invested; marine ways, investment, $100,000; brick and stone works in West Seattle, investment $300,000; railroad terminal buildings, investment $150,000; stock-yards, investment $75,000; coal-bunkers for the Gilman mines, investment $100,000; Hall Bros.' ship-yard; ice works, investment $150,000; furniture factory, investment $75,000; reduction works, investment $400,000, are among the more notable industries now under way, while smaller factories, employing from 10 to 40 men, are so numerous that space forbids detailed mention.

Among the more important business establishments were 5 national and 2 private banks, 23 churches, 4 public and 3 private schools, the Territorial University, 3 daily and 5 weekly papers, 5 gas and water systems, 2 electric-light companies, a fine opera-house, 7 sawmills, 2 ship-yards, 1 dry-dock, 3 iron foundries, 1 brass foundry, 4 furniture factories, etc.

GOLD IN GUTHRIE.—An Associated Press dispatch says: Guthrie is apparently on the verge of a gold excitement. For several weeks past a vague rumor has been circulating concerning the discoveries of gold about the city, but nothing worthy of credence has been learned until this evening, when it was inserted in a daily paper that the precious mineral had actually been found. A boomer while digging a well on his claim struck a rich deposit. He came to Guthrie, and, purchasing some hardware, gave in payment several nuggets. The merchant had the ore examined, the result of which, if the boomer's story be true, will be to cause a great gold excitement. The identity of the boomer and the location of the claim are matters, however, veiled in profound secrecy, pending the formation of a syndicate, etc. Meanwhile discoveries of zinc, lead, coal, limestone and iron are daily reported. The richest iron ore so far found will assay 75 per cent.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CLEVELAND.—Amador *Dispatch*, June 8: A few days ago a rich bunch of gravel was struck on this claim at Volcano, which shows free gold all through the pieces taken out. It is estimated to be worth $1000 per ton if there is much of the same kind. Fifty men are to be put to work immediately, which will be the means of livening up Volcano to a certain extent. The gravel is worked with the Cannon-ball mill at present; there is to be another mill built on the property shortly. Mr. Parberry has already delivered the lumber on the ground for same.

GARDNER.—Work was commenced on this property last Monday with Jas. Gleeson Jr. as superintendent. At present but four men are working tunneling to tap the old pump shaft. More men will soon be put to work, and proper machinery will also be erected. We will report progress.

KELLY.—A survey of the Kelly mine property in Hunt's gulch was made last Tuesday. Negotiations are about completed, and work on a small scale begun. An English company is at the back of it, which means that operations will be pushed when once a good start has been made.

MINING AROUND JACKSON.—*Ledger*, June 8: There is great activity manifested in mining matters around Jackson, which can hardly fail to lead to a material increase in the number of paying properties. Prospecting is being done on the Gardiner property by the parties who recently bonded it. Some work is being done on George White's quartz mine just east of town, with a view to its purchase by English capitalists, should it open out satisfactorily. S. W. Bright's claim east of town continues to show up very favorably. Overtures have been made to move a portion of the Ilex machinery on to the mine, and spend $2000 in prospecting. The offer was refused, as the sum was deemed too small to accomplish anything of consequence. We understand the Hardenburgh mine at Middle Bar has been bonded to the English company, operating the Morley or Wetzlar mine; it is also reported that the Amador Queen and Doyle properties are also under bonds to the same company. At the Amador gold mine, the carpenters were paid off on Monday and discharged. The intention is to confine the operations as much as possible to underground development. The small hoist placed underground at the 250 station works like a charm. John I. Midear has been formally reappointed superintendent by the new company. There is no lack of means. One pay-day was had last week, and another is looked for on the 12th, to square all indebtedness up to the present month.

MISCELLANEOUS.—Grading for the mill for the New London has commenced. At the Kennedy a tank is being placed in the shaft at the 1050 level to catch the water. This is preliminary to sinking.

FROM DRYTOWN.—At the Drytown Consolidated mine everything is running along in the usual manner. All the water has been taken out to the 280-foot level. New track and ladders and all the timbering is done to that depth. Reservoirs have been put in at the mouth of each drift to catch the water while work is going on below. Everything looks very encouraging. The Gover mill has been shut down a week on account of improvements being made in and around the mill. They are putting in new concentrators and other repairs. Wm. Parsons has had his roller-mill on the Ginocchio claim at the Black Hills ready to run for a couple of weeks, but is unable to get water enough to run steady.

Calaveras.

REPORTED SOLD.—Calaveras *Chronicle*, June 10: It is reported that the Gwin mine has been sold for $400,000. We give it merely as a floating report, however. In connection with the above, it was also reported that the Ilex mine machinery had been sold to the party or parties who purchased the Gwin mine. As to the last, we believe it is without foundation, hence our doubts as to the first.

El Dorado.

GREENWOOD.—Georgetown *Gazette*, June 6: The mining outlook of our little town never was brighter than at present. In the past the miners only waited for the rainy season to do a little work, but now they appear to have taken hold in earnest. Our old friend Col. T. G. Belty has a fine prospect. He has struck a ledge that promises something big, even better than he was expecting. He is busy timbering his tunnel. No mining man in this community is more deserving of the good-will of our people; he has labored under great disadvantage, but has never lost faith in his mine, ever hopeful that his mine will yet prove a source of great revenue to the town he loves so well, as well as to himself. The four Dixon brothers are working the Revenge mine, crushing their ore with an arastra run by horse-power.

RE-LEASED.—We understand that the old lease on the Parsons mine expires this month, and that it has been re-leased by B. F. Shepherd, Geo. Brown and Isaac McCullough, who have been working the mine, quit work last week.

GRIZZLY FLAT.—Placerville *Observer*, June 11: Captain Smith is pushing work on the Mount Pleasant mine as rapidly as possible. Developments being made are decidedly encouraging and it is now fully believed that this old mine, that has turned out so much bullion in past years, will again come to the front. The Sunday mine, which has been idle for several years, has been bonded by a San Francisco company and active operations will be commenced at once. The Black and White Con. mine has been bonded by capitalists of San Francisco, and two tunnels are being driven rapidly into the mine. The Mount Hope mine, which has produced considerable gold in years past, is now being opened up with favorable prospects. The Daley mine, two miles south of Grizzly Flat, is now being successfully operated. The ore is taken from a tunnel and dumped into the mill. Mr. Daley has a cannon-ball mill and one concentrator which reduces the ore and concentrates the sulphurets to his satisfaction.

PLACERVILLE DISTRICT.—At the Gignac mine development work is being prosecuted. The main tunnel is now in 240 feet and crosscuts are being run for the purpose of properly opening up the mine with a view of breasting out cement gravel in sufficient quantity to supply the mill. At the Bassett or Stewart mine the main tunnel is being driven ahead through favorable gravel. The tunnel has already passed through a fine bed of gravel which prospects well.

MUD SPRINGS DISTRICT.—At the Equator mine, north of the Church mine, some interesting developments are being made. For a long time croppings have been noticed some distance north of the Equator's west tunnel. During the last rainstorm, the water running down the hill washed the dirt off so as to expose the ledge to view. Supt. Burdick, becoming attracted by its favorable appearance, has run a crosscut opening a vein 30 feet wide which he informs us prospects well in free gold.

SMITH'S FLAT DISTRICT.—Supt. Coughlin is pushing work actively at the Rogers mine. A level is being run north for a bunch of gravel which they are daily expecting to strike.

KELSEY DISTRICT.—The Big Sandy mill at Kelsey is running regularly. The ledge is from 10 to 15 feet wide containing free gold the entire width. The whole ledge is being taken out and run through the mill, which is reported as giving satisfactory results.

Fresno.

A MILL.—Fresno *Republican*, June 8: The mine owned by James Morrow, and situated about one mile north of the town of Hildreth, has developed into a rich property. The deepest incline shaft is 150 feet, and at the bottom of this a ledge of decomposed porphyry, some two or three feet thick, has been uncovered. The rock assays, so far, about $30 to the ton, and is growing richer. There is already on the dump all the ore mined during the past month, and now that hoisting works have been completed the rock will be mined more rapidly. A five-stamp mill is to be built at once.

Inyo.

THE NEW BORAX WORKS.—*Independent*, June 8: Conn & Trudo have their borax works in Saline Valley in working order and are making borax. In fact they have already made a great many tons. They have 18 crystallizing tanks, each of a capacity of 1000 gallons. Three tanks are emptied each day, and the yield from these is about two tons of borax. In very warm weather the yield might not quite reach that amount, as the borax does not crystallize so well as in cool weather. The crude material is first boiled, the boiler having a capacity equal to three of the crystallizing tanks, and the solution is then run into them and allowed to stand six days. The borax accumulates on the sides of the tanks, which are made of zinc, and on plates of the same metal suspended in the liquid. Seven of these plates are used in each tank. The borax is put in sacks direct from the tanks, and is then ready for shipment. From the works to the railroad at Alvord, the distance is 55 miles. Within a few hundred yards of the works is an Indian settlement. The borax marsh has an elevation of about 500 feet above the level of the sea. The Inyo mountains rise like a wall close to the works and attain an elevation of about 11,000 feet above sea level. This is one of the grandest stretches of mountain scenery in the State.

Mono.

THE BODIE CON.—*Miner*, June 12: During the past week west crosscut, 1200 level, was advanced 12 feet. There were employed 10 miners and 1 foreman. Jointly with Mono, the upraise on the 1000 level was driven six feet, and upraise from south drift, 1200 level, was driven 26 feet.

MONO.—During the past week the southeast drift on the 1200 level was advanced 20 feet. South drift, 1000-foot level, was advanced 8 feet. There were employed 6 miners, 1 foreman, and jointly with Bodie 6 miners, 1 chief and 3 assistant engineers, 3 firemen, 2 carmen, 1 carpenter, 1 blacksmith, 1 laborer, 1 watchman.

Nevada.

A LUCKY FIND.—*Tidings*, June 5: Operations at the Idaho having been stopped, the waters of Wolf creek are clear and pellucid. Remarking on this this morning, Peter Brunstetter noticed a piece of quartz, evidently croppings, in the creek at a point just above the Idaho bridge. Impelled by curiosity, he secured the quartz and was enriched many dollars thereby, for the piece of rock (somewhat larger than a man's fist) carries a band of coarse gold all around, if not through it. This band, so to speak, varies in width from one-eighth to five-eighths of an inch. Mr. Brunstetter has refused $30 for the specimen. Later on, the young man found three pieces of gold-bearing quartz in Wolf creek where that stream passes in the rear of Murphy & Brunstetter's lumber-yard.

A PIGMENT.—*Tidings*, June 11: By combining the oxidized iron (refuse of the copper ore) and yellow ocher found in the mine, Woller & Pietzsch of the Spenceville copper mine have manufactured a paint for which a San Francisco house offers $40 a ton. There are thousands of tons of it in sight, and the necessary works for the manufacture of the pigment are in course of erection.

Placer.

THE GRAY EAGLE.—*Herald*, June 8: Last week several of the directors of this mine arrived at Auburn on the evening train, and next day drove over to the Forest Hill divide. They were accompanied by Mr. R. L. Dunn, their engineer, and interesting developments were looked for by the public. But the public has been disappointed, and the public is puzzled. All that can be learned is that work has been suspended, the force of men taken off, and the shaft is filling up with water. It is reported by some who ought to know that a well-defined channel was reached and gravel which returned a very satisfactory prospect was taken out. It is also said that a tunnel will be started immediately, but there is no movement at present to indicate it. There is an air of mystery about the whole affair which the curious are at a loss to account for. We sincerely hope that this venture for which such brilliant success was predicted is not to pass into history as an expensive failure.

San Bernardino.

GOLD HILL MINES.—Cor. *Press and Horticulturist*, June 8: Our party, consisting of J. R. Jumper, H. Waddington and your humble servant, left Riverside May 14, with the determination of going to the celebrated Gold Hill mines, near Death Valley, the point where Messrs. Nowlin, Beall, Barney Carter, and Taylor of South Riverside, are located. These gentlemen feel very sure that they have something rich. About the gold: What shall I say? The truth, of course. This I am afraid to attempt, but judging from what I have learned I must say that this is a very rich mineral belt, but it will take time and money and hard work to get it out, but these three elements combined can do wonders. The belt is much larger than those who have been there suppose. Interested parties are surveying a new road to reach the mines, which will be a little longer but will take teams and supplies near the mine, also near wood and water. Food for man and beast will have to be hauled from Hintley, the nearest point. In conclusion, I want to say that it is very hot, and that in my judgment it will be best for men to wait until the heated season is well past before going to the desert. That there is mineral, there is no doubt in my mind, and I had opportunity to interview nearly all the prospectors that have been in that country.

Sierra.

JIM CROW QUARTZ.—*Mountain Messenger*, June 8: Jesse Carney, who has been working on some quartz ledges in Jim Crow canyon for a number of years, has at last got matters in such shape that he will be able to develop them. He is said to have interested a company of Eastern people, and that for a certain proportion of the stock, they are to put in order a mill built many years ago, and to thoroughly prospect the property. Amos Hart has gone up to do the carpenter and millwright work.

THE BUFFALO MINE.—Sierra *Tribune*, June 7: The Buffalo Mining Co. cleaned up last Saturday. About seven ounces of gold was obtained. It is estimated by those who ought to know that fully $15,000 must have escaped and gone to the creek below, the amalgamating process that they used not working as the company thought it would. Work was resumed again to-day with Fred Rickard as amalgamator. He says that the gold is easily amalgamated, and thinks no other but that a good cleanup can be obtained. There is only water enough to run five stamps.

THE SIERRA BUTTES G. M. CO. of this place cleaned up $12,000 for last month's run. A party of miners of this place has leased the Colombo mine near Sierra City. They commenced operations at the mine this week. Walter Lawry, Sr., and H. M. Bradbury have been awarded the contract to put down an incline on the Wallis Consolidated drift mine above Forest City.

Siskiyou.

QUARTZ AND PLACER.—Yreka *Journal*, June 12: The Gold Ball Mining Company continues to take out exceedingly rich quartz from their ledge at Salmon river. Their ledge averages from four to five feet wide, and some of the quartz seems to be more gold than quartz. In one day they took out about $30,000, and all of their quartz pays handsomely. Another new ledge has lately been discovered near the Gold Ball ledge, by a man named Roberts, which prospects exceedingly well. The old Humpback ledge, between the Black Bear mine and Klamath mine, has been paying handsomely of late. The Uncle Sam mine in the same vicinity yields rich quartz, but the scarcity of water prevents the owners from being able to run their water-power mill. Splendid reports come in every day from the quartz mines on Know Nothing and Methodist creeks, near the Trinity county border, where an immense quantity of gold will be taken out this summer. The miners at Hamburg Bar and vicinity on Klamath river are all busy, but not far enough advanced with their work yet to get pay, although the prospects look encouraging for rich returns on nearing bedrock in the channel. The Klamath river miners in Cottonwood mining district are getting on with their work. John Waggoner & Co. have pumped out their inclosure and are sinking the pump down through gravel to bedrock. They get a good prospect in the gravel. Wm. Pullen has had an enormous amount of work to do, but is getting along in good shape now. His wing is done and wheels for washing, running derrick and pumping. Waggoner & Co.'s claim is about 75x225 feet, and Pullen's claim about 75x450 feet. Jillson & Co. have closed down their hydraulic for the season, there being no more water. They got a fine prospect considering the amount of ground they were able to pipe down with the small supply of water had.

Trinity.

NEW RIVER.—Cor. Trinity *Journal*, June 8: The great work of the season is being done by the Ridgeway Con. Gold Mines Syndicate. The company is running their tunnel into the mountain a distance of over 700 feet; they are in over 350 feet; they are also preparing to build a fine 10-stamp mill of 750 lb. stamps, with all modern improvements, such as concentrators, electric light, etc., at the intersection of lode. The amount of ground opened for stoping will be about 250 feet. The sawmill will be in operation in the course of another week, sawing lumber for the building of the mill and for the purpose of building a tramway from mine to mill for transporting ore; this tramway will be operated by cable. The tunnel is being run by contract by John Thynge & Co., who are doing excellent work. The Mountain Boomer is also doing good work; they have a force of men at work opening up the ground and keeping their mill running constantly on rich ore. The Excelsior is also employing a force of men on their mine with equally good results. A prospect has been lately struck west of this mine that bids fair to equal the Excelsior. Mr. Irving, who lately came to the camp, is the lucky owner and prospector. The Hard Tack is being worked by parties on tribute, and good paying ore is being taken out. The Golden Gate is also coming to the front as a gold producer. Mr. Gutzen is the owner and has commenced work on some very rich ore, some of which has assayed as high as $800 per ton; he is now engaged in erecting a 5-stamp mill to run by water power, and expects to be able to commence crushing by July 1st. The owners of the Siberia have also started in since the fine weather and have let the contract to run a tunnel 100 feet. This prospect is no doubt one of the most promising on New river; situated at the head of Slide creek, it presents a ledge of quartz matter nearly vertical, running directly into the mountain, going one foot in depth of ledge for every foot run; the prospects of this property vary from $40 to $100 to the ton. It is hard to conceive a more convenient place to open a mine than this, as timber and water are both plentiful. Many other properties are being opened in this district, and many new men coming into camp. It seems to be the prevailing opinion that the work being done this summer by Ridgeway and other companies will decide the question whether New River District is to take its place as a great gold producing camp or not; but in conversation with many old miners here I find every one most sanguine as to the outcome.

EAST FORK.—The Enterprise Co. will have a millman on the mine next week, and it will not be many months before the drop of stamps will be heard on the property. Henry Junkans will have a mill on the North Star as soon as satisfactory arrangements can be made. M. Simmons of East Fork, one of the locators and owners of the Web-Foot mine in that district, says that the prospects of the mine are looking well. The vein runs from six inches to seven feet in width. There are three tunnels on the ledge—one 160 feet in length and two shorter ones. In the tunnel begun last winter, the ledge goes from $10 to $25 to the ton. They have about 100 tons of good ore on the dump, which will be crushed by the mill on the "Fountain Head" as soon as completed, work on which is now being pushed.

Tuolumne.

COAL.—Tuolumne *Independent*, June 5: John Noonan has discovered a coal vein in this vicinity. It is about eight feet below the surface, and the vein dips about 45 degrees. He has followed it about 100 feet. It burns freely, and grows better as it goes deeper.

NEVADA.

Washoe District.

HALE & NORCROSS. — Virginia *Enterprise*, June 8: The last letter says: On the 300 level the north drift from the new station is advanced 85 feet. On the 400 level the stopes in the north drift from No. 1 west crosscut continue in ore of good quality. We are now stoping in the sixth set above the track floor. On the 500 level the north drift was advanced 18 feet. The stopes above this level continue to yield the usual quantity and quality of ore. On the 700 level the prospect drift north from the end of the west crosscut is advanced 30 feet. We are extracting fair-grade ore from the south stopes on this level. During the week we have hoisted 1245 cars of ore, have shipped to the Nevada mill 1080 tons and have milled 997 tons. Have shipped in bullion $75,072.27, and estimate that we will receive about $28,000 more on the final cleanup from May account.

SAVAGE.—On the 500 level west crosscut No. 2 was advanced 25 feet. The face is in vein porphyry. In the south drift are extracting ore from the old stopes. During the week hoisted 578 cars of ore, shipped to the Rock Point mill 503 tons and milled 490 tons. Average battery assays, $24 per ton. Shipped during the week $9216.14 in bullion.

ALTA.—The mine is looking well and the repairs to the mill are about completed.

CON. CAL. & VA.—Ore is being raised from all the levels between the 1400 and 1950. The usual shipments have been made to the river mills, and the average of the battery samples will be about the same as last week.

GOULD & CURRY.—The new upraise above the 490 level is entering into what is likely to prove a fertile formation.

BALTIMORE.—The south raise is still in good ore. The west crosscut on the 225 level is in very wet ground. Quartz carrying some metal is being obtained.

JUSTICE.—Mine yielding as usual, and mill kept running steadily.

UTAH.—Raise No. 2 above the main south drift on the 600 level continues to show quartz carrying metal.

OCCIDENTAL.—The north drift from the winze between the 550 and 650 levels is in quartz that is yielding some pay ore.

NORTH OCCIDENTAL.—Ore is being mined from the north drift on the 300 level.

SIERRA NEVADA.—The east drift on the 520 level continues wet, and is still in porphyry and clay.

UNION CON.—West crosscut No. 1 on the 1465 level is still in a wet formation consisting principally of porphyry and clay. This formation indicates the approach to fertile ground.

MEXICAN.—West crosscut No. 1 on the 1465 level is in a promising quartz and porphyry formation.

OPHIR. — The principal work in progress is in the shape of cleaning out and repairing.

BEST & BELCHER.—The southwest drift, 175 feet above the 625 level, is in quartz that carries some metal.

SCORPION.—Work is still confined to the east drift on the 520 level, joint with the Sierra Nevada.

OVERMAN.—Have extracted 1321 tons of ore. Shipped 1153 tons to the Vivian mill. Have run 397 feet of drifts and upraises from stope No. 3, the material being quartz and porphyry. Have repaired 104 feet of drifts on the 52 level above the track floor. This work was done to open up air connections with the Lambert incline.

CHOLLAR.—East crosscut 140 feet south of north line on the 550 level is out 21 feet; face in quartz giving low assays. The north lateral drift, 750 level, is out 265 feet; the face is in porphyry with streaks of quartz. The north lateral drift, 850 level, is out 343 feet; face in clay.

POTOSI.—The usual prospecting work is in progress. On the 950 level the south drift is being advanced into fertile ground.

EXCHEQUER.—On the 332 level east crosscut north incline is out 161 feet; face in clay and porphyry. No. 2 west crosscut, 150 feet south of north line, is out 16 feet; face in porphyry. North lateral drift, 500 level, is out 500 feet north of Alpha shaft; face in porphyry.

ALPHA.—About the same as Exchequer.

SILVER HILL.—On the 160 level the northwest drift is in quartz that shows well in gold.

ANDES.—West drift being pushed and a considerable amount of repair work in progress.

CROWN POINT.—The 300 east drift is out 46 feet, having advanced 10 feet during the week. The 500 raise is up 51 feet, the top in hard ground showing

a few small seams of quartz. Are opening twelfth floor in 400 south stope. No change to report elsewhere. Shipped to the mill during the week 567 tons of ore, the average battery sample of which was $24.77 per ton.

SEG. BELCHER.—The raise from the 1100 level is in quartz that gives good assays.

CONFIDENCE. — The joint Confidence-Challenge south drift on the 1250 level is in a distance of 20 feet, having been commenced during the week. The face shows a mixture of quartz and porphyry. During the week a great deal of necessary timbering has been done throughout the mine.

YELLOW JACKET.—About 100 tons of ore is sent daily to the Brunswick mill; average assay of battery samples, $30. Much exploring work is in progress.

BULLION.—Drifting north on the 760 level.

BELCHER.—The 1100 raise is up 70 feet, having been advanced 14 feet during the week. The top is in soft porphyry. The 1100 south drift has been advanced 50 feet, making its total length 190 feet. No change to report there. The 1100 south drift is out 68 feet, and the 1200 south drift 72 feet. Both in porphyry.

Columbus District.

THE COLUMBIA MINE.—Walker Lake *Bulletin*, June 5: S. P. Warren and G. H. Hill of New York, owners of the Columbia mine at Candelaria, arrived recently from the East. This is said to be a valuable property, and has a compartment shaft down 420 feet. These gentlemen have spent $125,000 on the property, which has been in litigation several years. The legal questions involved have all been settled, and work will be resumed early this month.

Eureka District.

MINERS IN LUCK.—Eureka *Sentinel*, June 10: A miner, who has had good luck and bad in the camp for a number of years past, tells us that two Italians who went to work in the Hugenot mine on Prospect mountain about a month ago, shipped a lot of ore to the furnaces and the returns amounted to over $500. Said he: "I have passed the place where that ore came from off and on for the last 12 years, but never thought there was any ore there."

Highland District.

PROSPECTING.—Eureka *Sentinel*, June 10: Interest is centering again on Highland mining district. For several years past not more than two prospectors have had courage enough to stay with their locations, but of late several outside parties have become interested in claims there, and some developments may be made this summer.

Pittsburg District.

THE MAYSVILLE MINE.—Virginia *Enterprise*, June 15: Chas. Rulison and George Likens have removed the Atlanta mill from Gold canyon to Pittsburg district, Lander county, where it is being erected for the reduction of ores from the Maysville mine, the property of W. S. Wilson of Reno. Mr. Wilson has been working his property for a few years. He has been sorting his ore and shipping the richest to San Francisco, Salt Lake and Denver, patronizing those mostly who did best by him. The best record of his shipments has been a gross return of $22,000 for one carload of ore. Mr. Wilson now has over 5000 tons of ore on his dump, which he considered of too low grade for shipment, but which is now brought within the line of profitable reduction by having a mill. George W. Likens has sampled the dump very carefully and thoroughly, and he estimates the net value of the dump at $40,000. The ledge of the Maysville mine is well defined for about a quarter of a mile, and averages four feet in width. It is silver-bearing ore and free-milling—easier to mill than Comstock ore, and there is fully $1,000,000 in sight. The Atlanta mill has two Huntington crushers—equal to 10 stamps. It is expected to be in running operation early in July. Mr. Chas. Rulison will run it.

Tuscarora District.

NAVAJO.—*Times-Review*, June 7: West crosscut from the end of the south drift, 350 foot level, extended 34 feet; total length, 76 feet. Crosscut from the south drift, No. 2, extended 16 feet. Rock in both crosscuts shows very favorable for ore.

BELLE ISLE.—North drift on the 250 foot level extended 12 feet. At the face of this drift a crosscut has been started west showing faces of ore. North drift on the 150 foot level extended 8 feet, in favorable looking porphyry.

NORTH BELLE ISLE.—A crosscut has been started west from the station on the 300 foot level. North drift on the 500 foot level extended 15 feet. The water has materially decreased. As soon as the drift is extended a short distance further, several crosscuts will be driven across the vein.

NORTH COMMONWEALTH.—East crosscut from the end of the south drift, 100 foot level, extended 16 feet; total length, 74 feet. The face is still in vein matter, showing some high-grade ore. The greatest width of ore cut during the week was four feet.

DEL MONTE.—East crosscut from the end of the north drift, 100 foot level, extended 14 feet; total length, 63 feet. The face continues to show some high-grade ore with no sign of wall as yet.

NEVADA QUEEN.—Winze from the 450 foot level sunk 8 feet; total 20 feet, and is just cutting into ore; average assay, $112 per ton. From present inclination of the ore will have to sink 8 feet farther to get the bottom of winze all into ore. Concentrating plant is running without change.

GRAND PRIZE.—The 400 foot level has been stulled, and stopes started for the extraction of milling ore, which is high grade and improving in size of vein as they are opened up. The engine for the concentrator has arrived and good progress has been made at the mill in the remodeling of it for a concentration plant.

COMMONWEALTH.—One hundred and fifty foot level: No. 9, north drift, has been extended 7 feet in porphyry. An upraise has been started from near the face of same drift, and is up 10 feet; this upraise is to give an outlet for the ore developed. No. 3 winze has been sunk 11 feet; total, 43 feet, developing a large body of fine ore. South drift, from bottom of east lateral winze, extended 8 feet; total, 53 feet, and will soon be connected with north drift from bottom of No. 1 winze. The ore is high grade the entire distance opened on this level. Three hundred foot level: South drift advanced 13 feet, without change. Stopes throughout the mine look as well as at any time. Have sent to the mill 235 tons of ore. Average assay, $118.35 per ton. Everything at the mine and mill running smoothly. Bullion shipped, $11,917.80.

ARIZONA.

BRADSHAW DISTRICT.—Prescott *Courier*, June 5: Chas. Quinn, Jacob Henkle and other miners of Bradshaw district, who are at present in Prescott, appear to be happy over prospects of the district. The Oro Bella and Crowned King mills, concentrators, etc., were being run successfully. Ledges of the district are of good size and rich in gold, silver and other metals. Owners of other veins were taking out shipping ore.

TIP TOP.—We have the usual good news from Tip Top district. Shipments of rich silver ore are every week made to the smelter at El Paso, Texas. Owners of the Boaz 20-stamp mill are going to add 20 more stamps and some concentrators. Mr. Listen says the mill at Del Pasco is running and doing well.

PECK.—P. Donlan is elated on account of the recent rich strike in the Occident, Peck district. The ore is worth thousands of dollars per ton. Farley of Humbug creek says miners are doing well there.

BIG BUG.—Wm. VanName of Big Bug district will shortly have a new mill in place of the one he lost by fire a short time ago.

WALKER.—Walker district miners keep right along developing their properties. Dixie Company people are building mill and mining. B. T. Riggs, who has been mining ever since 1849, accomplished quite a feat a few days ago. He sampled about 30 tons of Hillside mine ore, packed it into a railroad car and started it for Denver, Colo. He did this at Ross' place in Big Chino; tried to hire three tramps to assist him, but they were opposed to hard work. Senator teams are kept busy bringing in shipping ore from the mine. A rock-breaker and other large castings have just been forwarded to the Congress by its manager, F. M. Murphy. Rock-breaker weighed 8800 pounds. R. J. Holmes, who has passed the winter and spring months prospecting near Ehrenburg and Signal, says he saw in Plomoso mountains near Tyson's Wells a 1½-inch streak of gold rock in a vein that would pay $20,000 or more to the ton. It was being guarded by armed Mexicans. He also stated that he had heard that the McCrackin mine near Signal was recently purchased by a company.

SEVENTY-FIVE THOUSAND GALLONS A DAY.—Mohave *Miner*, June 8: Last evening at 5 o'clock as the workmen at the Sterling silver-mill were taking out the diamond drill to extract the core, a flow of water followed which averages over 75,000 gallons per 24 hours. The size of the hole is 1⅞ inches, but the pressure has not yet been gauged. Superintendent Fisher feels very exuberant and will now make all haste to start the mill. The flow of water comes from a point 85 feet south of the bottom of the well, which is 57 feet deep and is very clear and cool and good for drinking purposes. The pump will be kept going until the drill has been hoisted from the well. The Ground Hog, Vizini and other mines of the company will be started up in a short time, and the drill, which has made such a splendid success, will be used in these mines to prospect with. Should this latter prove a success, this camp will soon be in a far better condition than in its best days. Holes will be sunk thickly on the hillsides and in the valleys, and an abundance of water and large bodies of ore will be discovered with little labor and small expense. The fact of striking a 75,000-gallon flow of pure water in this city means volumes to southeastern Arizona. It demonstrates that water can be found almost anywhere in the granite formation in sufficient quantity for agricultural and stock-raising purposes.

COLORADO.

BULLION KING.—Elk Mountain *Pilot*, June 6: The Bullion King is doing well as regards the production of the precious metals, and as depth is gained, more bodies of ore are exposed. There is considerable first-class ore on hand and several hundred tons of concentrating ore that is awaiting shipment as soon as the roads will permit. They are almost free from snow at this writing, and they will soon dig up and then we look for more life and activity around the King mine. Roat and Corbett have shipped a car of first-class ore to Denver from their lease. They also have considerable concentrating ore on hand. Nelse Bergh is sorting up the ore from the Little Crown that was taken out during the winter. The Metzler concentrator is started on its season's run. No new developments about the Sylvanite mine, we are sorry to say.

ORE.—Idaho Springs *News*, June 11: Jas. F. Mathews & Co. handled for the month of May, 1,220,000 pounds of ore carrying 18,210 ounces silver, 780 ounces gold, 45,000 pounds lead and 4800 pounds copper. The Idaho Custom Mill is operating the Grover Cleveland lode at the head of Virginia canyon. The vein of mill dirt is four feet in width and runs four ounces gold to the cord. David Kennedy had ten tons of ore from his Adriadne mine treated at the Idaho Custom Mill this week. The lot yielded ten ounces of gold on the plates, and tailings worth $220 per ton. The Oneida sampled 44 tons of concentrates and 12 tons of crude ore sampled at Mathews & Co.'s last Monday. Levels have been started east and west at a depth of 90 feet in the shaft. The mineral is in fair quantities and prospects are good.

DAKOTA.

UNCLE SAM BULLION.—Deadwood *Pioneer*, June 5: Supt. J. A. Harding came in from the Sam yesterday afternoon with the bullion cleanup for the last half of May. Its approximate value was $7800, or nearly as much as that brought over on the 16th of last month, and representing a 20 days' run. That brought in yesterday was the result of operations for only 15 days, and the amount should be extremely gratifying to stockholders, as it brings the product for May nearly, if not quite, up to $16,000. This is more than sufficient to pay all operating expenses, including a large amount of dead-work in the mine for the last two months, and to leave a neat surplus besides. It is probable that before final cleanup for June, 10 and perhaps 20 more stamps will be dropping, while it is anticipated all the 60 at the mill will be employed by the middle of July. The quality of the ore is established, and as a monthly output of $16,000 can be produced with 30 stamps, the product from 60 will not be less than $32,000. As operating expenses are comparatively light, good dividends can be reasonably expected from such an output.

KEYSTONE CHLORINATION WORKS.—The works have now been in operation two days, and are giving entire satisfaction. Roasters work to a charm, the cost per ton for roasting being now estimated at only $2. This will materially reduce cost for treatment. The works are now treating about 12 tons per day. A fair estimate of the percentage of the assay value of the ore saved by the process can probably be made this evening. First cleanup takes place on the 15th.

BRITISH COLUMBIA.

THE PORCUPINE CREEK PLACERS.—Donald *Truth*, June 7: Every company that worked on Porcupine last season will be on hand and at work on their claims next Monday. The Discovery and Elsie companies will probably be sluicing before a week is over, the others, being in deep ground, will begin sinking shafts to bedrock. Porcupine creek will make a record this season, one way or other.

IDAHO.

MORE RICH MINES.—*Statesman*, June 5: Mr. J. C. Brown, just down from the Boise Basin, brings the cheering intelligence of two very rich discoveries recently made by the persevering prospectors in that section. One of these is a large lode of gold-bearing quartz, with a parallel vein of rich galena ore. This lode is situated a short distance above Centerville in the hills bordering a ravine coming into Grimes' creek from the west. The walls of the lode are well defined and inclosed in granite. The other lode was found in the range of hills between Idaho City and Centerville, near the line of the old Channel ditch. This lode is very wide, and has been traced for a distance of 4500 feet along and near the crest of the hills. The vein matter of the lode is a friable porphyritic mass filled with detached pieces of quartz so rich in gold that it does not seem safe to give here the estimated value per ton. Every day's work done by the prospectors in the Basin is producing new evidence that the wealth of that mineral region has never yet been half revealed. The want of water to work the placer mines this season and last, while very much deplored, proves far from being an unmixed evil, since it has brought an era of quartz prospecting which will not stop until the world will be startled by the rich finds that will be made.

BANNER.—Idaho *World*, June 7: The ore taken from the Banner mine last winter having all been crushed, a cleanup is being made. Twenty tons of ore taken out by the lessees yielded $10,300, an average of $515 per ton. In a little less than one month over $90,000 has been produced. Such a record is enough to create a boom for Boise county.

THE ELKHORN.—The Elkhorn is employing only two men at present, but Hugh Turner informed us yesterday that a force would be put on in two or three days, when the mill will resume crushing.

YANKEE FORK.—Frank Simpson writes that the Yankee Fork country is pretty dull, owing to the temporary closing down of the Custer mill.

LOWER CALIFORNIA.

THE MINES BOOMING.—National City *Record*, June 6: Private letters received in this city from Mexican gulch and the Alamo all go to prove that the *Record's* prediction as to the stability and richness of the Santa Clara mines was correct. There is one five-stamp mill in operation and a ten-stamp mill is being set up, with others going to the ground. A sawmill is also to be erected in the timberlands near the mines. This has been a necessity from the start. Lumber has been badly needed for building purposes, and now timbers for shafts and drifts are a necessity. The expense of freighting lumber and timbers is something appalling, and with mills within a few miles of the camp, much money will be saved. The most sanguine of the Santa Clara miners are astonished by the richness of the mines developed. The richness has not cropped out in a few isolated places, but it has been found everywhere in the district. It is the richest country in gold quartz ever known. But gold is not the only mineral carried in the belt. Galena ore carrying silver in paying quantities has been found, and there is every indication that rich deposits of carbonates and chlorides of silver will be found. The camp to-day contains 2000 inhabitants, the population having increased 500 within five weeks. The place is self-supporting so far as living expenses are concerned, and yet all the gold taken out has been from the placers. The actual output of the district has not commenced, as the work done on the quartz leads has been to meet the requirements of the government and to develop the properties as much as possible. But it has been demonstrated that when the taking out of ore is commenced in earnest, the output will amount to many thousands every month. Every day outfits bound to the mines pass through National City or go down by steamer. The rush is increasing, not diminishing. At the National City Reduction Works, of which extended mention will be made next week, preparations are being made for the handling of the mineral that is beginning to come this way.

ALAMO.—Cor. San Diego *Union*, June 8: Alamo is what I call a really fine mining camp, with a population of from 1000 to 1500 people. The placers in Mexican gulch and Alamo do not amount to much now, although they are taking out a good deal of gold every week. The old gentleman with whom I am camping, and who runs a store, manages to get in a pound or two of gold every week regularly. Alamo has 52 liquor licenses out. Gambling is not allowed under any circumstances, and, mind you, the law is enforced to the letter. The boys have paid heavily for trying to run games, but have finally given it up as a bad job. Mr. Butler has a five-stamp mill running, and Heise & Co. of San Bernardino have a 10-stamp mill, which will be in a few days. Several other parties are after mills, and the prospect looks good for a permanent camp, although but little work has been done up to the present time. I think it will be safe to say that there is nothing down over 30 feet. In the Texas mine, at 20 feet, the rock is literally hung together by golden threads. There is in all about 125 ledges denounced, and if 25 turn out good, that is all that is required to make this a bonanza camp. Capital comes creeping in slowly, owing to reasons best known to Americans. The great cause is apprehension and fear, but as soon as they commence shipping bullion, as they undoubtedly will, things will boom as they have never boomed before, and substantially, too.

MONTANA.

TWIN MOUNTAIN.—Cor. Butte *Miner*, June 8: The camp is at the head of Minnesota gulch, a tributary of German gulch, and also the headwaters of Jerry creek and American gulch, the waters of the two flowing into the Big Hole, and distant from Butte 22 miles, and three from Dr. Beal's camp on German. The district is, so far as mineral locations now found, six miles by three. The country rock is lime, cut by porphyry dikes, and in some places covered with granite. The main developments, as yet, are by the American Gulch Stock Co. They are down 118 feet, have a whim, and are sinking with good ore. The Edwards Carbonate, owned by Edwards, Fletcher & Co., has a tunnel in 320 feet, and shafts, winzes and drifts to the amount of 600 feet. They have a fine body of ore and several carloads of shipping ore, and are packing out. The ore averages 63 ozs. silver and 46 per cent lead. The ore of the camp is lead and silver, with plenty of iron for fluxing, and is easily treated. It also carries from $1 to $3 in gold. The camp is not yet quite one year old, it still lacking nine days to make it a year from the day when old man Edwards and Joe Fletcher stumbled upon it in their search for the source of some exceedingly rich float which Edwards found 23 years ago. They located the Carbonate, the first claim staked off in the camp. Last fall they shipped 20 tons of ore, and it was that shipment which gave the camp its first start. Since then much development work has been done, and the showing now made by the camp, yet in its infancy, is far above the average, and demonstrates that all of the Butte cities have not yet been discovered. Twenty-five men wintered in the camp, the altitude of which is 9000 feet at its highest point, namely, Edwards' Carbonate.

NEW MEXICO.

WORK RESUMED.—Silver City *Enterprise*, June 7: Work has been resumed on the Silver Reef and Arthone mines at Lone Mountain, under the management of Antone Schwere, of St. Louis. The work on the Pacific and Aztec mills, above town, is being pushed as rapidly as possible. The mortgage on the Solid Silver mine will be foreclosed at this term of court. A new company will probably be organized and operations resumed. The recent shipments by Bragaw & Schlosser from the McNulty, of Georgetown, averaged 181 ounces per ton. The mine is now making money. E. G. Payne came in from East Camp Tuesday. He brought in a silver brick, the result of an eight days' run. Both the mine and mill are now doing nicely. A run of 10 tons of ore was recently made at the Telegraph mill, by the present leasers, which averaged 29 ounces. The recent strike in the Mountain View mine presages a new era of prosperity for the Pinos Altos district, and conclusively demonstrates that that which hitherto has been considered a mere pocket is a strong continuous vein of ore, extending the entire length of the shaft, besides improving in quantity and quality as depth is gained. The ore, besides carrying coarse native gold, contains tellurium, and by some it is thought that the rare gold-bearing mineral, ripidolite, is also associated with the ore. An average of the richest part of the vein gave in gold $1310, and silver $300, per ton, while an average of crevice material, principally quartz and talc, yielded at the rate of $95 per ton in gold and silver. The strike has caused quite a ripple of excitement in the camp.

UTAH.

PARK NOTES. — *Record*, June 8: The Alliance Mining Co. is arranging for the equipment of the old Sampson hoisting works with new and more powerful machinery so that developments can be pursued with greater advantage. A few men are now at work at the mine getting things in shape for a larger production of ore this season, and the plan is to extract and ship sufficient ore from the upper levels to pay operating expenses while the 4800-foot drain tunnel, to tap the mine at a depth of 1500 feet, is being driven. The Alliance will distinguish itself this season as one of the Park's heavy producers of ore.

THE DISAPPOINTMENT STRIKE.—The first of the week an important lead was struck in the Disappointment property, situated up Thayne's canyon on the west side opposite the Crescent. The air in the lower tunnel, which is in a distance of 470 feet, got quite bad and a tunnel higher up the hill was started. When in about 25 feet a fine-looking ledge three feet in width was encountered, and crosscutting was at once begun. The pay streak is about a foot wide and carries ore that will assay well in silver and lead. The find was made at a point about 15 feet under the surface, but the ore looks unusually well.

THE CONCENTRATOR ABOUT READY.—The new Union concentrator up Empire canyon is rapidly nearing completion and it is confidently expected that it will be started up on the 20th inst. It will do custom work, commencing on the Woodside leasers' second-class ore, of which there is on the dump and otherwise available about 10,000 tons, worth all of $15 a ton. The capacity of the concentrator is 100 tons daily, and it will not be surprising if it has to be increased to double the capacity before winter approaches.

WASHINGTON TERRITORY.

PLACER MINING.—Cor. Tacoma *Globe*, June 5: It may not be generally known that placer mining is carried on with success near Ellensburg. But such is a fact. Between here and North Yakima 25 Chinamen are constantly engaged in washing out gold in the Yakima river in primitive style. A pan is all that is used. The parties in search of the yellow dust are not new to the business, or to their present field of operations. It is not likely they would long remain in this quest without a reasonable find. You ask John how much he is making and he is dumb as an oyster.

MECHANICAL PROGRESS.

Fly-Wheels and Steel Tubes Made From Steel Wire.

MM. Mannesmann, of Remscheid, Westphalia, have been led to attempt the manufacture of fly-wheels capable of double and even treble the speed of fly-wheels made of cast iron, the resistance of which is generally limited to a speed of 40 meters for the rim of the wheel. If this speed is exceeded, there is a risk of the fly-wheel breaking to pieces under the action of the centrifugal force. They have succeeded in obtaining fly-wheels which are capable of acquiring three times the speed of ordinary fly-wheels, by constructing the nave and the spokes of iron or steel, and making a rim entirely of steel wire wound round and round itself a great many times. Thanks to these fly-wheels, to immense reheating furnaces for the steel plates, and to a somewhat complicated but very perfect apparatus, they have succeeded in obtaining surprising results, especially with long truss-girders and steel pipes of extremely remarkable perfection. They can thus manufacture pieces of exceptional length —up to 10 meters or more, which are made of steel, the proportion of carbon of which is arranged beforehand. The process is especially useful for manufacturing tubes of all diameters and thicknesses capable of sustaining a pressure of 100 atmospheres, and which are only about a quarter of the thickness of cast-iron tubes.

We may consider only the manufacture of tubes and compare them with the cast-iron tubes, the average resistance of which but little surpasses 15 or 20 atmospheres, and which are manufactured in enormous quantities in the English and especially in the Scotch foundries. MM. Mannesmann can supply tubes of steel of the same thickness capable of sustaining a much higher degree of pressure than those of cast iron, and the price of which can be reduced to the price of cast-iron tubes of the same diameter.

As far back as 1856, M. Reuleaux, when he was professor of mechanics at Zurich, was persuaded that the proposition made in 1852 to the Sardinian Government by M. Colladon, to pierce the tunnels by compressed air circulating in long pipes of cast iron, would be the best method of transmitting force to a distance. M. Reuleaux saw steel pipes in England capable of resisting much greater pressure, and which, being much lighter than those of cast iron, may be obtained at the same price.

According to experiments made at St. Gothard with tubes of cast iron 0 20 meter in diameter and 4600 meters long (which experiments were published by M. E. Stockalper), when the pressure was 5 atmospheres 60 at the entrance of the tunnel, it was 5 atmospheres 24 when it was measured 4600 meters beyond. The loss of pressure was only from 1-15th to 1-16th. The cooling may be avoided by a little tepid water mixed with the air. This was the result obtained with pipes of cast iron, but with pipes of steel manufactured according to the process of MM. Mannesmann, it is possible for the same price to transmit a much higher degree of power by employing tubes of steel of the same diameter and furnishing compressed air at 50 atmospheres or more of useful pressure. The machines will be much less costly, as they will be greatly reduced in dimensions.

A company has been recently formed in England for working with a conduit of 11 kilometers in length, and which will use MM. Mannesmann's steel tubes. This company proposes to transmit power with pressure of from 40 to 60 atmospheres, at the same time diminishing the cost of receivers for their customers. M Colladon, who is the author of the article which we have summarized from the *Bulletin de la Societe des Ingenieurs*, adds that air may be produced almost without heating by means of a small quantity of water injected into the compressors by a small injection pipe.—*La Semaine Industrielle.*

NEW TESTS FOR CAST IRON.—The advisability of ascertaining the precise nature of the various qualities of cast iron has caused the "Keep" tests for that metal to be largely adopted. The old practice in specifying the quality of cast iron was content with describing the mixture of the pig, the physical character of the product, and breaking strength. The tests now in question, however, according to the *Mechanical World*, furnish more precise indications of the quality of cast iron. In carrying them out a sample of the metal weighing 15 pounds is melted in a plumbago crucible set in a brass furnace, and from this three steel test bars run. One bar is one-half inch square, and is cast with both ends against chills 12½ inches apart. Another bar, also run between end chills, is one-half inch wide and 0.1 inch thick. When the bars are cooled, so that they and the chills are of the same temperature, the shrinkage is measured by inserting a taper gauge between the end of each bar and the chill. A third bar is run to test the fluidity; the mold being 12 inches long, 1 inch wide, and 0.06 thick. This is run from one end, and is poured first; but the strip rarely runs full to the end, and its length is taken as the index of the fluidity of the metal. The fourth bar is called the "crooked strip," and is 12 inches long, 1 inch wide, and 0.086 inch thick. On the center of one side is a rib 0.412 in. high, 0.2 in. wide at the base, and 0.1 in. wide at top. The unequal shrinkage of the thin flat strip of the taper rib causes a slight curve in the bar, and the measurement of this is called the "crook." The square bar is tested for transverse strength by means of a gradually applied weight, the deflection being measured at the same time. The second rectangular bar is tested for resistance to impact; the test being the fall of a 25-pound hammer, at first with a fall of one-half inch, increasing by one-eighth of an inch until the bar breaks.

HOW DOES IRON SOLIDIFY?—At a recent meeting of the New York Railroad Club, Mr. Whitney, a prominent car-wheel maker, stated that iron in solidifying acts like water and expands. Mr. Thomas D. West, who is considered authority on such matters, being consulted regarding the matter, replies as follows: "In answer to your question, Does molten iron expand at the moment of solidification? I would say that practically I have never seen it demonstrated. It may be that the molecules of the metal will expand at the moment of solidification; but, taking the body of the casting as a whole, there is no such state existing as 'moment of solidification,' and practically cannot be seen or shown as it can with ice. With molten or liquid iron cooling, two elements of action exist. The first takes place during the cooling of the molten metal to a solid state, and the second from the solidification point to that of its lowest point of temperature or coolness. When molten iron is permitted by form of casting and the mold to have a natural action, it will, from the moment the mold is filled or poured till it has reached as a casting its lowest point of temperature, be all the time constantly shrinking and contracting, so as to occupy less space. Liquid metal while cooling to a solid state requires on an average one pound of metal to every 100 pounds to supply its shrinkage or prevent space existing within its body, and its contraction from the solidification point to its lowest temperature will vary from one-sixteenth inch to one-eighth inch per foot. I know that some advocate that molten iron, like ice, expands at the moment of solidification, but I have failed to see it proved, and for one would be pleased to see such elements demonstrated or proven to exist."

THAT CAST-STEEL GUN, the trial and failure of which we noticed in these columns some weeks ago, has not been lost sight of. The revolution which it would introduce in the manufacture of heavy guns is too large and important a prize to be abandoned at the first trial. It is worth many trials at large costs. The bore of the gun has been regauged, bringing to light some slight defects that were not discovered on the first examination. The result of this examination has been laid before the Secretary of the Navy, and if acted upon might lead to a rejection of the gun. The Standard Steel Casting Company, by whom the gun was made, however, claim that the gun stood the test prescribed by law, and that it should be accepted and paid for. They have signified their willingness to have the gun subjected to another trial more severe than the first.

AN UNDULATING PUDDLING FURNACE.—A Pittsburg iron-worker named Anthony Barker is the inventor of what he terms an undulating puddling furnace. As its name implies, the furnace is so constructed that an undulating motion is given to the iron during the process of boiling. When a heat is to be "balled," the bottom of the new furnace adjusts itself automatically, and the process from that out differs but little from the present method of puddling. The inventor claims that the first cost will only be a little over that of the old style, while it will turn out at least double the weight of iron with one more man. A company has been formed to manufacture and introduce the furnace, one of which is nearly in readiness for a free trial at the works of H. Lloyd & Son, Pittsburg, Pa.

CHEAP IRON.—The Ironton (Ohio) *Register* says that a party in Virginia, near Clifton Forge, offers to lease for 50 years 20 acres of land on which to build a furnace, and agrees to furnish said furnace all the ore it can use at $2 to the ton of iron. That seems to be a marvelous proposition, and yet we are assured it is a fact. Pocahontas coke can be delivered there at $2.40 a ton. A ton and a half of this to the ton of iron will make $3.60 for fuel, making the cost of ore and coke at $5 60 to the ton of iron. This will bring the cost of making metal less than $9 a ton, and will beat the best record of any Southern furnace if there is nothing uncertain in the $2 part of it.

STEEL BOATS FOR SHIPS.—A new development in metallurgical work is about to be established at Leeds. Machinery has been patented for the purpose of constructing ships' boats out of single plates of steel. The boats thus produced will be of various dimensions. It is obvious that there must be great economy in this mode of manufacturing boats in assorted sizes like so many pots or kettles.

HOLLOW STEEL INGOTS.—In Sweden, hollow steel ingots are being made by casting steel to molds hung on trunnions, allowing the sides in chill to required thickness and pouring out the steel still liquid in the center. These hollow ingots go to England, where they are drawn out cold into tubing.

SCIENTIFIC PROGRESS.

The Mechanical Features of Dust Explosions.

It is only quite recently that public attention has been called to the danger attending the presence of large quantities of dry floating dust, as is always especially observable in the atmosphere of flour-mills. Such explosions as have occurred at the great flouring-mill at Minneapolis, at a large candy factory in another Western city, and numerous lesser accidents, have, of late, quite familiarized the public mind with the possibility of the great catastrophes which, under certain conditions, may happen from the contact of such accumulations of dust with flame. That a force, comparable in its effects with gunpowder, may thus be suddenly developed, is now well known, and very naturally the scientific mind of the country has been studying carefully the philosophy of this new source of danger. An Eastern journal, which we see mentioned merely as "the *Monitor*," philosophizes upon the matter as follows:

If fire comes in contact with powder, dynamite, or any other ordinary explosive, the result is certain and instantaneous. An atmosphere of dust, on the contrary, may for years be in contact with a flame. That without any apparent change in its character, it should suddenly explode after so long demonstrating its harmless qualities, seems incredible.

The enigma would be less perplexing if the mechanical properties of matter were more generally understood. The latest advances in scientific investigation prove more and more conclusively that mechanical modifications are at the bottom of all the varied forms and properties of matter; that we are, in fact, dealing with a substance whose essence is the same, whether it be gold or iron or earth or water, or any other material with which we are acquainted—that it is the building up of the atoms, their mechanical structure, which determines to which of the great classes of metals or minerals the substance shall belong. The same atoms may be gunpowder, or they may be clay; they may be water or air or lead, according to their mechanical arrangement. Chemistry in its last analysis would seem to be nothing more than the laws and principles of the mechanical arrangement of atomic quantities.

When this truth is recognized it is easier to understand how a dust-laden atmosphere may suddenly develop the most dangerous properties after years of apparent harmlessness. That dust will burn in the presence of flame and air, and that the product will be a gas much greater in volume, all will admit who have ever tossed a handful of flour dust on the fire. But the conditions under which a dust-laden atmosphere will burn are so peculiar that, experimentally, they rarely occur. Every boy who has kindled a bonfire knows how much his success will depend upon the arrangement of the sticks and the strength of the fire already started. Until sufficient volume of flame is secured, each stick must be carefully adjusted to support the slow combustion of its fellows. But once under full headway, he may toss his sticks as he pleases, and they are instantly licked in the embrace of the roaring fire.

Somewhat after the same fashion we may regard the flour dust. Until the distribution of the particles has reached a point where they will sustain each other in creating a volume of flame, no explosion will occur. The individual particles in contact with a lamp or candle may be insensibly consumed, while their fellows float harmlessly around them. But once the precise conditions are present, the flame, with ever-increasing energy, shoots through the mass and the explosion follows. Fortunately, the conditions favorable to such a disaster are so rare that skepticism still prevails.

THE LESSONS OF THE ROCKS.—The geological history of the world develops strange facts. Geological history, says Archibald Beikie, brings before us many facts well calculated to impress our minds with the great antiquity of our planet, and with the[marvelous changes by which the present order of things has been brought about. We learn from it that the mountains and valleys have not come suddenly into existence, as we now see them, but have been formed gradually by a long series of processes similar to those which are now slowly doing the same kind of work. We discover that every part of the land under our feet can yield up its story, if we only know how to question it. And strangest of all, we find that the races of plants and animals which now tenant land and sea are not the first or original races, but that they were preceded by others and these again by others still more remote. We see that there has been upon the earth a history of living things as well as of dead matter. At the beginning of this wonderful history we detect traces of merely lowly forms. At the end we are brought face to face with man, thinking, working, restless man, battling steadily with the powers of nature, overcoming them one by one by learning how to obey the laws which direct them.

THE MOST PERFECT PENDULUM.—What is supposed to be the most perfectly acting pendulum, especially in respect to simplicity, is in operation at the University of Glasgow, Scotland. According to this plan, a small shot of about 1.16 of an inch in diameter is suspended by a single silk fiber (half a cocoon fiber) two feet long in a glass tube of three-fourths inch internal diameter, exhausting the latter to about one-tenth of a millionth of an atmosphere. Starting with a vibrational range of one-fourth inch on each side of its middle portion, the vibrations can be easily counted after a lapse of as many as 14 hours, a fact not realized elsewhere.

RAPID GROWTH OF CORAL ISLANDS.—The growth of coral islands under a tropical sun is exceedingly rapid. A remarkable instance of this kind is reported by Capt. Delap of the American ship Yorktown, which touched at Boston Island in March last, while bound from Philadelphia to Hiogo, Japan. The Yorktown has just arrived at Sandy Hook, with a large cargo of general merchandise, and Capt. Delap made close and careful observation, not only of the island, but of the natives also. The first visit to the island was made by Capt. Duperry, a Boston explorer, in 1824. He named the island after his native city. While there he made an accurate survey of the island as well as the outlying reefs, over which the sea made a clean breach at times. The largest island was without vegetation or life, and has been so marked on all navigators' charts. When the Yorktown approached the islands the vessel was hove to, and in a short time was surrounded by copper-colored natives of a friendly disposition, who brought with them such fruit as was common to the islands. Instead of reefs, as had been seen by Capt. Duperry, there were 13 islands surrounding a salt-water lagoon, densely covered with vegetation, and all inhabited. The group was called Ebon Island, and was three miles long, having grown at least a mile in half a century. Three Germans were reported to have recently arrived there from New Zealand. With the exception of the latter visitors, who were probably shipwrecked sailors, and Capt. Delap, no white men are known to have visited those islands since they were first discovered.—*Philadelphia Record.*

THE NEW ACADEMY OF SCIENCES BUILDING, on Market street, is beginning to show itself above the street level. It will be an appropriate and elegant home, covering a lot with 80 feet frontage on Market street by 195 feet deep. The edifice will cost $160,000, and is being erected on a lot given to the academy before the death of that eminent philanthropist, James Lick. The money to build it with and maintain the association as an active worker in the domain of science is also derived from the residuary fund which has been accumulated under Mr. Lick's will. The structure will be an ornament to the city and a palatial monument to science, placed directly in what will soon become the business center of our great and growing city. A cotemporary has very properly said: Captious critics have raised objections to the site of the new building. It has been said that a purely scientific institution could carry on its researches just as well in a back street as on the chief thoroughfare of the city, and that had it located its new home on a spot where land was worth $300 a front foot instead of building on land which was worth $3000 a foot, it would have had more money to devote to the cause for which it was established. There is, however, this to be said in favor of the location on Market street: that portion of the building not required for the Academy of Sciences will always bring in a good rent, and if at a future date the academy should find itself in possession of a surplus of funds, it may still be able to erect another building for its own use.

DISCOVERY IN TELESCOPE LENSES.—Prof. C. S. Hastings of the Sheffield Scientific School, who has been experimenting for some time past to find a combination of glasses which would correct chromatic aberration, has recently succeeded in combining two glasses, the composition of which is a secret, so that the aberration has been reduced to one-twentieth of what it is in the old telescope. It is said that a telescope made on the principle which Prof. Hastings has discovered will be from 10 to 30 per cent more powerful than one of equal size on the old principle. This is the first time chromatic aberration has been corrected by means of only two glass lenses. This telescope, it is claimed, is about as near perfection as any telescope can ever be made, though theoretically the aberration is not entirely corrected, yet the best eye cannot possibly detect it.

A NEW ASTEROID.—The director of the Lick Observatory has been notified of the discovery at Nice, France, on the 29th ult., of an asteroid at 4h. 32m. Washington time. Its position was right ascension 14h. 21m. 7s., and its declination south 14° 22′ 32″.

WIND PRESSURES.—It is said if a hollow hemisphere is turned first with its concave and then with its convex surface toward the wind, the pressure sustained will be respectively 1.94 and 0 77 times as much as on a plane surface of equal projection.

A NEW COLOR to stain wood is a rich violet, and the stain is thus made: The wood is heated with a bath of 4½ ounces of olive oil, same of soda ash, and 2½ pints of boiling water. It is then dyed with magenta.

A NEW COMPOUND, containing aluminium in a lower state of oxidation, corresponding to ferrous iron, has been obtained.

GOOD HEALTH.

Health and Morals.

A writer in the Providence *Journal* makes the following remarks, among others, on the causes of vice and crime:

The relation of physical disease to immorality and crime is doubtless difficult to trace, but it is clear that in large degree it is that of cause and effect. We know that irritability, petulance, and many other forms of ill temper are directly due to nervous disorders, and they increase in direct proportion to the increase of their cause; perhaps it can be shown also that anger, hatred, avarice, lust, and most if not all other species of immorality are due to physical defects. It is clear that the latter stages of intemperance, resulting in debauchery that at first would have been inconceivable to the unfortunate victim, are the result of diseased conditions of body gradually produced by indulgence; perhaps it is also true that there is a subtile connection between the earlier symptoms of a love for strong drink and inherited physical conditions. * * * Doubtless it will be said that man's power of will and sense of right are strong enough to control evil tendencies, and that guilt lies in not so controlling them. But the only proof of strength lies in its use. If a man does not use it, the presumption is that it does not lie in his nature to use it; that is, he does not really possess it.

Whether all this is true or not, it is certain that it is largely true. Our physical diseases are the cause of much of our immoralities and crimes. We are not likely to be much different from what we are at present until we change our wrong methods of living and regain our lost physical health. The real sin of man lies in neglect of the laws of health, which, disobeyed, force him into a course of action which is immoral and disastrous and compel him to travel therein at an ever-accelerating rate. What we need is a physician, if one could be found, who has skill enough to discover the ancestral taints and weaknesses of our bodies, which cloud our mind, dwarf our moral sense, weaken our will and cause our sins.

So far the *Journal*. Now while the foregoing is true to some extent, it is quite as certain that an awakened consciousness of man's essentially spiritual nature and moral powers has enabled many who had been deemed "hopeless cases" to rise up out of diseased and depraved conditions into the health, mental and physical, which is Humanity's true estate.

Without undervaluing the importance of learning and obeying the "laws of health," we must insist that a cheerful courage and a hopeful trust are the most potent medicines, while doubt and fear are depressing and killing. Although a locomotive jumps the track sometimes, with fatal consequences, it must still be borne in mind that the engineer plans and builds the engine in the first place, and often puts it in repair—the engine never creates nor medicates the engineer! An understanding of this truth lies at the root of the marvelous cures effected by "metaphysical" treatment and "Christian science." Man *is* a soul and *has* a body.

COCOANUT FOR TAPEWORMS.—In this country, remarks an exchange, comparatively few people harbor that troublesome parasite the tapeworm. Americans are no lovers of raw meats—the common source of infection. There are a number of drugs held to possess qualities destructive to tapeworms, but most of them have been proved unreliable. Recently attention has been called to cocoanuts as a vermifuge. Prof. Paresi of Athens, when he was in Abyssinia, happened to discover that ordinary cocoanut possesses vermifuge qualities in a high degree. He took, one day, a quantity of the juice and pulp, and shortly afterward felt some gastric disturbance, which, however, passed off in a few hours. Subsequently he had diarrhea, and was surprised to find that there had been expelled a complete tapeworm, head and all, quite dead. After returning to Athens he made a number of observations which were most satisfactory, the tapeworm being always passed and quite dead. He orders the milk and pulp of one cocoanut to be taken early in the morning fasting, no purgative or confinement to the house being required. A correspondent writes to the *Pharmaceutical Journal* that the cocoanut has been used as a vermifuge in India for probably 40 generations by the beef-eaters of the country, and is so well known there as a means of expelling the flat worm that he cannot conceive how information of the fact has not reached England before. When properly prepared and intelligently administered, he says it is equally efficacious with male fern, kousso, pomegranate root, turpentine, etc., while it is as pleasant for the palate as they are offensive.

MEDICAL SCIENCE.—The greatest advance in the medical science of our generation is the clearer and more general recognition that the power of medicine to cure diseases is extremely limited; in other words, that the aim of the enlightened physician should be prevention rather than cure. The sanitary science has accomplished wonders, but only as the handmaid of medicine. The discoveries of the past two centuries have taught sanitary reformers where and how to work. It is the unselfish lot of mankind and a generous sense of duty that have stimulated many of those researches that are now bearing such golden fruit, and which, while limiting the work of the doctor and curtailing his income, make life longer and pleasanter.—*Edinburgh Review*.

LITTLE ONES IN SPECTACLES.—A writer in the Boston *Herald* says that the very general and growing prevalence of near sight is largely due to carelessness with children. The number of children who wear spectacles has become a serious subject of remark. That a radical wrong exists somewhere, when children only four years of age are thus hampered for life, is only too palpable, but whose the blame, and what the remedy for this evidently increasing affliction? Are future generations to be *sans* eyes as well as *sans* teeth? The defects in vision necessitating spectacles are inherited, or infants scarcely able to read would not be hurried to opticians and fitted to glasses that must bother them while they live. Oculists give many sensible reasons for this weakness of the optic nerves. But no one impresses the necessity of care in the management of eyes until the damage is done, and then it is too late. Young mothers who cover the baby's face with a veil, or who wear spotted lace against their own eyes, and who allow their children to read by insufficient light, are laying up trouble for themselves, though oculist and optician will be better off for their criminal ignorance. As to the schoolrooms, where children spend so many hours of the day, do parents ever ask or know how they are lighted, and whether the scholars face windows, and whether they are obliged to strain their eyes by blackboard exercises in half lights? A little precaution in the use of the eyes, and some knowledge on the subject of improper lighting, would be a pound of cure in this matter of spectacles.

LIQUIDS MAKE FAT.—Liquids make fat. There is no doubt of this in my mind, says a writer, though I am fully cognizant of the fact that a good many people will deny it. The character of the liquids has a good deal to do with it, but the practice of drinking invariably leads to unwieldly bulk. In Spain, where men drink little, a fat man is unknown. In Paris, where men content themselves with sipping thimblefuls of absinthe or small cups of black coffee, the French are thin to a remarkable degree. The women, on the other hand, drink great quantities of champagne, Burgundy and latterly beer, and they are as a result prone to stoutness. In England men drink ale and beer, and they are a thick-necked, pudgy and heavy race as a rule. I had observed all this many times, and when I went to Germany, where I knew the consumption of beer was very great, I had prepared to find fat men in abundance. I was not disappointed. There would seem to be absolutely no end of big, corpulent and unwieldy men in Germany. While in the army they are slim and splendid-looking warriors, but two months after they leave the ranks they become heavy, puffy and beefy to the last degree. This is even so in the ranks among the other soldiers, and the cavalry were men of such extraordinary weight that they always excited comment from strangers.

USEFUL INFORMATION.

SAND DRIFTS.—The ocean beach back of San Francisco is not the only place in the world where drifting sands impede the progress of improvements. Dry, loose sand, wherever it occurs, is constantly being shifted by the wind, and often buries cultivated lands, buildings and forests. On the shores of Lake Michigan are drifts 100 feet deep, and those of Cornwall reach 300 feet in depth, while the drifts of the Gobi desert are 40 miles long and 900 feet high in places. On the shores of the Bay of Biscay the drifting sand travels inland 16 feet a year; in parts of Denmark, 24 feet; and in southern India, 17 yards. In some places walls and barriers of vegetation have been created to stop the destroying drifts. Fine sand is taken up to a great hight in the air and deposited many miles away. In 1882 Iceland was visited by a remarkable sand-storm lasting two weeks, which hid the sun and objects a few yards off like a dense fog, and caused the death of thousands of sheep and horses.

COMPOSITION PAVING BRICKS.—What are known by the name of iron bricks have been satisfactorily introduced as paving material in some parts of Germany. These bricks are made by mixing equal parts of finely ground, red argillaceous slate and finely ground clay, with the addition of five per cent of iron ore. The ingredients thus mixed together are then moistened with a solution of 25 per cent of sulphate of iron, to which fine iron ore is added, until the mass shows a consistency of 38 degrees Beaume. After this the compound is shaped in a press, dried, dipped once more in a nearly concentrated solution of finely ground iron ore, and then baked in an oven for about 48 hours in a reducing flame.

A NEW RIFLE CARTRIDGE.—London *Invention* states that a rifle cartridge has been invented in France, and some surprising results have been obtained with it at the Vincennes ranges. The new cartridge, which is similar in appearance, weight and every other detail to the Lebel cartridge, is claimed to possess considerable advantages. In the first place, the metal jacket is entirely dispensed with, and the cartridge can be instantly adapted to all military rifles, especially the Gras, which is still borne by the French Territorial Corps. Finally, the cartridge is said to be smokeless, and does not foul or clog the barrel, while the cost is 70 per cent below the price of the ordinary cartridge.

FIRE PROOF BUILDINGS.—Iron, when heated, bends very readily under weight, so that it cannot be considered the best of material for fireproof buildings. Stone, and especially granite, is very little better to withstand the ravages of fire. There is no material, according to the best fire-insurance authorities, that can be used for construction equal to brick. It is the opinion of both insurance men and heads of fire departments that brick has stood the test better than any other material. There is no material, says the *American Builder*, that can be used for construction equal to brick. Every brick bears its own weight. Bricks have already passed the fiery ordeal before they are used in buildings, and are tempered.

GLAZED BRICKS are now largely used for both interior and exterior decoration. They are manufactured in Philadelphia and elsewhere in the United States. For this purpose an ordinary light-colored or red brick is used, and a suitable enamel is produced on the surfaces to be exposed. Some colors are very easily obtained. A simple lead glaze or a cheap buff brick makes a good yellow. A manganese and iron glaze is used for black. White and blue are the most difficult to produce, since the red color of the brick must first be hidden by an opaque layer of white before the finishing glaze is applied. Green must be made in the same way.

THE PHILOSOPHY OF COMBUSTION FROM STEAM HEAT.—In an article on "Danger of Fire from Steam Pipes," in Glaser's *Annalen*, it is said that after wood has remained a long time in contact with steam, hot-water or hot-air pipes, the surface becomes carbonized. During the warm season the charcoal absorbs moisture. When again heated, the moisture is driven off, leaving a vacuum, into which the fresh-air current, circulating around the pipes, rapidly penetrates and imparts its oxygen to the charcoal, causing a gradual heating and eventually combustion. The rusting of the pipes contributes also to this result.

NEW PROCESS FOR MAKING WHITE LEAD.—Mr. J. B. Harvay of Glasgow has just invented a new apparatus for the manufacture of white lead. It consists of three distinct parts—a furnace, a condenser, and a washing machine. The lead is untouched by hand, the whole of the process being conducted by machinery. The process is kept going by shoveling into the furnace a quantity of lead ore. This is converted into white lead, washed and dried, in three hours, as compared with the four months of the old system. It is stated that under Mr. Harvay's process sulphur of lead, which sells for $140 per ton, can be produced for $52 50 per ton.

SPANNING THE TIME SINCE THE PILGRIMS.—That was a most extraordinary reminiscence which the speaker, Judge O. W. Holmes, cited from a letter written by the late Sidney Bartlett: "Deacon Spooner died in 1818, aged 94. I saw him and talked with him. He talked with Elder Faunce, who talked with the pilgrims, and is said to have pointed out the rock." Only three lives, one of them but just passed away, between us and the men of the Mayflower!—*Boston Advertiser*.

TO CLEAN SMALL SCREWS.—Screws that are too small for separate treatment may be cleaned from rust as follows: Take a pound of screws and place them in a small box—a cigar-box will do; put a small quantity of oil on them and shake for a minute; then put a piece of cotton-waste in the box and repeat for a minute; finally, put a handful of sawdust in the box and shake for another minute or so, and remove the sawdust by sifting it from the screws in a fine sieve.

A POTATO FREAK.—The Nevada *Transcript* says: H. D. Towle has some last year's potatoes that can be classed among freaks. They were kept in a warm and dry place. They did not sprout to any great extent, but what they did do was to have a brand-new and solid potato grow inside of each of them, and when it had grown as large as the parent potato it had invariably burst its way through the side of the latter and kept on growing.

A FAST LOCOMOTIVE.—The fastest time ever made in the United States by a locomotive was recently made on the Reading road, near Woolton, Penn. The locomotive, just turned out of the Baldwin works, in an eight-mile run on the level track at full speed, averaged a mile in 39 seconds, equivalent to 92 miles an hour.

HIGH-SPEED ENGINES.—The great advantage of high-speed engines is that the steam has no time to condense, or, rather, that very little of it is condensed in comparison with the amount utilized.

AN Englishman has made a toy containing 400 animals and men. They are all put in motion by a windmill turned by the current from burning candles.

ELECTRICITY.

NEW SOURCE OF ELECTRICITY.—London *Iron* states that a new source of electricity has been discovered by Prof. Braun of Tubingen. Hitherto it was found impossible to transform mechanical work direct into electricity. The German professor says that he has succeeded in doing this. Physicists have known for some time that currents may be produced in metal wires by bending them. Prof. Braun has found that nickel wire develops the strongest currents by winding it into a spiral, and connecting its ends with a delicate measuring apparatus (multiplicator). The pointer of the multiplicator deflected considerably according as the spiral was elongated or compressed, showing that relatively strong currents were created; the current flowing during the elongation of the spiral in a direction opposite to that in which the wire had been run in its passage through the draw-plate. The interest in the phenomena observed will be enhanced as soon as there is a prospect of increasing the strength of the currents to a degree which will render them available for practical purposes. As Prof. Braun has succeeded in putting in circuit a number of spirals like galvanic elements, and thus obtaining stronger currents, there is a probability of constructing engines which will perform useful work. Yet we cannot help thinking that the currents would prove too feeble, and that they would develop but little mechanical energy on account of the great molecular friction. Should the anticipation of the discoverer be fulfilled, however, the currents would supply to the engineer the cheapest means of transforming work into electricity direct. Prof. Braun's experiments also confirm the well-known law of reciprocation. In passing through a spiral the current of Bunsen's elements, he could prove an elongation or compression of the spiral, according to the direction of the current.

ELECTRIC-POWER TRANSMISSION IN EUROPE. The success attending the several electric-power transmission systems put down by the Oerliken Works, Switzerland, has more recently had the effect of directing attention to means of utilizing the water-power of the river Rhine near Rheinfelden. Three prominent Swiss establishments, Zschokke & Co. of Aaron; Escher, Wyss & Co. of Zurich, and the already mentioned Oerliken Works, have taken up the matter, and have commenced the preliminary work in connection with laying out plans for a plant. It is estimated that the Rhine can furnish about 15,000-horse power, and this is to be distributed among the several industrial centers located within a radius of about 15 miles. To utilize the water-power, 20 turbines, each rated at 750-horse power, are to be coupled directly to as many dynamos. Permission has already been sought for the erection of the primary station at Rheinfelden. The financial side of the undertaking having been disposed of satisfactorily, everything now depends upon the grant of this permission by the Government.

ELECTRICITY FOR TEMPERING STEEL.—Among the more recent new uses to which electricity has been applied is that for tempering watch springs and other forms of spring steel, whether in the form of ribbon or wire. The steel is wound on a spool, whence it passes down through a bath of oil. An electric current is sent through the wire of such strength as to keep it at the proper redness to answer the desired requirements of temper. As the heating is not done in contact with the air, but is entirely beneath the surface of the oil, there is no trouble from blistering, as in the ordinary methods. The final temper is drawn in the same manner, and the wire or ribbon is finished by means of rolls. The process is also applied to a number of springs besides those for watches, including piano wires. In all cases the process can be controlled to a nicety, both as to the exact temper and its uniformity through the wire.

THE FUTURE OF ELECTRICITY.—It would be quite impossible to forecast the future, even for a single decade, with reference to the applications of electricity, even though discovery were ended, writes C. F. Brackett in the June number of *Scribner*. The mere expansion of industries already in some degree established will give them an importance which we cannot now estimate. But discovery is not ended, and it is more than probable that results will yet be reached which, although they cannot be at variance with the general doctrine of energy as now understood, may, to some extent, revolutionize methods, with corresponding advantages.

SIMPLICITY IN DYNAMOS.—One of the latest discoveries in dynamos and motors is that the simpler they are made the better they work. This is a happy discovery, for the earlier forms of these machines suggested a maze of parts and details which promised to rival the modern printing press in complexity.

DANGER OF GRADE CROSSINGS.—Though in Germany there are nearly twice as many grade crossings as in Massachusetts, there are 12 times as many people killed in Massachusetts, making the crossings about 24 times as destructive to life.

MINING AND SCIENTIFIC PRESS.

A. T. DEWEY. W. B. EWER.

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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO
Saturday, June 15, 1889.

TABLE OF CONTENTS.

EDITORIALS.—An Open-Hearth Furnace Plant, 433. Passing Events; Reservoir Dams; Mineral Products of the United States; Chinese Miners for Lower California; Amalgam on Plates; The Idaho Mine Fire, 440.

ILLUSTRATIONS.—Lash Open-Hearth Furnace, 433. Retort and Melting Furnace for Gold Amalgam; Section of the Neuchaum Mine; Barrel for Use in Cleaning-Up at Quartz-Mills, 441.

CORRESPONDENCE.—The Oro Bella Mines, 434.

MISCELLANEOUS.—Old Mines in Honduras; A Refinery for Butte; No Rail North of Ukiah; State Railroad Statistics; Mining Experts Not Discoverers; The Slickens Question, 434. White Labor; Durability of Timber: The Seattle Fire; Gold in Guthrie; Gold in Utah; Silver in Alaska, 435;

MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 436-7.

MECHANICAL PROGRESS.—Fly-Wheels and Steel Tubes Made From Steel Wire; New Tests for Cast Iron; How Does Iron Solidify; An Undulating Puddling Furnace; Cheap Iron; Steel Boats for Ships; Hollow Steel Ingots, 438.

SCIENTIFIC PROGRESS.—The Mechanical Features of Dust Explosions; The Lessons of the Rocks; The Most Perfect Pendulum; Rapid Growth of Coral Islands; Discovery in Telescope Lenses; A New Asteroid; Wind Pressures, 438.

GOOD HEALTH.—Health and Morals; Cocoanut for Tapeworms; Medical Science; Little Ones in Spectacles; Liquids Make Fat, 438.

USEFUL INFORMATION.—Sand Drifts; Composition Paving Bricks; A New Rifle Cartridge; Fire-Proof Buildings, The Philosophy of Combustion from Steam Heat; New Process for Making White Lead; Spanning the Time Since the Pilgrims; To Clean Small Screws; A Potato Freak; A Fast Locomotive; High-Speed Engines, 439.

ELECTRICITY.—New Source of Electricity; Electric Power Transmission in Europe; Electricity for Tempering Steel; The Future of Electricity; Simplicity in Dynamos; Danger of Grade Crossings, 439.

WHEAT AND FLOUR.—The English Wheat Markets; Flour-Milling and Grain Gambling; An Improved Cloth-Cleaner for Mills; The English Flour Market; What is Patent Flour; A Million Bushels; A Competitive Exhibition; Cornmeal vs. Wheat Flour, 442.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 448.

Business Announcements.

[NEW THIS ISSUE.]

Twenty-Stamp Silver-Mill—Pacific Iron Works.
Situation Wanted—"C. F. B.," Box 2517.

☞ *See Advertising Columns.*

Passing Events.

The men encased in submarine armor were unable to accomplish anything in the Idaho mine, owing to causes given in another column. The mine is now to be filled with carbonic acid gas to extinguish the fire. The bodies of the two miners who were suffocated were not recovered.

The strike in the Haas gas well at Stockton is most important, the flow being now from 80,000 to 90,000 cubic feet per day. A receiver has been built and filled with 22,000 cubic feet in six hours. This well alone can supply enough gas for the city of Stockton for some time. Other borings are now being made.

It is now estimated that the loss at the Seattle fire was at least $10,000,000, with an insurance of $2,500,000. This was the largest fire which ever took place west of Chicago.

The purchase of mining ground of large extent in Lower California will take 1000 or more Chinese from this city across the border, whence they cannot return. Doubtless if the mines pay at all, still more Chinamen will follow those now engaged.

Reservoir Dams

The dreadful result arising from the breakage of the Conemaugh dam, above Johnstown, Penn., has called attention to the condition of other dams throughout the country. It seems that the Conemaugh dam has not been in good condition for years. A. M. Wellington, with F. P. Burt, associate editor of the *Engineering News* of New York, have completed an examination of the dam which caused the disaster. Wellington states that the dam was in every respect of very inferior construction and of a kind wholly unwarranted by the good engineering practices of 30 years ago. Both the original and reconstructed dams were of earth only, with no heart wall, but only riprapped on the slopes. The original dam, however, was made in rammed and watered layers, which still show very distinctly in the wrecked dam. The new end merely added to its stability, but it was to all appearances simply dumped in like an ordinary railroad fill; or, if rammed, shows no evidence of the good effect from it. Much of the old part is standing intact, while the adjacent parts of the new work are wholly carried off. There was no central wall of puddle or masonry either in the new or old dam.

The riprapping was merely a skin on each face, with more or less loose spauls mixed with the earth. The dam was 72 feet above the water, 2 to 1 inside slope, 1½ to 1 outside slope and 20 feet wide on the top. The rock throughout was about one foot below the surface. The earth was pretty good material for such a dam, if it were to be built at all, being of a clayey nature, making a good puddle. To this the fact of its standing intact since 1881 must be ascribed.

Resident Engineer Park made every effort to save the dam a day before it broke. To strengthen the dam a plow was run along the top of it, and earth was then thrown into the furrows. On the west side a channel was dug and sluice constructed. Once they got the channel open, the water leaped down to the bedrock, and a stream fully 20 feet wide and 3 feet deep rushed out on that end of the dam, while great quantities of water were coming in by the pier at the other end. And then in the face of this great escape of water from the dam, it kept raising at the rate of ten inches an hour.

Mr. Park says that he sent warnings by telegraph three hours before the break. At 1 P. M. he walked over the dam, and then the water was about three inches above it and was gradually gnawing away its face. He thinks there was fully a million tons of water in the reservoir. Mr. Park says: "The big break took place at just three o'clock, and it was about ten feet wide at first and shallow; but when the opening was made, the fearful rushing waters opened the gap with such increasing rapidity that soon after the entire lake leaped out and started on its fearful march of death down the Valley of the Conemaugh. It took but 40 minutes to drain that three miles of water, and the downpour of millions of tons of water was irresistible. The big bowlders and great rafters and logs that were in the bed of the river were picked up like so much chaff and carried down the river for miles. Trees that stood fully 75 feet in hight and 4 feet through were snapped off like pipestems."

The loss of life as the result of this breakage is now estimated at 5000. There have been frequent failures of large dams, but no such damage as this has ever occurred before.

The dam of Estrecho de Rientes, Spain, which was 164 feet high, broke April 30, 1802, destroying 600 lives and $7,000,000 worth of property.

The Habra dam in Algiers, when it broke, caused a loss of 207 lives and several villages. The dam was 1066 feet long and held back 26,414,000,000 gallons of water, all of which poured out with a rush similar to the catastrophe at Johnstown. The water started over the *top* of the dam, as was the case at Johnstown.

The Dale Dyke reservoir, Sheffield, England, was emptied suddenly by the breakage of the dam in March, 1864, and 300 lives were lost, with an immense amount of property.

The breakage of the Williamsburg, Hampshire county, Mass., dam, May 17, 1874, caused a loss of 150 lives and much property.

We had in California when the English dam of the Milton Mining and Water Co. broke in June, 1873, the largest quantity of water ever set free at once from an artificial reservoir in the history of the world, with the exception of the instance of the Habra dam. In the space of one hour 600,000,000 cubic feet of water rushed into the canyon below, and in 1½ hours the whole quantity of 650,000,000 cubic feet was discharged. There was no loss of life, and not very much in property, owing to the topography of the country through which the wave flowed. In some places in the canyons of the middle Yuba the flood reached a hight of from 75 to 80 feet, but by the time it reached Marysville, 85 miles from the dam, it was moving 8½ miles an hour and was only 2 feet 8 inches high.

Mineral Products of the United States.

Statistics prepared by the U. S. Geological Survey show that the total value of the minerals produced in 1888 was $591,659,931. It is recognized that this is the sum of the values of substances taken in various stages of manufacture and hence not strictly comparable with each other; still, it is the most valuable means for comparing the total products of different years. The result is an increase of nearly $50,000,000 beyond the value of the product in 1887. In that year nearly every mineral industry showed an increase, and hence an increased total was evident. But the fact that the increase was so very large was due to rather exceptional conditions in a few important industries, and it could not reasonably be expected that a similar combination of circumstances would result in even a larger total value for 1888. Nevertheless the unprecedented stimulus given to the production of copper by an artificial price increased the total value of that product nearly $13,000,000, or nearly enough to offset the decline in the total value of pig iron. The other important factors in the increase were coal and the other fuels which followed the increased quantity of metals. With the anticipated decline of copper to the normal demand, a decline in the total value of the product in 1889 will not be inconsistent with the natural development of our mineral resources.

The value of the metals produced was $256,245,403, and of mineral substances and products, $335,414,528, making the total given above.

It is curious to note how the discovery and utilization of one product displaces another. For instance, the natural gas consumed has displaced large quantities of coal. It is estimated that the amount of coal displaced by natural gas in the United States in 1888 was 14,163,830 tons, valued at $22,662,128. Of this amount, 12,543,830 tons were displaced in Pennsylvania, 750,000 tons in Ohio, and 660,000 tons in Indiana.

Chinese Miners for Lower California.

Some time since mention was made in the PRESS of pending negotiations between the Chinese Six Companies in this city and the Lower California Mining Co., which, if concluded, would result in the Chinese mining there on their own account. This week the contracts were signed with the Chinese syndicate, by which they purchased two-fifths of the Masac concession of 115 square miles in Lower California for $328,000. The Chinese merchants will have a voice in the management of the company, with Theophilus Masac as president. The contracts as signed provide that the Chinese shall invest $60,000 in improvements within the next six months. They are also to assume all outstanding obligations and to pay all taxes on the property. Within two years they must erect reduction works, and two-thirds of the product of the mines must be reduced on Mexican soil. By July 1st from 150 to 200 Chinese laborers from this city will be taken to the mines. A second installment of from 500 to 1000 coolies will follow in the fall. These laborers go into Lower California with the understanding that they can never return to the United States. In other words, they have burned their bridges behind them, and will leave San Francisco permanently. Of course the merchants and stockholders can go and come at pleasure. The first work to be done at the mines will be the construction of a water flume six miles in length, at a cost of about $225,000.

PATTERN-MAKERS' work is dull in the city just now.

Amalgam on Plates.

The practice of using cyanide of potassium to promote amalgamation with plates is less common than formerly, but even when used a few pounds will be enough to clean the plates of a 40-stamp mill for a year. Silver-plated copper has almost everywhere superseded the ordinary amalgamated copper plates. These are not generally resilvered, as a coating of amalgam forms upon them which is very effective in saving gold. This layer of amalgam should not be allowed to accumulate to too great a thickness, but should be removed occasionally by "sweating" the plates. An improved method in use at the North Star mill, Nevada county, is to immerse the plates in boiling water until the amalgam is sufficiently softened to be easily scraped off. Where the pulp carries but little amalgam or silver, the silver plating is soon worn out.

There is a constant absorption of amalgam by the plates. The amalgam replaces copper or forms a layer upon it too hard to be rubbed off. At Grass Valley, after a run of a year or two, the outside battery plates and apron are sweated. Notwithstanding the fact that the plates were quite well cleaned every day, the sweating of the outside battery plates and the aprons from four batteries of the Empire mill yielded $19,000 worth of amalgam. This was the result of the absorbed amalgam after 1 years' run. The ore during this period averaged about $18 per ton in free gold.

The Idaho Mine Fire.

The attempt of the men in divers' armor to extinguish the fire in the Idaho mine was unsuccessful. They went down the shaft twice. At the 900 level the candle went out and the electric light showed a thick smoke, but they found no difficulty in breathing, the supply of air through the hose and into the helmets being good. Near the 1000-foot level the cage was stopped. The heat was very great and the helmets became very hot. The rubber around the wrists softened. The signal to hoist was given and the men were taken to the surface.

Several reasons are assigned by the men for their failure to accomplish anything. The pump which supplied them with fresh air was, unfortunately, situated at the mouth of the 700-foot level, and consequently the air was vitiated and impure to such a degree as to be absolutely poisonous. Again, the provisions made in a diver's submarine suit for disposing of the air after it has been deprived of its life-sustaining properties are altogether regulated by the pressure of the water upon the rubber suit. As the surplus air expands the rubber the water pressure releases a spring, which opens a valve and allows the foul air to escape without admitting any water. In the Idaho mine the clothing of both Page and Tucker became bulged out with the impure air, the atmospheric pressure being inadequate to release the spring, and consequently both men were compelled to open the valve themselves and take chances on the poisonous gases which surrounded them effecting an entrance. Some idea of the heat experienced may be formed when it is known that one of the eye-glasses of Page's helmet was cracked. Had it broken, his life would have paid for the forfeit. They are satisfied that their experiment will be of value, as it will cause scientists to endeavor to discover some material from which diving suits for mine fires may be manufactured.

As far as possible air has been excluded from the lower levels. The stove plan for burning charcoal and generating carbonic gas has been abandoned and a furnace for the same purpose has been built. This comprises an iron shell six feet in diameter and lined with brick eight inches deep. At least a week will be required for surcharging the mine with carbonic gas. Then the gas will have to be expelled before workmen can go down into the depths. If bad caves have occurred, many weeks will elapse before the 200 employes will again be at work.

CLEANUP.—A correspondent informs us that "a gold mine some 20 miles from Beckworth and about seven miles from Johnsville, Plumas county, owned by residents of Beckworth and vicinity, recently had its season's cleaning up after a run of about two months. The amount taken out was 80 pounds of gold, of which one nugget weighed 14 pounds."

The Neuebaumer Mine.

(Written for the PRESS by ARGUS.)

This mine is situated on the south fork of the Stanislaus river, on the "mother lode" series, Tuolumne county. The vein shows in places from three to four feet wide. The rich ore certainly will average two feet. It mills in arastra $55 per ton in free gold, exclusive of sulphurets, which latter assay from $1500 to $5500 per ton. The formation is metallic slate, black in color, carrying also rich sulphurets. The vein is a segregated lode, with interpolations of slate between the quartz, all constituting vein matter. The mine is opened and developed by two tunnels, entered from the mountain-side or face, one 350 feet and the other 250 feet in length. The two tunnels are nearly connected by a winze and raise; that is to say, the winze is sunk 54 feet.

They are now raising to connect with winze so as to tap the water that has accumulated during the last heavy rains, and to further develop and ventilate the mine; also, to facilitate stoping. This connection will afford backs to stope out of about 80 feet.

I here show a rough sketch of the works. The shaded portions show the parts stoped out. The vein's course is 45° west of north. The property comprises 2900 feet (linear) with mill-site on river, and any amount of free water all the year round. A ditch is constructed 1¼ miles long, by which water is brought to the arastra on top tunnel level.

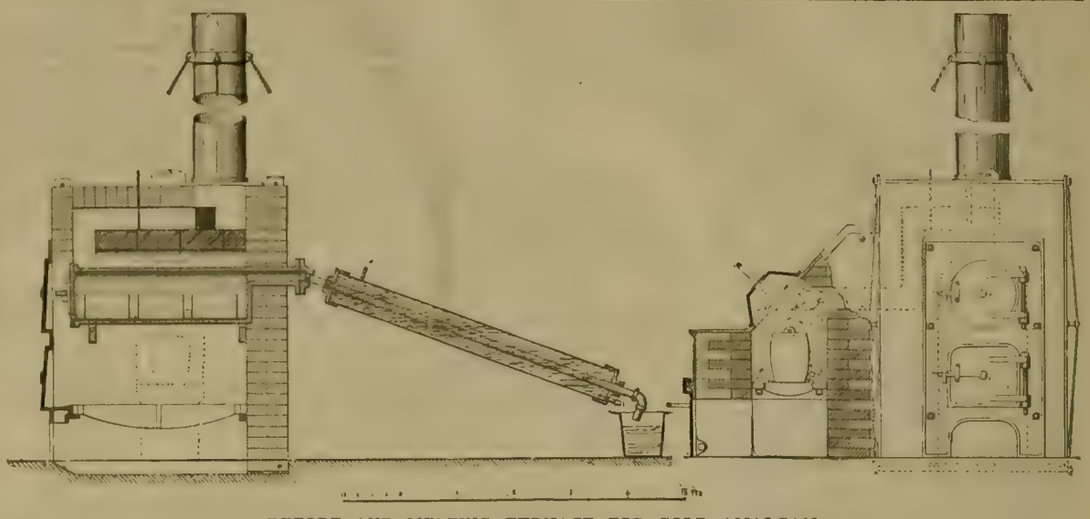
The river water is not being used at present; flows at the base of mine. The water in the ditch drives an overshot wheel that gives power to the arastra, the water being purchased and costing $30 per month. Half of the present water now used would drive a 10 stamp mill with concentrator at the proper millsite, having a vertical fall of over 1000 feet, a Pelton or Knight wheel being used. This mine requires no pump or hoisting works for very many years, as the vein can be tapped by tunnel from mountain-side on the vein all the distance. The sulphurets are of very high grade, having been worked to $300 per ton. Further, there is considerable free gold, averaging $50 to $60 per ton. I have seen some exceedingly rich rock, giving a value of a dollar to pound. There is a heavy percentage of bases—from 5 to 15 per cent. The mine topographically is splendidly situated, easy of access, there being a good road to the hillside.

BULLION RATES.—The Executive Board of the Interstate Railway Association has rendered a decision in regard to the demand for the readjustment of bullion rates from Colorado and Utah points to the Missouri river. It was held by the board that sufficient reasons exist for the proposed reduction from $15 to $13 per ton, on the rate on bullion from Utah common points to the Missouri river not exceeding $100 per ton in valuation, and the latter rate therefore is authorized. It was further found that sufficient reasons did not exist for any change in the present rate of $7 per ton from Denver, Pueblo and Colorado common points to the Missouri river, and no change in this rate is authorized.

DUMMY GUARD.—To prove the efficiency of a cable-car dummy guard invented by him, Herman Montag has several times thrown himself in front of moving dummies, when the guard has pushed him aside unhurt. The Sutter-Street Company's representatives, Messrs. Morrow, McCord and Swett, did not think the device any better than the ones they are now putting on the cars. Supervisors Barry, Becker and Pilster of the Health and Police Committee thought the guard superior to any in use in the city, and far preferable to any thus far exhibited by the Sutter-Street Company.

A LETTER from Ensenada to a San Diego paper states that a very rich strike has been made in the Santa Clara mining country, and it is believed that the mother ledge has been discovered. Two feet below the surface the ledge had been uncovered to the width of seven feet, and neither wall had been reached yet. The rock assayed from $40 to $60 to the ton.

THE *Evening Wisconsin's* Hurley special says: The Iron King mine, one of the best shippers on the Gogebic range, closed down to-day owing to trouble between the stockholders. All of the Bessemer consolidated companies' mines have also closed down, owing, as the superintendent states, to lack of ready cash. A large number of men are made idle along the Gogebic range by the above suspensions.

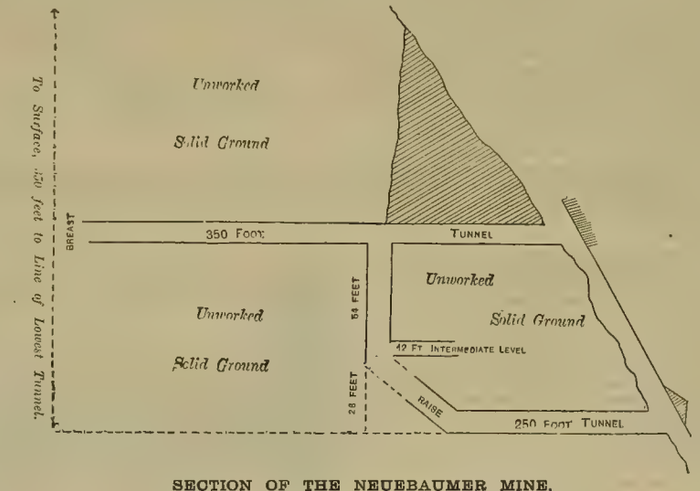


RETORT AND MELTING FURNACE FOR GOLD AMALGAM.

Cleaning Up a Gold-Mill.

In a chapter on "The Milling of Gold Ores in California," by John Hays Hammond, E. M., in the last report of the State Mineralogist, the details of construction and operation of a mill are given, with the methods employed for saving the gold. Concerning the cleanup, Mr. Hammond says:

The frequency of the cleanup depends upon the richness of the ore and upon the local practice in this respect. The outside plates, *i. e.*, the outside battery plates, the apron plates and the sluice plates are usually cleaned up every 24 hours. The amalgam and the "skimmings" are ground with the addition of quicksilver in the cleanup pan, in order to soften and clean the amalgam. The redundant quicksilver is expressed and the amalgam retorted in conjunction with the amalgam from the general cleanup. The cleanup of the outside plates requires from 10 to 15 minutes for each battery. The general cleanup of the mill is usually once or twice a month. Two batteries are hung up, the outside battery plates and the screens removed, and the inside plates and the dies taken out. These plates are laid over the sluice-plates and the amalgam scraped off. Care must be observed to prevent the plates being scratched. Amalgam will sometimes be found adhering firmly to the linings of the mortar and to the dies. All the amalgam obtained is cleaned in the cleanup pan. In large mills the use of the barrel and cleanup batea is to be recommended. A cut of a cleanup barrel is given herewith.



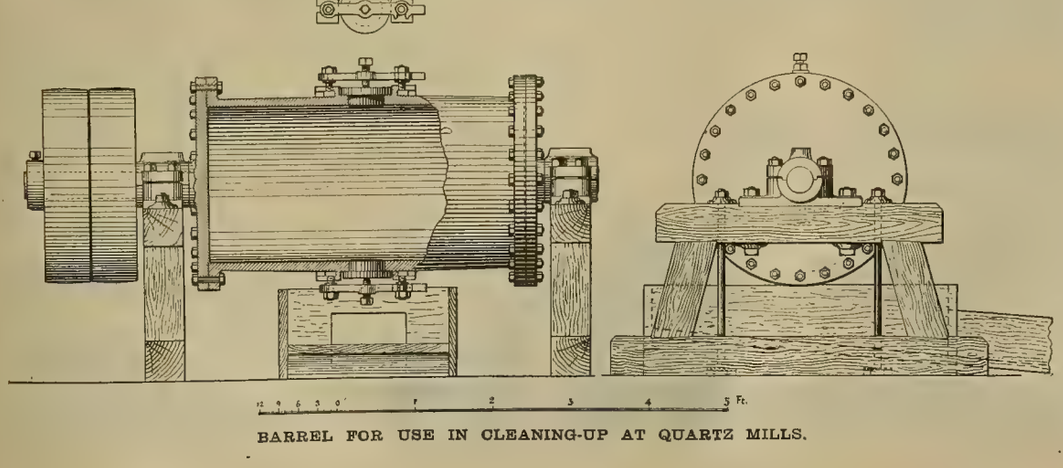
SECTION OF THE NEUEBAUMER MINE.

The "headings," composed of pulp and uncrushed ore, quicksilver, sulphurets, pieces of iron, steel, etc. (the steel and iron are taken out with a magnet), amounting to two or three pailfuls, are run through one of the batteries, through which the headings from the other batteries are likewise passed. This battery is cleaned up in the manner above described, a part of the worthless material removed by panning with a miner's common gold-pan, and the remaining material is then run through the cleanup pan. After one or two hours' grinding, with the addition of quicksilver, in the cleanup pan, the refuse matter is run off and the amalgam and the quicksilver collected. Three men can clean up a 40-stamp mill in from five to seven hours. The loss of from five to seven hours for two batteries is consequently incurred by a general cleanup. At this time advantage is taken of the stoppage of the battery to make needed repairs and to change the shoes, dies, screens, etc., if required.

It takes from two to four hours to retort the amalgam in the silver retorts which are used in large mills. Small mills use the cup-shaped retort. It takes about one to two hours to melt the gold from the retorted amalgam. A cut of a retort and melting furnace is given on this page. The melted gold is poured into molds of the suitable dimensions. Bullion assays should be made to ascertain the fineness of the gold bar.

The cleanup room should be as near as possible to the battery. The floor should be of cement to prevent loss of amalgam and quicksilver. There should be two cast-iron tanks four feet long, three feet wide, and three feet deep, to prevent loss of material and leakage in panning out. In one corner of the room there is placed a small cleanup pan 2½ feet in diameter. This pan is provided with drags of iron or hard rock.

THE WHITE-LEAD TRUST.—It is authoritatively stated that the stockholders of the Southern White-Lead Company of St. Louis and Chicago sold their stock to the National Lead Trust. This company has very large works, and the output of white and red lead for several years past has been much the largest in the United States, in fact in the world. The Eckstein Co. of Cincinnati also signed a contract to sell to the trust, and negotiations looking to the absorption of the Atlantic mills of Brooklyn are on foot. By these acquisitions the trust gains control of over 90 per cent of the output of the United States.



BARREL FOR USE IN CLEANING-UP AT QUARTZ MILLS.

WHEAT AND FLOUR

The English Wheat Markets.

The price of American wheat being materially affected at times by the crop in India gives interest to facts concerning the agricultural progress of India. Efforts which are making through an agricultural department established at Bengal to improve the quality of wheat indicate the probability of increasing competition from that quarter. In 1872 India rose to the second place as a feeder of Great Britain, and in 1877 the relative positions as concerns the United States were maintained, but trade returns for 1888 show a startling revolution in the figures. Russia has now taken first place, sending 21,396,000 cwt. as against 5,523,000 cwt. during 1886, this increase being almost entirely at the expense of America, the falling off in the imports from the United States amounting to 15,857,000 cwt., while India has exported within 325,000 cwt. of the preceding year; and it is worth noting, as pointed out by Sir James Caird in the London *Times*, that this change of basis in supply has been accomplished without in any material degree advancing the price of bread in England.

The *Mark Lane Express* of London, in commenting on the increase of Russian shipments to England, says: Russia's grain shipments in 1888 having been the largest on record, it is somewhat surprising to learn that Russian official opinion, as embodied in the report of a recent Agricultural Commission, is of a very pessimistic character concerning the future of the vast corn-growing lands of the Empire. The big yield of 1888 following the good crop of 1887, is an event which must be regarded as very exceptional, while the decrease in the average fertility of the soil on the returns of every 10 years appears to be continuous. The destruction of forests and the embarrassed state of the farmers, whose crops as well as holdings are mortgaged at a higher rate of interest than agricultural profits allow, are two other causes of what appears to be well-grounded alarm.

Flour-Milling and Grain Gambling.

The *Northwestern Miller* speaks as follows in regard to the influence which grain gambling exerts on legitimate milling industry: "Milling is no longer milling. It is simply speculation. No matter how anxious a miller may be to do a legitimate business, he finds himself forced to regard the Chicago wheat market with more concern than anything else. * * * All the immense sums invested in flour-mill buildings, in costly machinery and expensive processes, have ceased to fulfill the destiny for which they were intended, and have become the football for the amusement of a lot of wheat speculators, who employ no labor, invest no money and do not care a particle whether the American flour trade is ruined or not."

Upon the above the *Milling Engineer* comments as follows: "All of which is true so far as the great majority of millers are concerned. When a miller becomes a speculator, and runs his mill as a sideshow to his gambling operations, he is just as bad, or worse, than the grain gambler who is minus mill and capital invested. It remains to be seen whether the millers who are desirous of doing a legitimate milling business are numerous enough, united enough and have nerve enough to take the bull by the horns. If not, all the immense capital invested in milling property might just as well be sunk at the bottom of the sea."

It is no doubt a fact that a great number of the large millers, especially in the great wheat-growing States of the Northwest, are engaged in wheat speculations, and that they are now reaping the natural results of their folly. It is to be hoped that since they have learned the lesson of experience, and paid a good price therefor, they will now give their exclusive attention to the legitimate industry of milling and have nerve enough to unite firmly with their brethren who have not sinned the sin of speculation, take the bull by the horns, and wipe out, forever, this incubus on the great leading industry of the country.

AN IMPROVED CLOTH-CLEANER FOR MILLS.—Mr. W. C. L. Meyer of Starr's Mills, at Vallejo, is the inventor of an ingenious cloth-cleaner for use in mills. There is a necessity for the cleaning of flannel cloths used in the milling process, and this has heretofore been done in a crude and imperfect manner. After many years of study, Mr. Meyer has perfected and patented a machine which has been introduced into Starr's Mills and is particularly recommended by the owners to other mills. Mr. Meyer's invention supplies a need and is bound to have a successful run.

THE ENGLISH FLOUR MARKET.—Western millers have been so long shut out from the British flour market by high prices of wheat in the United States that they are fearful of losing the export trade altogether. To learn the prospects, numerous inquiries were recently addressed to correspondents in England, from whom replies have been received agreeing in all the main particulars. The general conclusion reached is that at the present time Great Britain is almost wholly independent of American supplies. Not only has the British product improved in quality, but Hungarian brands so closely resemble the best Minnesota products that the two qualities are scarcely distinguishable. Hungarian flour, therefore, is a formidable rival. Prices have undergone no material change. With reference to trade prospects, the present condition is regarded as temporary, correspondents abroad being of the opinion that with a return of abundant crops and prices on an export level the American trade would speedily revive.

WHAT IS PATENT FLOUR?—Patent flour is not any particular part of the wheat berry. It is not as strong as the bakers' or clear flour, and stronger than the low grade. We frequently hear it said that the patent flour is only made up of the harder and more glutinous portions of the wheat. The low grade, or the flour from next the bran, would come as near meeting this definition as does the flour from the middlings in the present system of manufacture. In the old system of grinding with the millstone, and especially the low grinding system, the middlings were that portion of the wheat which was best calculated to resist the action of the millstone—the hardest part. The present system of making middlings by corrugated rolls does not depend upon the varying hardness of the different portions of the wheat to make middlings. Where the wheat is harder it will be more brittle, but this is merely an incident. Middlings making is the principal object in reducing wheat by corrugated rolls, and by this method the wheat is broken into middlings, not ground into flour, with a portion remaining as middlings because of its hardness. For this reason patent flour, made according to the present methods, does not necessarily mean flour from any particular part of the wheat berry, as ordinarily understood.—*The Millstone.*

A MILLION BUSHELS.—People talk glibly about a million bushels of wheat, but very few of them realize what a vast amount that is. A wheat broker says that if a million bushels were loaded on freight cars, 500 bushels to a car, it would fill a train over 15 miles long; if transported by wagon, 44 bushels per wagon, it would make a line of teams 142 miles long. If made into bread, reckoning a bushel to every 60 pounds of flour, it would give each man, woman and child in the United States a two-pound loaf of bread. With the above in mind, the reader can better appreciate the following paragraph: There are used annually in the United States about 15,000,000 bushels of wheat in various manufactures, such as starch, food preparations, sizing for cloth and paper; 50,000,000 bushels are required for seeding and 285,000,000 for food consumption, which leaves only about 50,000,000 bushels for export. If these averages are all kept up, an increase in the wheat area of the country is imperatively demanded.

IMPROVED MILLING gives much more nutriment in flour than formerly. In the old process, a nutritious layer, called the perisperm, was, on account of its close attachment to the inner husk, largely carried away. Hence the vegetarian, Sylvester Graham, whose name is applied to bread made from unbolted flour, was correct in his time in saying that such bread contained the most nutriment. The "gradual reduction" process saves this portion of the wheat. The wheat loaf of white flour now contains a much larger percentage of nutriment than the graham loaf of unbolted flour mingled with the woody husk or bran.—*Dr. George Hays.*

A COMPETITIVE EXHIBITION.—The Congress of Chili has made an appropriation for a competitive exhibition of flour-mill machinery which is to be opened at Santiago, Chili, next November, under the auspices of the Chilian Society for the Promotion of Manufactures. The prize of $4000 will be awarded the successful competitor, whatever his country, by a jury of experts. Full particulars can be obtained by addressing Secretary Chilian Legation, Washington, D. C.

CORNMEAL VS. WHEAT FLOUR.—The *United States Miller* says: We have recently had some correspondence with cornmeal millers, and they almost unanimously report trade to be unusually good. Johnny-cake, mush and milk, hog and hominy, and potatoes and meat are being used to a greater extent than usual, while the consumption of flour is falling off. Verily, man does not live by bread alone.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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CHAS. DUGAN—Stanislaus Co.
A. F. JEWETT—Tulare Co.
E. B. GREENOUGH—Mendocino Co.
CHAS. F. BLACKBURN—Idaho.
R. G. HUSTON—Montana.

THE Napa Consolidated Quicksilver Mining Company has declared a dividend of 10 cents per share, payable July 1st to stockholders of record June 15th.

ASSESSMENT NOTICE.

Gray Eagle Mining Company.—Location of principal place of business, San Francisco, California.

Location of works, Placer County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 15th day of May, 1889, an assessment, No 13, of Five Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, 327 Pine St., Room 9, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1889, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 16th day of July, 1889, to pay the delinquent assessment, together with the costs of advertising and exponses of sale.

By order of the Board of Directors.

O. H. BOGART, Secretary.

OFFICE—327 Pine St, Room 9, San Francisco, California.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No 1, 32 ft; No. 2, 9½ ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Lefler, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

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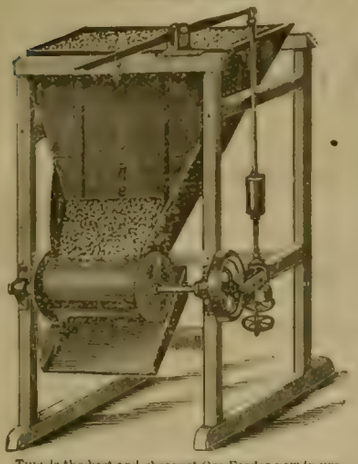

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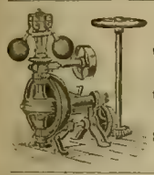

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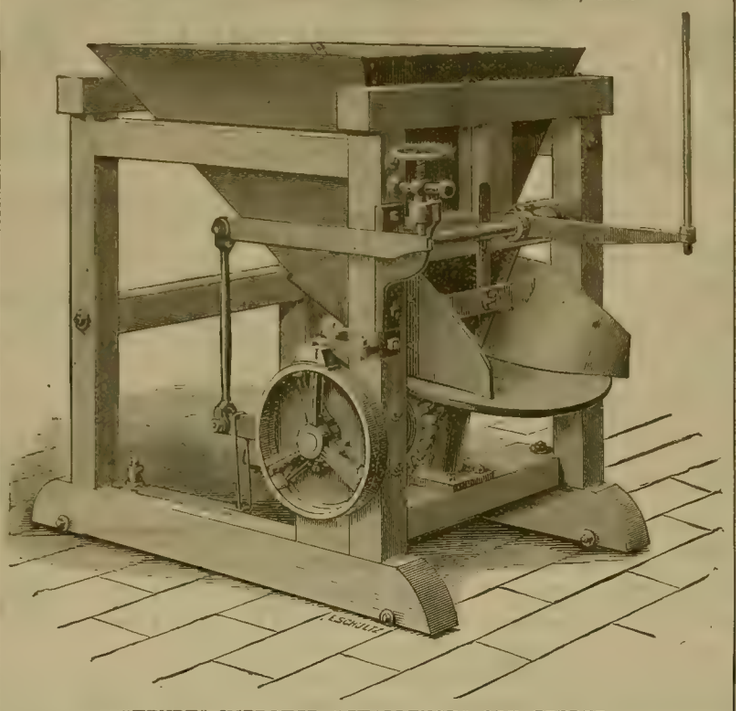

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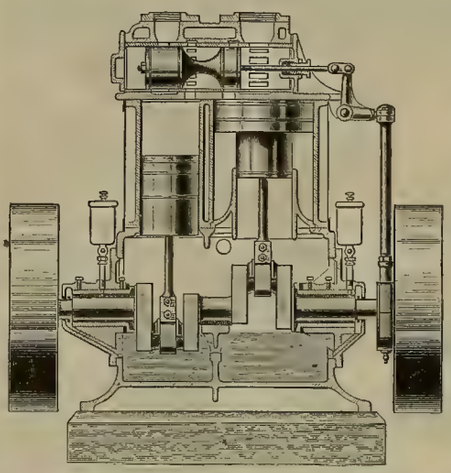

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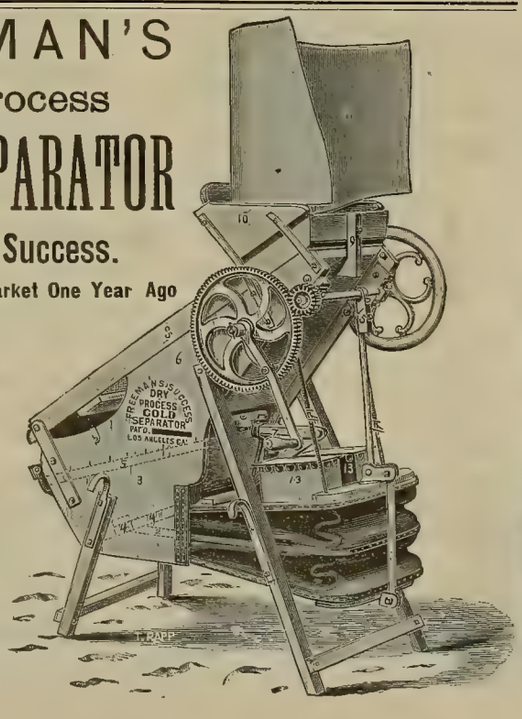

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List of U. S. Patents for Pacific Coast Inventors.

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FOR WEEK ENDING JUNE 4, 1889.

404,461.—VEHICLE—H. Arenberg, Edgewood, Cal.

404,517.—FRUIT-STONER—Briggs & Leach, San Buenaventura, Cal.

404,481.—DEVICE FOR OILING WHEELS—F. W. Harris, Napa, Cal.

404,023.—SAW-SWAGING MACHINE—T. B. Hite, Seattle, W. T.

404,494.—FOLDING VEHICLE—Jos. McBoyle, Oakland, Cal.

404,403.—CHECK-REIN HOOK—G. W. Moliere, Ocean View, Cal.

404,727.—FLY-TRAP—J. E. Packard, Mendocino, Cal.

404,496.—VEHICLE—Wilfred Page, Penn's Grove, Cal.

404,554.—CHISEL—T. H. Palmer, San Bernardino, Cal.

404,436.—NECKTIE FASTENER—J. Reidl, Lewiston, I. T.

404,573.—STEAM ENGINE—A. H. Straub, Los Angeles, Cal.

404,509.—VALVE GEAR FOR COMPOUND ENGINE—J. C. H. Stut, S. F.

404,511.—FIRE-LADDER EXTENSION—Jas. W. Tully, S. F.

404,580.—SLOT-MAKING ATTACHMENT FOR BOLT-HEADING MACHINES—S. Uren, Sacramento, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

TWO-WHEELED VEHICLES.—Wilfred Page, Penn's Grove, Sonoma county. No. 404,496. Dated June 4, 1889. This patent covers novel shaft-connections in the class of two-wheeled vehicles known as "carts," by which to overcome the unpleasant jogging motion imparted to it by the action of the horse. There is no rigid connection of the shafts with the axle, but the axle remains steady, and no back or forward motion is imparted to the body.

SLOT-MAKING ATTACHMENT FOR BOLT-HEADING MACHINES.—Stephen Uren, Sacramento. No. 404,580. Dated June 4, 1889. The invention relates to that class of bolt-heading machines in which the bolt is confined and gripped between opposing dies, while a reciprocating plunger operates against the end of the bar and upsets it so as to form the head of the bolt. The attachment to this machine, covered by this patent, is so operated that it cuts a slot in the bolt at the same time that the bolt is being formed.

FOLDING VEHICLE.—Joseph McBoyle, Oakland. No. 404,494. Dated June 4, 1889. This is one of that class of vehicles in which the several parts are so arranged and connected as to adapt them to be folded, thereby reducing the vehicle to a smaller compass and rendering it portable. The object is to provide a vehicle for a child's use, which can be packed in a small compass and carried about, and when required for use can be unfolded and be developed into a perfect and practical vehicle in which the child may be drawn. The invention consists in the folding wheels, the folding tongue, the folding body or seat and folding back and a folding foot-rest, all so combined and arranged as to be well adapted for the purpose named.

ADJUSTABLE ATTACHMENT AND EXTENSION FOR FIRE-LADDERS.—James W. Tully, S. F. No. 404,511. Dated June 4, 1889. The invention consists in an auxiliary or supplementary ladder adapted to be readily applied to and connected with the main ladder, and in suitable ropes attached to said auxiliary ladder whereby the former may be extended from the latter at any suitable inclination. The object of the invention is to provide an attachment for a fire-ladder, and especially for that extensible ladder known as the "Hayes," whereby the windows or wall of a building may be readily reached by means of the extension or attachment, notwithstanding that the main body of the ladder is unable because of obstructions such as telegraph wires, etc., to reach the walls or near enough to the building to render it of service.

VEHICLE.—Herman Arenberg, Edgwood, Siskiyou Co., assignor one-half to Geo. J. Clark. No. 404,461. Dated June 4, 1889. This patent covers a means for mounting the body of the vehicle upon its running gear. The invention, though applicable to all kinds of vehicles, is specially applicable to two-wheeled carts, and its object is to overcome and ease up the several unpleasant motions of the vehicle by allowing the body an independence sufficient to counteract the tendency to undue motion, which tendency is obviously greater in two-wheeled vehicles than in other forms. The body has a movement from side to side upon its pivoted hangers, while it has a movement forward and back by means of rock-bolts on top of the shafts and rock-bars underneath the body; while between the side and forward and back movements intermediate or modified movements in diagonal lines are permitted by the rocking of the bolts and bars.

DEVICE FOR OILING WHEELS.—Frank W. Harris, Napa. No. 404,481. Dated June 4, 1889. This is a device for heating and applying oil to the fellies of wooden wheels. It consists of a segmental trough adjustably supported upon standards, a lamp or heater fixed with relation to said trough so as to heat its contents, and standards upon each side for the support of the shaft upon which the wheel is mounted. In those countries which have a rainless summer, as in California, the wooden portion of vehicle wheels becomes so dry and contracted that the tires will be loose upon the wheels, and if they are shrunk so as to fit the wheels in that condition, the wheels will, when they are again swollen by the wet weather, be greatly dished and the spokes bent out of shape, the wheel being ultimately soon destroyed. By this apparatus this inventor is enabled to apply boiling linseed oil to the fellies and spoke ends, and it will, when thus applied, penetrate the wood and swell it, so that the tires will remain tight throughout the dry season, the expansion and contraction of the wood being reduced by this means to a minimum.

VALVE GEAR FOR COMPOUND ENGINES.—John Ch. Henry Stut, S. F. No. 404,509. Dated June 4, 1889. This invention relates to improvements in cut-off mechanism for compound engines having cranks at right angles and an intermediate receiver or reservoir into which the steam is exhausted from the primary or high-pressure cylinder, and from which it is admitted to the low-pressure cylinder by suitable valve gear. The object of the invention is to provide a means by which the cut-off mechanism of the expansion cylinder is regulated by a governor or governors of the initial and expansion cylinders, which are coupled together in such a manner that they act in unison. It also consists in an adjustable mechanism whereby the cut-off or expansion cylinder may be changed with relation to that of the initial cylinder. Most of the modern compound-receiver engines have a variable automatic cut-off on the initial cylinder, but the cut-off for the steam of the expansion cylinder is set by hand at a fixed point, and this point is determined when the engine is running, so as to give the best general results. After being set, there is no variation from it, whether the engine is working with high or low pressure steam or a light or heavy load. In some cases a governor for the initial cylinder and a governor for the expansion cylinder have been employed, working independent of each other; but the results obtained from this construction are not found so satisfactory as those from the variable cut-off for the initial cylinder and fixed cut off for the expansion cylinder. The great disadvantage of this kind of cut-off is that a drop in the pressure of the steam from the initial cylinder to the receiver very often occurs, and at other times a compression takes place, while the expansion cylinder can take out only a constant quantity of steam from the receiver for each stroke. This result is produced by reason of the variable cut-off of the initial cylinder, which gives steam at different pressures when leaving the initial cylinder. This invention is designed to overcome this difficulty by so arranging the cut-offs of the initial and expansion cylinders and connecting the governors of the two cylinders that the steam will be cut off in the expansion cylinder earlier or later with reference to the cut-off in the initial cylinder, and thus retain the pressure in the receiver, so that there will be no drop in the exhaust from the initial cylinder into the receiver, and consequently no loss of power. This invention is applicable to any automatic cut-off, with only such changes in form or construction as will adapt it mechanically to the particular style of cut-off employed.

Complimentary Samples.

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IRRIGATION IN NEW MEXICO.—The Senate Committee on Reclamation of Arid Lands is to hold sessions in September at Santa Fe, Las Cruces, Las Vegas and possibly Albuquerque. In preparation for their visit, Gov. Prince has just issued an open letter to the people of New Mexico, urging county commissioners, mayors, boards of trade, agricultural societies and similar officials and representative bodies, as well as individuals, to collect facts, prepare opinions and make suggestions regarding irrigation, water storage, etc., and forward them to the committee at Washington prior to July 20th. The Governor says: "Nothing is of more importance to the future prosperity of New Mexico, and we should not fail to avail ourselves of this opportunity to aid in obtaining such intelligent legislative and national aid as will be of the greatest benefit to the Territory."

An Open-Hearth Furnace Plant.

(Continued from page 433.)

the flues, but also to increase the heating surfaces. The uptakes (7) are extended down below the points of entrance of the chimney flues, in this manner forming pockets (32) for the reception of any cinder, dust, or other matter that may be drawn over from the furnace chamber, and preventing this material from going forward toward the stack and clogging the checker-work (31) in the chimney flues (22-23). Suitable openings are provided in the brick-work, so that by taking down the brick bulk-heads these cinder pockets may be easily opened and cleaned out.

The four-way chamber (25) has the air duct (26) leading into it permanently open, and is fitted with a three-way valve (33) alternately connecting with flues (22-23) leading to each end of the furnace with the chimney (21), and with this air-chamber (25), in this way reversing the furnace on the well-known Siemens principle. This three-way valve (33) is hollow and is kept cold by a stream of water running through it, preventing the warping or burning out of the valve, or with Siemens gas-furnace, the direct loss of fuel by leakage to the chimney.

The tap-hole of the melting-furnace (34) is at about the ground level, and the metal is conducted, through an inclined spout (35) some 10 feet in length, to the ladle-pit (27). The ladle, after being filled, is lifted by a crane and transported to an auxiliary semi-circular casting-pit, only about four feet lower than the ground level in which the ingot molds are set. The front of the furnace is provided with three cranes, so located that they cover the entire pit-space, the ladle and ladle-pit and the furnace melting-chamber, so that, if a movable roof be put on the furnaces, large pieces may be swung into the furnace-hearth.

RECEPTION TO MR. SCOTT.—On Monday last a formal public reception was tendered to Irving M. Scott of the Union Iron Works by the employes of the works. A number of merchants and manufacturers were also present. A handsomely engraved memorial was presented to Mr. Scott expressive of appreciation of his efforts in obtaining contracts for building Government vessels here and the successes which he has accomplished. An eloquent response was made by Mr. Scott. He thanked those present for the reception and memorial in a touching manner, and congratulated the people of California on the success of their united efforts to lift the State a little higher on the plane of civilization. Some have said that San Francisco could never be a manufacturing center. He believed that he could soon reverse this verdict. The time would soon come when the industries of the Pacific Coast would surpass those of other sections of the United States. The feat of the Charleston in running 18 knots an hour during the first trip had never before been accomplished by any other vessel. It was the duty of capitalists to keep labor and money at home. They should not fill their pockets with money earned here and spend or invest it in foreign ports. In conclusion, Mr. Scott predicted a grand future for the Pacific Coast and its industries.

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About Obtaining Patents.

Patents are Virtually Contracts.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, in order that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. If, by this "preliminary examination," the improvement is found to have been previously invented, our client will receive, for the small sum of $5 for the examination, a verbal or written report showing definitely wherein his invention has been anticipated, thereby saving him further expense and perhaps much time, anxiety, etc.

To avoid all needless delay, however and secure patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with $15 as a first instalment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately and forwarded to the inventor for his signature. When he receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of $20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give up a case so long as there is a chance of obtaining a patent. The Agency charge, including drawings, rarely exceeds $40, and for this we do all we can without appealing the case.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are more satisfactory to the Patent Office than the old cumbersome system of storing up an immense bulk of countless models.

Drawings or sketches, sufficient to illustrate the invention clearly, with a description that will enable us to make a full set of perfect drawings for the Patent Office, is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had it been skillfully, completely and artistically portrayed. In all cases prepared by us, the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken to have the invention fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

Advantages to Inventors on the Pacific Coast.

The firm of DEWEY & CO. has edited and published the MINING AND SCIENTIFIC PRESS continuously since 1860, a period of 28 years. Few agents, who are still engaged in the business, have had so long-extended practice in patent soliciting. The members of the firm give personal attention to the applications intrusted to their care; and their familiarity with inventions and with local affairs in the Pacific States and Territories, enables them to understand the wants of inventors on this coast more readily and thoroughly, as we believe, than any other agents in America. Thus there is saved a great deal of the time which ordinarily—when distant agents are employed—is wasted in preliminary writing back and forth.

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Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation best calculated to widely inform the class of readers especially interested in the subject of his invention.

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A Caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the caveator to receive notice, for a period of one year, of any application for a patent subsequently filed, which is adjudged to be novel and is likely to interfere with the invention described in the caveat, and the caveator is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from $10 to $20. The Government fee is $10 additional.

To enable us to prepare caveat papers, we require only a sketch and description of the invention.

Rejected Applications.

Inventors who have rejected cases (prepared either by themselves or for them by other agents) and desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

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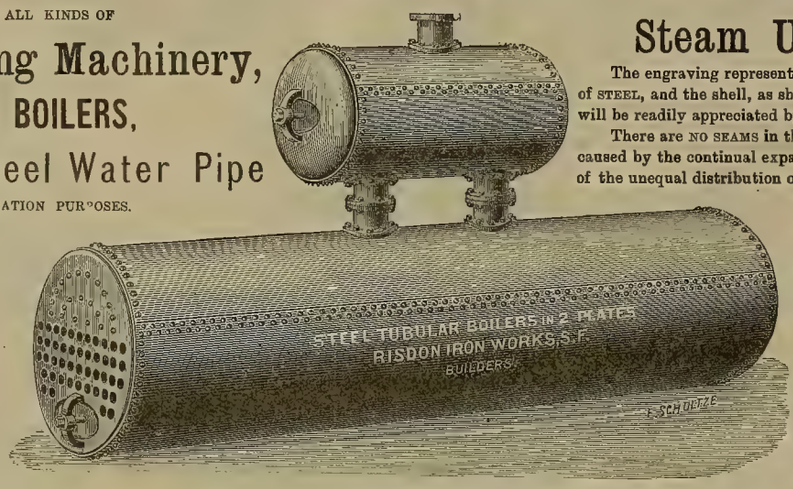

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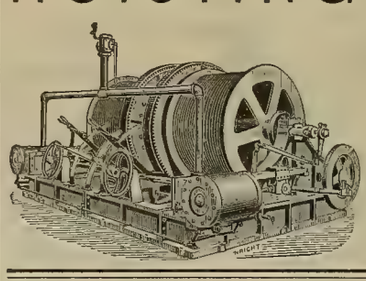

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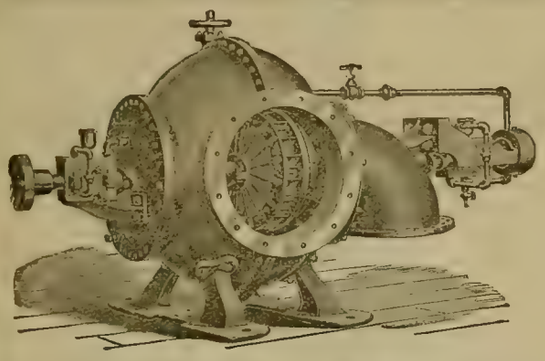

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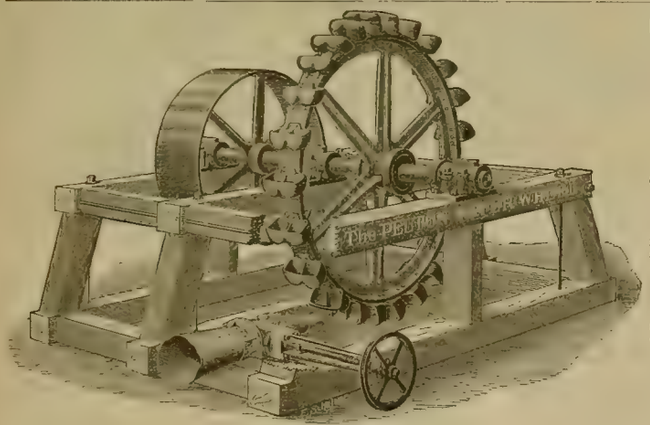

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We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

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Assaying and Analysis of Ores, Minerals and Waters.
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For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass Zinc and other metals punched for all uses.

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Mining Screens a specialty, from No. 1 to 15 (fine).

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JOHN W. QUICK, Proprietor.

QUICKSILVER

For Sale in Lots to Suit by
PARROTT & CO.,
306 California St., San Francisco, Cal.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, June 13, 1889.

Trade the past week has been fairly active; the call appears to be increasing from the agricultural districts. Heavy shipments were made to Seattle immediately following the fire in that city. Among machinists, foundrymen and iron-workers in general there is a more hopeful feeling, with orders coming in. It now looks as if the summer and fall months will prove very active for all engaged in the above branches.

For the month of May the imports of foreign goods show a valuation of $4,880,000, and for the first five months of the year the imports aggregate in value $23,865,562. The treasure imports by sea from foreign ports in the month of May aggregated in bullion as follows: Gold, $35,818, and silver, $126,330; and in coin as follows: Gold, $16,818, and silver, $89 924.

The local money market continues easy notwithstanding the near approach of the time for a free call for crop purposes. The fire in Seattle, destroying about $12,000,000 of property, had a temporary effect on our market, but which is now passing away. The heavy losses, about $3,000,000, met by the insurance companies, cause some derangement in exchanges and a passing effect on the money market, but as much of their wants will be met by drafts on home offices, transfers through the Sub-Treasury will be in order within a few days, so that the money withdrawn by the insurance companies here will be replaced by coin through these transfers. The imports by sea of treasure the past week were as follows: Coin, $15,046; bullion, $62,868. The latter came from Alaska. The exports of treasury by sea the past week were as follows: To Hongkong, Mexican dollars, $196,915; gold coin, $5435. To Japan, Mexican dollars, $72,000; silver bullion, $155,500.

In the speculative market there was more activity in cereal futures, with a stronger tone noted. In mining stocks the strong depression and gradual shrinkage of the past four weeks brought in large quantities of stock and created more activity at the close. In local securities, trading continues only fair; the very high prices restrict general business.

SILVER—The market held fairly strong at from 92½@92⅝c for shipment by last outgoing steamer; but after its sailing, buyers dropped bids to 92¼c. The drop in exchange is against the market, but this is expected to be only temporary. The drop in exchange is due to heavy offerings by the insurance companies who lost by the recent fire at Seattle. They are drawing funds to this coast so as to keep their surplus up to legal requirements. The production of the mines is reported to be unchanged.

The silver market to-day closed as follows: London, 42d; New York, 91⅞ to 92c; and San Francisco, 92¾c bid.

MEXICAN DOLLARS—The market has held fairly firm at quotations. The demand, although not active, is fair for the season of the year. The market is under good control, owing to supplies being well concentrated.

The market for Mexican dollars closed to-day at 74c for new.

QUICKSILVER—Receipts the past week aggregate 429 flasks. The market is easier at lower quotations. Receipts are larger, while the demand is reported to be slower.

BORAX—Receipts the past week aggregate 1235 centals. The market holds strong, with a good demand reported at the East.

LIME—Receipts the past week aggregate 4100 barrels.

TIN—Imports the past week were 3193 ingots from Australia, 5942 boxes tinplate by overland railroad, and 302 boxes from Port Townsend. The tinplate received by overland railroad is for the Pacific can manufacturing company, who, some time ago, bought 10,000 boxes in the East for fear of running short of supplies. The market for both spot and loading is dull and lower. Many vessels abroad are heading this way, and take freight at lower rates. The exports the past week by sea were 1112 boxes tinplate, and 3000 lbs. pig to Victoria, B. C.

COPPER — The market is without essential change. The tone appears to be stronger and healthier, under a freer consumptive demand.

LEAD—The market holds quite strong. The consumption both on this coast and at the East is large, larger than at this time in 1888.

IRON—The only importation the past week was 40 tons from Yaquina bay, Oregon. The market is without change. Foundrymen and iron-workers in general report a freer consumption with their holdings being reduced. Iron abroad is reported firm, as it is in the Eastern States, although at the East, active competition is still reported. Freight room from abroad is in shippers' favor, with some ships reported taking in iron for ballast.

COAL—Importations the past week were light; they aggregate as follows: From Australia, 2450 tons; Utsalady, 622; Departure bay, 5350; Seattle, 2064; Coos bay, 700. Total, 11,120 tons. The fire at Seattle, it is claimed, will temporarily interfere with receipts from that quarter, although the Black Diamond Coal Co. received some the past week shipped from Utsalady. There is an increased tonnage on berth at and on the way from New Castle, N. S. W., and Sydney for this port, San Diego and San Pedro, but of which very little is due in this month. Freights favor shipments from England, but the quantity on the way is light. Our advices from Australia report heavy rainfalls and the prospects favorable for a large wheat crop, which, if realized, will cause freights from Australia, after October next, to rule higher to this coast.

Eastern Metal Markets.

By Telegraph.

NEW YORK, June 12.—The supply of borax is running low; firm at 8⅛@8¾c. California and powdered, 7¾@8½c. In quicksilver, there is an easier feeling. A rather more animated tone attends copper. One hundred and fifty tons Santa Fe casting sold at 16c, and consumers are using lake ingot more freely at 12c. In pig lead a very fair business transpired at $3.95@4, spot and near future. Considerable is offered at $4 for July and August.

NEW YORK, June 12, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42 3-16	92¼	$12 00	$4 02½	$20 35
Friday	42⅛	92¼	12 00	4 02½	20 40
Saturday	42⅛	92¼	12 20	4 00	20 40
Monday	—	92¼	12 05	4 00	20 45
Tuesday	42 1-16	92¼	12 05	3 95	20 40
Wednesday	42	92	12 05	3 95	20 30

San Francisco Metal Market.

WHOLESALE.

THURSDAY June 13, 1889.

ANTIMONY	— @ 14
BORAX—Refined	7¼@ 7⅞
Powdered	7¼@ 7⅞
Concentrated	7 @ 7⅛
COPPER—	
Bolt	26 @ 27
Sheathing	26 @ —
Ingot	17½@ 18½
Fire Box Sheets	— @ 26
LEAD—Pig	4½@ —
Bar	5 @ —
Sheet	8 @ —
Pipe	9 @ —
Shot, discount 10% on 500 bags Drop, ₱ bag	1 45 @ —
Buck, ₱ bag	1 65 @ —
Chilled, do	1 85 @ —
STEEL—English, lb	16 @ 20
Canton tool	9½@ —
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Toe Calk	4½@ —
TINPLATE—B. V., steel grade, 14x20, P. S	4 60 @ 4 65
B. V., steel grade, 14x20, spot	4 70 @ 4 75
Obarcoal, 14x20	6 50 @ 7 00
do roofing, 14x20	5 37½@ 5 50
Pig tin, spot, ₱ lb, asking	22 @ 23
do, do, prompt shipment	— @ —
QUICKSILVER—By the flask	45 00 @47 50
Flasks, new	— @ —
Flasks, old	35 @ —
ZINC—Eng., ton, spot, in blk & sks, reaptvly	18 00 @20 00
Do, do, to load	13 00 @13 25

COKE—Spot.	To Load.
IRON—Glengarnock ton	27 00 @— — 27½@ —
Eglinton, ton	26 00 @— — 26½@ —
American Soft, No. 1, ton	— @31 00 31½@ —
Oregon Pig, ton	— @30 00 — @ —
Clay Lane White	— @24 50 25 @ —
Shotts, No. 1	28 50 @29 00 — @ —
Bar Iron (base price) ₱ lb	2¾@ 3 — @ —
Chrome iron ore, ₱ ton	— @10 00 — @ —

Lumber.

Pine, Fir and Spruce.

	RETAIL.	JOBBING.
Rough Pine, merchantable, 40 ft	$20 00	$18 00
41 to 50 ft	20 00	17 00
51 to 60 ft	22 00	19 00
61 to 70 ft	26 00	22 00
1x3, fencing	21 00	18 00
1x4, "	20 00	17 00
1x3, 1x4 and 1x6, odd lengths	18 00	15 00
Second quality	16 00	14 00
Selected	23 00	21 00
Clear, except for flooring	30 00	27 00
Clear for flooring	1 00	.....
Clear V. G. No. 1 flooring	5 00	.....
Firewood	13 00	9 00
Dressed Pine, flooring, No. 1, 1x6	31 00	28 00
No. 1, 1x4	33 00	29 00
No. 1, 1¼x4, 1¼x6, and odd sizes	36 00	32 00
All sizes, No. 2	26 00	23 00
Stepping, No. 1	43 00	34 00
Stepping, No. 2	33 00	24 00
Ship timber and plank, rough	26 00	17 00
Selected, planed 1 side, average 40 ft	28 00	23 00
" " 2 " " " "	30 00	25 00
" " 3 " " " "	32 00	27 00
" " 4 " " " "	34 00	29 00
Deck plank, rough, average 35 ft	34 00	31 00
Dressed, average 35 feet	39 00	34 50
Pickets, rough, B. M	19 00	15 00
4x1½, 4 ft long, ₱ M	5 50	4 00

Coal.

TO LOAD.

	Per Ton.		Per Ton.
*Australian	$ 6 75 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	16 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	6 00
Scotch Splint	8 00	Seattle	6 00
West Hartley	9 50	Coos Bay	5 00
Greta	8 00	Cannel	10 00
Westminster Brymbo	8 00	Egg, hard	17 00
Nanaimo	9 00	Cumberland, in sacks	18 50
Sydney	$ 8 00	do, bulk	17 50

*For August–September loading $6.50@6.75 is reported asked and $6@6.25 bid.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

PACIFIC BELT AND TRUSS CO., June 7. Capital stock, $50,000. Directors—A. T. Sherwood, Martin Armstrong, J. L. Boone, M. G. Loefler and J. A. Vaughan.

HONEY LAKE WATER CO., June 7. Capital stock, $50,000. Directors—W. A. Clark, S. W. Fuller, G. D. Cooper, J. B. Jardine and D. E. Hayes.

HARTMANN G. M. CO., June 7. Capital stock, $500,000. Directors—W. B. Miller, F. S. Zimmerman, W. J. Bevans, N. L. Lenham and C. F. Filer.

PACIFIC TILE AND BRICK CO., June 12. Capital stock, $100,000. Directors—John T. Davis, M. H. Turrill, M. C. Jewell, C. B. Turrill and J. French Davis.

TIOGA DISTRICT M. CO., June 12. Location, Tuolumne county. Capital stock, $500,000. Directors—Wm. B. Wightman, Frank G. Drum, Leon D. Smith and E. B. Clement of Oakland, and Wm. H. V. Cronise of San Francisco.

CALIFORNIA LEAD BATH AMALGAMATING CO., June 11. The company has purchased the Shields patent lead bath amalgamating apparatus and propose to put it in operation in this State. Capital stock, $100,000. Directors—A. M. Shields, Chas. J. Shields, Walter Morosco, Chas. H. Bacon and George W. Van Ness.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS
Bella Union Quicksilver M Co				20..	May 21..	June 24..	July 15..	A Halsey
Best & Belcher M Co	Nevada	43		25..	June 6..	July 11..	Aug 1..	L Osborn
Buena Vista Petroleum Co	California	34		50..	Apr 21..	May 30..	June 27..	J Morizio
Equitable Tunnel & M Co	Utah	34		5..	May 14..	June 20..	July 15..	C J Collins
Gould & Curry M Co	Nevada	62		30..	May 1..	June 5..	June 27..	A K Dustron
Gray Eagle M Co	California	13		05..	May 15..	Jun 25..	July 16..	O H Bogart
Inyo Marble Co	California	6		5..	May 14..	Jun 24..	July 24..	G W Luce
Kentuck M Co	Nevada	18		30..	Apr 26..	May 29..	June 19..	J W Pew
Locomotive M Co	Arizona	4		50..	Apr 25..	May 29..	June 18..	A H Fish
Morgan M Co	California	13		15..	May 9..	Jun 17..	July 8..	C S Neal
Nevada Queen M Co	Nevada	5		50..	June 3..	July 9..	July 30..	H Deas
Ophir M Co	Nevada	55		50..	May 11..	Jun 16..	July 2..	E B Holmes
Oak Con M Co	California	2		3..	Mar 23..	May 25..	June 20..	E J Ryan
Final Con M Co	Arizona	8		13..	May 15.	Jun 21..	July 12..	A Cheminant
Seg Belcher & Midas Con M Co	Nev	3		25..	June 4..	July 8..	July 29..	E B Holmes
Sierra Nevada M Co	Nevada	95		25..	June 7..	July 11..	July 31..	E L Parker
Teirakoff M Co	California	2		10..	May 18..	Jun 18..	July 18..	W J Gurnett
Union Con M Co	Nevada	38		25..	May 13..	Jun 19..	July 10..	J M Buffington
Weldon M Co	Arizona	13		10..	May 13..	Jun 18..	July 9..	A Waterman

COMPANY.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Bodie Con M Co	E L Burling	309 Montgomery St	Annual	June 17
Found Treasure M Co	J Stadfeldt	309 Montgomery St	Annual	June 20
Homestake M Co	I C Stump	309 Montgomery St		
Live Oak Drift Gravel M Co	J Morizio	328 Montgomery St	Annual	Aug 20
North Belle Isle M Co	J W Pew	328 Montgomery St	Annual	June 26

MEETINGS TO BE HELD.

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	May 10
Caledonia M Co	Nevada	A S Chemisant	328 Montgomery St	08	Apr 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	May 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Sales at San Francisco Stock Exchange.

THURSDAY, Jun. 6, 9:30 A. M.

200	Alta	300	Justice 1.30
		50	Mono 1.10
200	Alta 1.35	400	Mexican 3.40
50	Alpha 1.45	1	O Nev. Queen 1.00
600	Baltimore 15c	700	New York 70c
300	Belcher 3.50	450	N. Belle Is 1.10
105	Best & B 3.25	450	Ophir 4 75
100	Benton 3.30	300	Overman 1.30
300	Bullion 70c	350	Potosi 1.95
550	Challar 2.00	100	Savage 2.30
200	Crown Point 3.10	300	S. B. & M 2.60
100	Con. Imperial 45c	100	Sierra Nevada 2.35
200	Con Va & Cal 7.37½	500	Tuscarora 05c
300	Gould & Curry 2.35	250	Union 3.40
100	Hale & Nor 3.70	50	Weldon 20c
200	Julia 25	200	W Comstock 30c

Mining Share Market.

The market the past week for the leading Comstocks shaded off up to Monday, when a drop of about 10 per cent set in, after which values steadied, followed by a very slight reaction on yesterday and to-day (Thursday). There is no doubt, outside of chronic bulls, outside operators are disgusted at the action of the market, many of whom have sold out, while others again are letting go at every favorable opportunity. The drop this week threw considerable margined stock on the market, and necessitated others on a margin to put up more money. Since about April 20th the shrinkage in the price of the Comstock stocks has been from 60 to 80 per cent, with apparently the end not yet, although before going lower there may be more reactions than is now looked for by the trading public. In outside stocks the Quijotoas have held firm, the Tuscaroras have acted "groggy," and the Bodies—well, they are a puzzle. From a thorough canvass of the market, we are convinced that a quiet but thoroughly active, if not hot, contest is going on to get control of Bodie at the annual election to be held on next Monday. On the surface it would look as if the contest for control is for office and attending revenue, but yet there may be a deeper significance, for both Capt. Kelly and Archie Borland have high reputations for being experienced and practical miners, and therefore there may possibly be something else at the bottom of the contest. Who knows but there may be every indication on the lower levels in the mine of the finding of the rich gold ledge they have been searching for? Reliable, authentic news from the Bodie mines is hard to get, yet we are in the hope of having arrangements so perfected as to secure such advices at an early day.

The news from the Comstock mines is of an encouraging character. In the Mexican crosscut an important improvement is reported, as there is in Best and Belcher on the 625-foot level, in Gould and Curry on the 490-foot level, and in Belcher on the 1100-foot level. A decided change for the better is also reported in Yellow Jacket and Crown Point. Heretofore all reported improvements in the mines have, after a small spurt, caused stocks to sink lower in value than before the strike or improvement. It is the crawfishing of stock before favorable reports that disgusts outside operators. The work going on in the other mines is said to be deserving of careful watching as the work goes west. The Cal. Pan-Mill will probably start up by July 1st. The Eureka mill will, so says report, be run by steam after the water gives out, provided the ore in the Con. Virginia does not give out. From the Bodies there are conflicting reports, while the official reports are only "driving ahead" the crosscuts, drifts, raises, etc., all of which is very entertaining to the searcher after information. It is about as enticing as fish bones with the meat off. From the Tuscaroras continued reports of the most favorable character are received, all of which outside shareholders get, while others appear to get the benefit of the money raised from assessments and bullion turned out. From the Quijotoas all advices are of a very favorable character. The Eureka Consolidated Mill is to start up next week, while stockholders are favored with an assessment on the stock, probably for the sake of variety.

The May bullion returns from the Con. Virginia give the yield at nearly 83 per cent of amalgam assay, and that of the Hale and Norcross at 79.9 per cent. This is marked and gratifying change for the better, and is evidence that bullion production is being watched more closely by the mine managers. The latter can go still further and with deserving praise from long-suffering stockholders by making public the assay value of the ore at the mine; that is, the assay by carload as it is shipped to the mill.

BRIDGE AT KNIGHT'S LANDING.—The Yolo county supervisors will join the S. P. Co. and Sutter county in building a free bridge across the Sacramento river at Knight's Landing, and have appropriated $5000 for that purpose.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 22.		WEEK ENDING May 28.		WEEK ENDING June 5.		WEEK ENDING June 12.	
Alpha	2.65	2.10	1.70	1.85	1.70	1.85	1.35	1.65
Alta	1.40	1.65	1.45	1.65	1.45	1.55	1.35	1.50
Andes	.50	.75	.60	.70	.60	.70	.50	.55
Argenta	....	....	....	....	....	....	....	....
Belcher	3.75	4.95	3.80	4.20	3.95	4.30	3.30	4.05
Best & Belcher	3.50	3.90	3.65	3.95	3.70	3.95	3.00	3.70
Bullion	.70	.90	.80	.85	.80	.85	.60	.75
Baltimore	....	.20	.15	.15	....	.2	....	.10
Belle Isle	....	....	.30	.30	.30	.35	....	.25
Bodie Con	1.45	1.70	1.50	2.10	1.70	1.95	1.25	1.70
Benton	....	....	....	....	....	2.70	3.00	3.50
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.45	.50	.40	.55	.45	.50	.30	.40
Commonwealth	4 70	4.90	4.90	5½	5	5⅝	4.60	4.70
Con. Va. & Cal	7.50	7⅝	7¼	7⅝	7⅛	7⅝	7.00	7⅜
Challenge	2.70	3.30	3.00	3.15	2.80	3 10	2.35	2.85
Chollar	2.05	2.60	2.15	2.45	2 10	2.30	1.75	2.55
Confidence	.7	7⅜	7⅛	7⅛	6.75	7⅜	6	6⅜
Con. Imperial	.50	.60	.50	.60	.50	.55	.35	.50
Caledonia	.20	.35	.25	.25	.20	.30	.20	.25
Con. Pacific	....	....	....	.15	....	....	....	....
Crown Point	3.40	4.3	3.45	3.80	3.55	3.80	2.90	3.65
Crocker	.40	.45	.35	.40	.40	.50	.40	.45
Central	....	....	....	....	....	....	....	....
Dudley	....	....	.20	.30	....	....	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	1.50	....	....	2.00	3.00	....	2.50
Exchequer	.75	.95	.80	.85	.80	.85	.65	.85
Grand Prize	.70	.80	.65	.75	.80	.85	.80	.90
Gould & Curry	2.10	2.35	2.15	2.45	2 50	2.65	2.15	2.60
Hale & Norcross	3.75	4.30	3.90	4.25	3.95	4.05	3.55	3.85
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	.20	.30	.25	.25	.25	.30	....	.25
Justice	1.00	1.20	1.05	1.15	1.10	1.15	....	1.10
Kentuck	1.10	1.20	....	....	1.45	1.70	1.20	1.50
Lady Wash	.25	.35	....	....	....	.35	.35	.40
Locomotive	....	....	....	....	....	.10	....	....
Martin White	....	....	....	....	....	....	....	....
Mono	1.35	1.60	1.60	1.85	1.60	1.65	1.05	1.35
Mexican	3.30	4.45	3.40	3.75	3.45	3.75	3.05	3 70
Mt. Diablo	....	....	....	....	....	....	....	....
Navajo	.70	.75	.50	.60	....	.50	....	.50
North Belle Isle	1.35	1.50	1.35	1.50	1.00	1.50	1.05	1.10
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	1.20	1.50	1.35	1.45	.90	1.50	1.00	1.05
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.45	1.55	1.50	1.6	1.55	1.65	1.45	1.60
Ophir	4.10	4 50	4.30	4.75	4.40	4.6	4.35	4.60
Overman	1.10	1.45	1.20	1.35	1 30	1.45	1.25	1.50
Potosi	2.20	2.45	2.20	2.45	2.1C	2.30	1.85	2.15
Peerless	.50	.60	.50	.60	.55	.60	....	.50
Peer	....	.25	.25	.25	.20	.25	.20	.25
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.30	2.60	2.45	2.75	2.60	2.65	2.05	2.50
S. B. & M	2.80	3.15	2.75	3.05	2.75	3.05	2.55	2 95
Sierra Nevada	2.65	3.45	2.55	2.85	2.60	2.85	2.20	2.75
Silver Hill	.35	.50	.45	.50	.40	.50	.40	.45
Silver King	....	....	....	....	....	....	....	....
Scorpion	.20	.55	.20	.25	.20	.25	.20	.25
St. Louis	.40	.50	....	....	....	....	....	....
Syndicate	....	....	....	....	....	....	....	....
Union Con	3.30	4.45	3.35	3.75	3 40	3.65	2.80	3.50
Utah	1.00	1.30	1.05	1.25	1.10	1.15	.90	1.10
Yellow Jacket	3.80	4.65	3.80	4.00	3.80	4.00	3.15	3.80
	....	....	....	....	....	....	....	....

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Chollar, June 8, $18,000; Commonwealth, 8, $12,000; Con. Cal. and Virginia (for May) $109,865; Hanauer, 5, $2000; Hanauer, 6, $2900; 7, $2200. Last week's bullion shipments from Salt Lake were 11 cars bullion, 289,410 pounds; 59 cars silver and lead ore, 1,745,570 pounds; 1 car copper ore, 37,100 pounds; total, 71 cars, 2,072,080 pounds.

Books on Working Ores.

BY GUIDO KUSTEL, M. E.

ROASTING OF GOLD AND SILVER ORES (Second Edition) and the Extraction of their Respective Metals without Quicksilver. By GUIDO KUSTEL, M. E. 1880.

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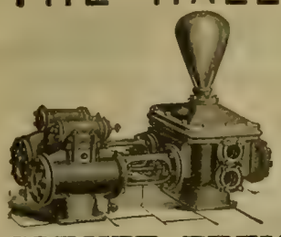

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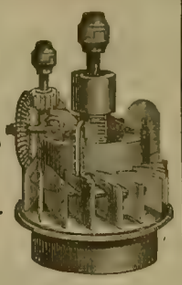

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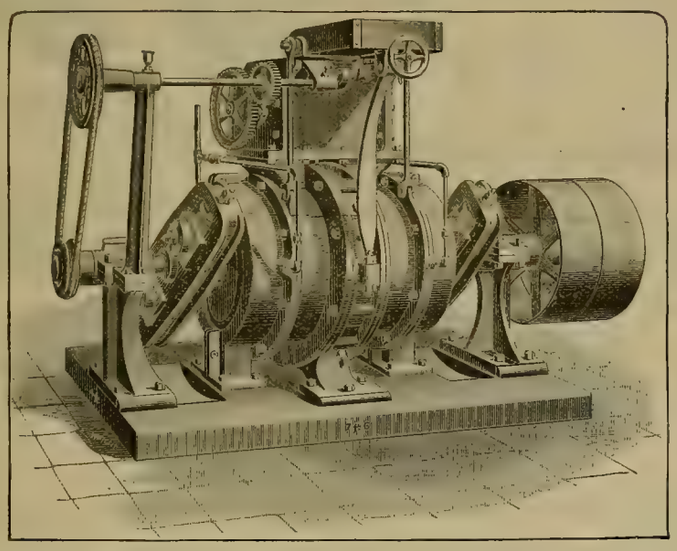

IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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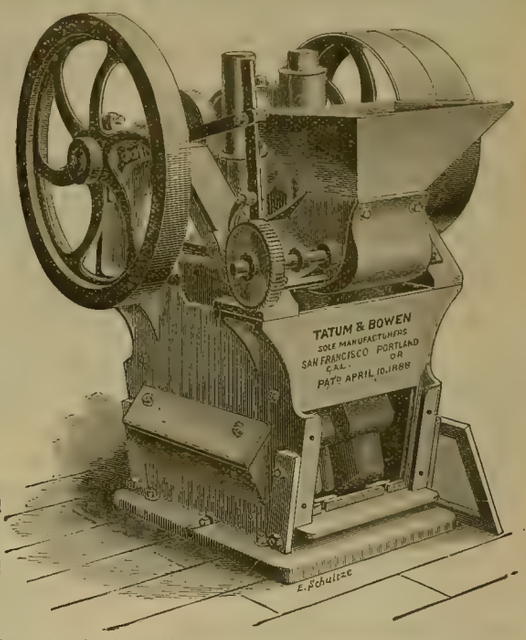

Attached to each Mill is an effective

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THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

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IMPROVED ROCK BREAKER.

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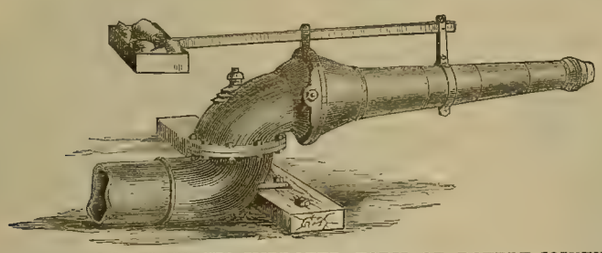

THE ABOVE CUT ILLUSTRATES **THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS** which we manufacture. We guarantee purchasers of this form of Giants against all costs, expenses or damages which may arise from any adverse suits or actions at law. We are further prepared to furnish **Single-Jointed Giants** when required. Prices, discounts and Catalogues of our specialties of **Hydraulic Mining Machinery** sent on application.

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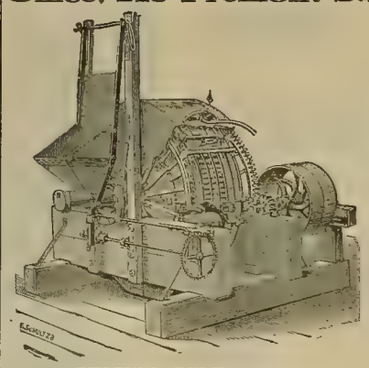
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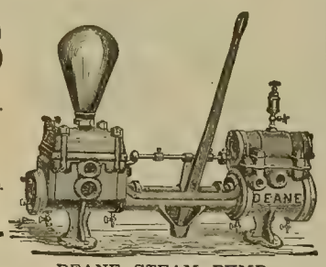

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COAL MINES OF THE WESTERN COAST.
A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for $2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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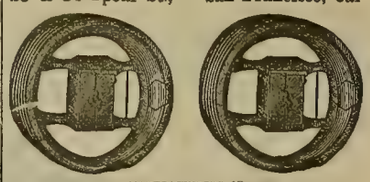
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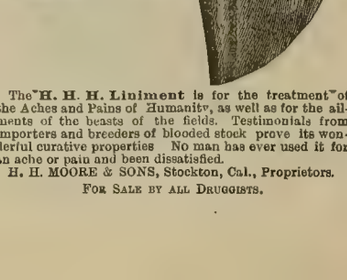
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FOR SALE BY ALL DRUGGISTS.

IMPROVED BELT FRUE ORE CONCENTRATOR,

The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, $900, f. o. b.
Price of Plain Belt Frue Vanner, $575, f. o. b.

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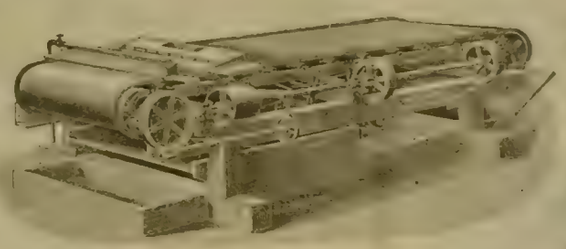

Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIRS: Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 41 additional Frues and more stamps have been purchased. ADAMS & CARTER.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., Room 15, No. 132 Market Street, San Francisco, Cal.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

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Price "Triumph" Concentrators, with Improved (Patented) Belt - - - - $650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt - - - - - - - $550 f. o. b.

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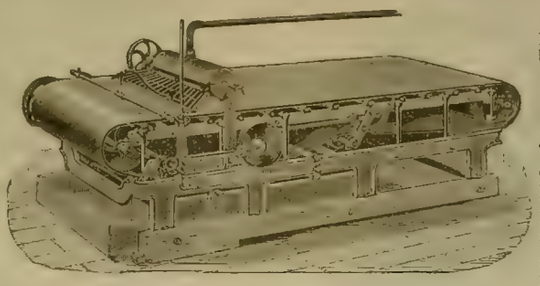
We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

—o—

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.

GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.

Joshua Hendy Machine Works, 51 to 51 Fremont St., S. F., Cal.:

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vann or concentrating devices. DAVID McKAY, JR.,
[Signed] Sup't North Star and Original Empire Mining Co

N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

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AND GAS PLANTS,
CONVERSE PATENT LOCK-JOINT PIPE.

Strength, Durability, Economy.

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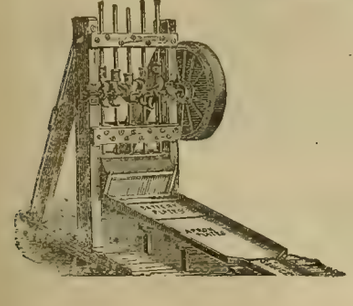

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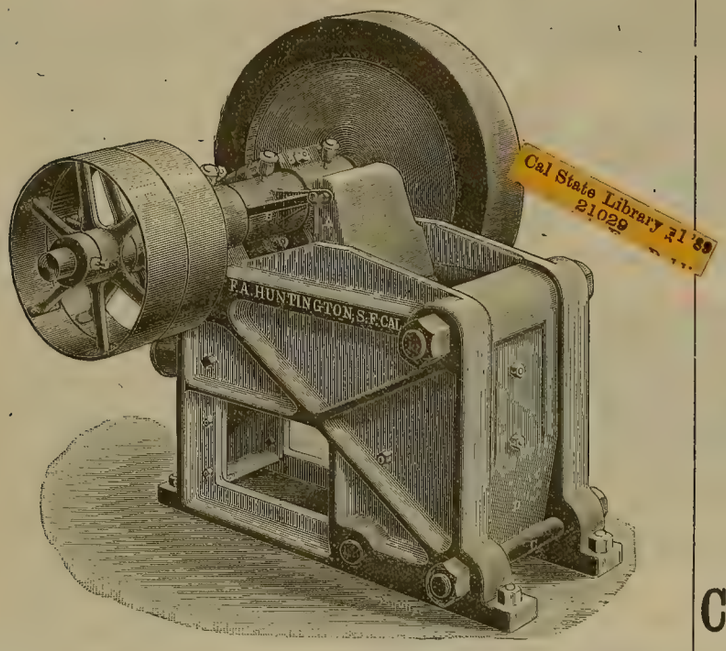

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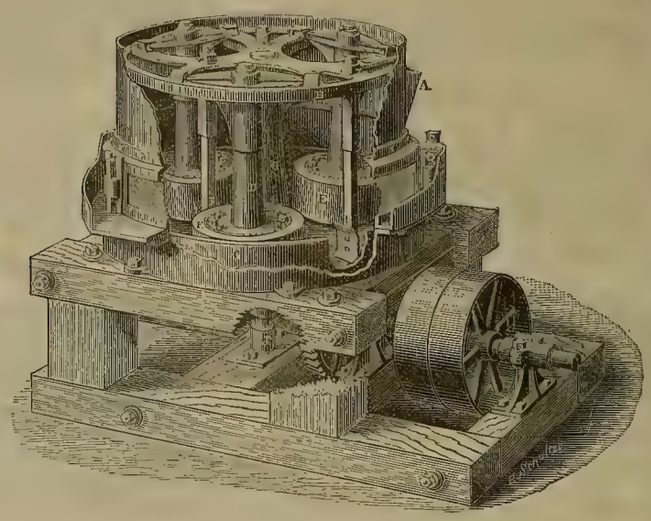
Huntington's Improved Rock-Breaker.

The main features of this machine are strength, ease of adjustment and simplicity of construction.

The movable jaw *A* is worked by the eccentric *B* and is pivoted at the bottom. The stationary jaw *D* is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt *C*. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt *C* and the jaw *D*. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



F. A. HUNTINGTON'S
Centrifugal Roller Quartz Mill.

The following will explain the above cut:

The ore and water being fed into the mill at the hopper *A*, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

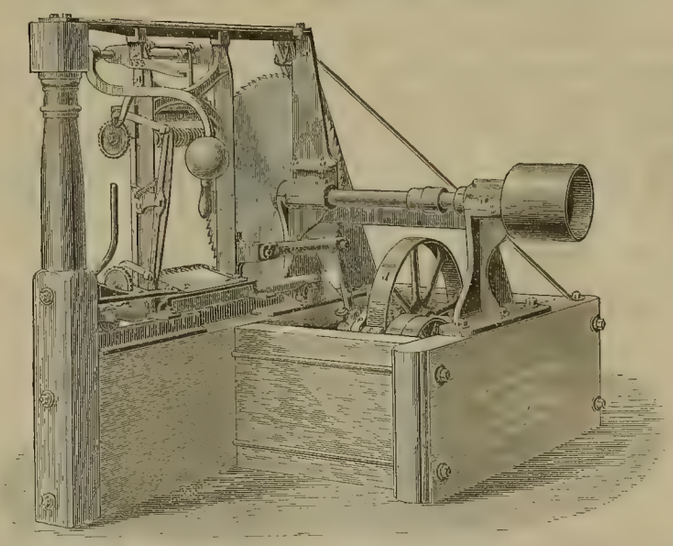
The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet crushing and gold saving it has no equal.

I claim especial merit in that feature of this system *which prevents* ALL FLOURING of gold and quicksilver, and the consequent loss of gold that attends stamp milling.

For the economical working of ore that contains sulphurets, I particularly claim the adaption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.

F. A. HUNTINGTON'S
PATENT SHINGLE MACHINE.

This Machine is so well and favorably known by all the principal Lumbermen on the Pacific Coast that it is useless to go into any detailed account of its merits; suffice it to say that recent improvements in a new, quick return feed-works has placed it far ahead of all competitors. This feed-works is positive and uniform in its action and obviates all the jar or tremor formerly given to the machine by the weight used in the old style feed.



For simplicity, durability and rapidity of action, these machines have no equal, cutting from 50,000 to 75,500 shingles per day.

Price, complete with Jointer and one 38-inch Saw, $475.00.

The new feed-works can be applied to any of the old machines.

Price $100.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

TWENTY-PAGE EDITION.

VOL. LVIII. Number 25.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, JUNE 22, 1889.

Three Dollars per Annum
Single Copies, 10 Cts.

Bimetallism in England.

Three thousand copies of the final report of the British Royal Commission appointed to inquire into the recent changes in the relative values of the precious metals, authorized to be issued by the United States Government, are now ready or distribution. The publication of this report will enable a large class of readers to arrive at a more correct understanding of the subject than through any other source of information, owing to the thoroughness with which the inquiry was made.

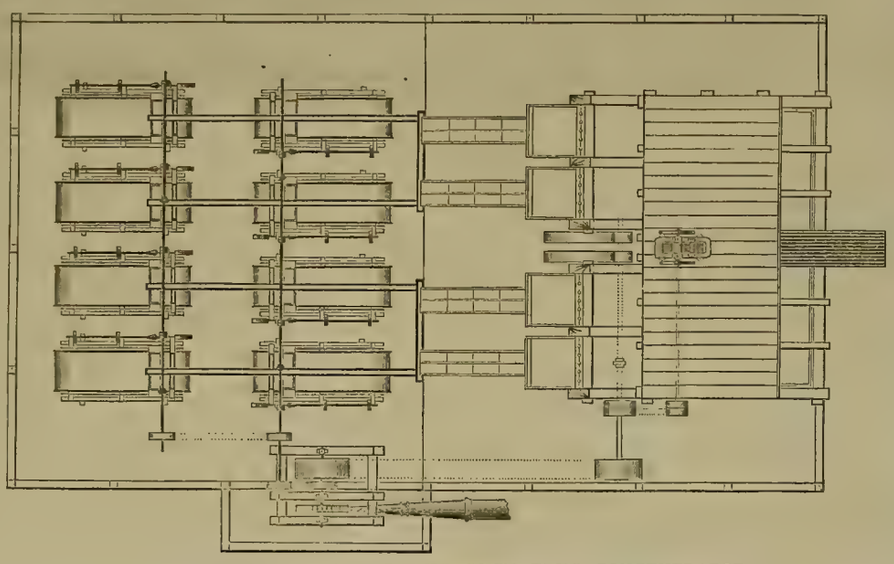
It appears by the report that six of the commissioners are outspoken in favor of bimetallism, while the other six are more conservative in their views. The only positive recommendation by the latter is abolition of the duty of 1s. 6d. per ounce on silver plate manufactured in Great Britain or imported from abroad. Four of them, Herschel, Freemantle, Farrer and Courtney, recommend the issue of silver certificates of the denomination of 10 shillings and £1 as a means of checking the decline in price of the metal, besides producing an economy in the use of gold.

The other six commissioners, namely, Messrs. Mallet, Balfour, Chaplin, Barbour, Houldsworth and Montagu, not only concur in the recommendation for the repeal of the duty upon silver plate and for the issue of silver certificates, but declare emphatically in favor of an international conference between the United Kingdom, India, and other British colonies and the United States, Germany, and the States forming the Latin Union, to arrive at a common agreement for the free coinage of both metals into legal-tender money at a ratio to be hereafter agreed upon.

The commission, as a whole, toward the close of their report, says: "Failing any attempt to re-establish the connecting link between the two metals, it seems probable that the general tendency of the commercial nations of the world will be toward a single gold standard. Any step in that direction would, of course, aggravate all the evils of the existing situation, and could not fail to have a most injurious effect upon the progress of the world. A further fall in the value of silver might at any moment give rise to further evils of great and indefinite magnitude in India, while a further rise in the value of gold might produce the most serious consequences at home."

COPPER ORE BY SEA.—A New York telegram says: Among the curiosities of commerce is the unloading of a lot of copper ore from the bark Iceberg at the stores of George A. Lawrence. The ore has been transported from the copper mines in Montana, this side of the Rocky mountains, to San Francisco, thence by the Iceberg hither. It will be taken to France.

MECHANICS' INSTITUTE.—At the last meeting of the directors of the Mechanics' Institute, the Committee on Resolutions of Respect and Regret presented their reports on the retirement of George Spaulding, who has served for 16 years, James Spiers, who served as trustee in 1866, and has served continuously for the past 12 years, and Columbus Waterhouse, who has served since 1877. The resolutions set forth their valuable services to the Institute and the regret of the Board of Managers at their loss.



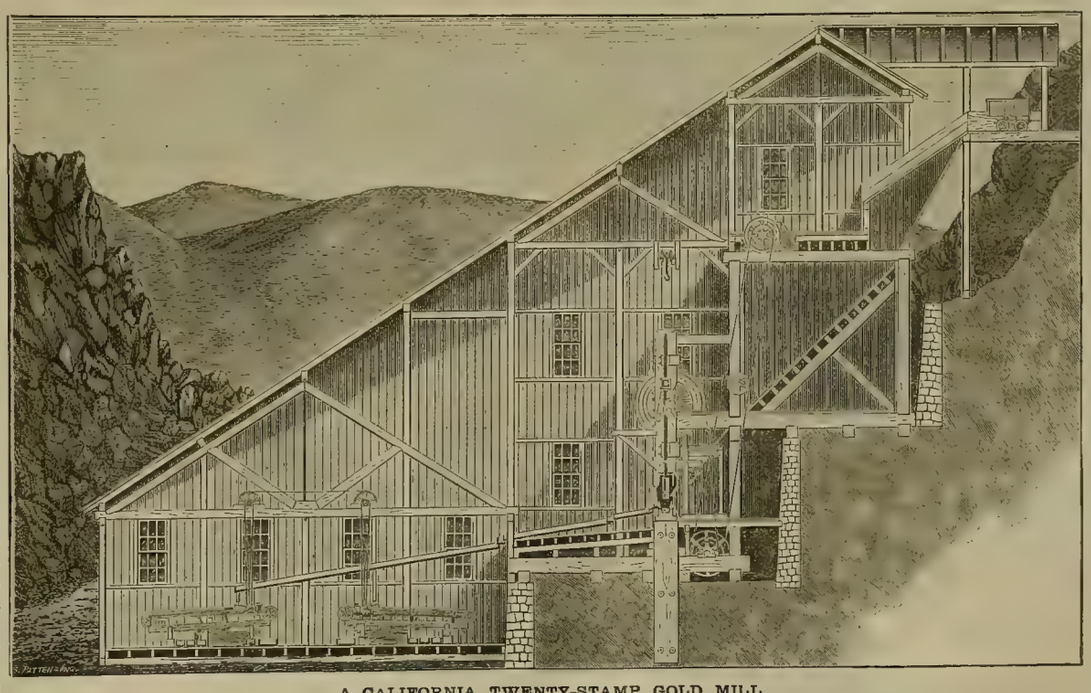
PLAN OF TWENTY-STAMP MILL WITH FRUE CONCENTRATOR.

Gold-Mills.

The cuts on this page will give a good idea of the general plan of a modern 20-stamp gold-mill with Frue concentrators. The ore, upon coming from the mine, is dumped over an inclined grizzly or ore screen at the top of mill, that portion of the ore which is fine enough passing through and falling into ore bin behind batteries; while the larger pieces are crushed by the rock-breaker to the requisite size. The ore is then drawn from bins into the feeders which supply the batteries automatically. Inside of the mortars are placed one or more copper plates covered with quicksilver; the table in front of mortar has also silver-plated copper plates over which the crushed ore and water flow after being discharged through battery screens. The free gold in the ore is caught on both inside and outside copper plates by means of the quicksilver, forming gold amalgam, which at intervals is scraped off and retorted. In retorting, the quicksilver is vaporized and afterward condensed, the gold thus left being melted and run into ingot molds.

Most gold ores will yield only a portion of their contents to the simple milling process, because some of the precious metal is in combination with sulphur and baser metals. It is for the purpose of saving these "sulphurets," as they are generally called, that Frue concentrators are placed below the copper plates. The concentrates are subsequently treated by the chlorination process or are sold to smelting works.

It is often the case that gold ores do not carry sufficient, if any, sulphurets to warrant the use of concentrators; in which case the portion of mill covering concentrators is omitted, and, as will be seen, can be easily added should subsequent developments in the mine require them. We take these cuts from the recently published mining machinery catalogue of the Fulton Iron Works. They also give a table of specifications for gold-mills of various sizes.



A CALIFORNIA TWENTY-STAMP GOLD MILL

A SHORT time ago, miners working in the Sunnyside claim near Downieville, Sierra county, took out four large gold nuggets. The largest weighs 181 ounces, and is worth $3200. In shape and size it resembles a small cobblestone.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Northern Counties of California—No. 4.

Gravel Mines of Siskiyou County.

[Written for the Press by JAMES H. CROSSMAN.]

Though mining is yet in its infancy in Siskiyou county, and agriculture the leading feature, the day is not far distant when the product from its mines will largely exceed that from its agricultural fields. Gold is the predominating metal, and not only found in place in well-defined veins of quartz and auriferous slate, but large areas of placer ground as yet remain intact in the deep beds of rivers, high bars, benches and terraces that line the banks for hundreds of feet above the present river-bed, and which will yield an abundant harvest of the precious metal for many years to come. The eighth annual report of the California State Mining Bureau has devoted much space to this subject (pages 581 to 631), to which we refer our readers for more particular information. Here, as elsewhere in California, there have been several systems (six in all) introduced for working the placers, each adapted to the condition in which the gravel occurs.

The Sluicing System.

The ordinary riffled sluice, pick and shovel have been used in the shoal and now nearly exhausted placers of beds of streams and bars. These grounds are still each successive year reworked by Chinamen, who are content with a small per diem for their labor.

The head and wing dam system is used in the beds of rivers and running streams.

This system either requires capital or organized labor. A company of from four to eight men is formed, and a favorable locality selected. Virgin ground on bars or in eddies is considered essential to success. If without funds, an accommodating storekeeper is secured, who is willing to take the chances on the outcome for the material and lumber, rope, provisions, etc., that he may furnish while the claim is being opened, operated, and ground tested. This class of mining is considered "extra" hazardous, and corresponding prices are asked for the equipment of the claim which in the aggregate varies from $2000 to $5000 before any results can be realized, and a dead loss should the bedrock when reached not prove productive or an unexpected and sudden rise in the river sweep everything away. A rise invariably occurs in the fall and the loss is usually total. Work is commenced in the spring—usually in June—when the river has reached a sufficiently low stage. The season, if propitious, lasts four months. The work is inaugurated by first building cribs of poles and timber which are placed in position in the swift-running current of these torrential streams. Guyed by ropes and weighted by rock, the cribs are sunk to the gravelly bed, often reaching a depth of from 12 to 15 feet, using double cribs.

Single cribs suffice for a depth from five to eight feet. During process of construction the crib-builders are often either swimming or wading in the icy-cold stream and powerful current and often losing their lives. These cribs serve as a support for the wing-dam proper and foundation for the powerful pumping and hoisting machinery that it is necessary to use to free the water and hoist the gravel. In the construction of both crib and dams they are lined with boards and plank held in position by the filling of clay and earth wheeled in from the river banks, together with the hydrostatic pressure of the river water, as the water in the crib space is removed. On the completion of the side dam the head and foot dam are placed in position and pumps put in place, the motor being the current of the river as it impinges on large breast-wheels. The water once pumped out, sinking commences often to a depth of from 40 to 60 feet through sand, rock and gravel. The powerful "Bull" or hoisting-wheel raises enormous bowlders of tons in weight which are swung shoreward by the long arm of the derrick. By the shorter arm the gravel is dumped on to a platform which discharges from an inclined plane into the sluices. The gold is saved in the riffles and the debris is dumped into the channel's current below the foot dam or opposite, the sluice being supplied with water from a large bucket-wheel that is also propelled by the river's current.

The Back-Channel System

Is either worked by the last-described system or by open pits cut longitudinally with the river course. The latter deposits antedate the more modern river channel, and originated from comparatively recent slides from the river banks or mountain slopes, filling the river bed and turning its course, the running water eroding the opposite banks and forming new troughs or channels in the bedded rocks. These back channels as a rule are richer than those of more recent origin. The next in order is the

Drifting System,

Which is in use in the high bars above the channel proper. These bars are also formed by the same causes, viz., slips or slides of earth changing the course of the river. The superincumbent mass being non-auriferous and often of great depth, these deposits are worked from tunnels driven from the lowest possible level attainable through the rim rock, crossing the inner channel at a right angle. On reaching its center, longitudinal drifts are driven to the boundary line of the claim, from which gangways are driven at right angles every 100 feet on either side to the raising rim rock. At the terminal point of these gangways longitudinal levels are driven, corresponding with the central and equi-distant, thus blocking out the ground into squares or parallelograms, establishing a system of thorough communication and ventilation. The claim is now opened and ready for the extraction of the auriferous gravels. Breasting is commenced from back to the central tunnel, using single posts and caps. The boulders and worthless top gravel are thrown back, forming false pillars, which serve to support the roof of the undermined and excavated ground. As the stope advances both post and caps are withdrawn and used on the next set. It is usual to carry in the breast with the bottom gravel from six to eight inches of bedrock, which often contains pockets and crevices rich in gold. Should these back channels be below the modern river bed, pumps propelled by river-water are used during the winter months and at a high stage of water the work is suspended. The same system has been adopted in working the channels of the ancient or Pliocene rivers.

The Hydraulic Elevator System

Is in use where the natural grade is not sufficient to carry off the debris without artificial elevation. This is accomplished by the assistance of the hydraulic gravel elevator, which, by the force of water under a sufficient pressure head raises the auriferous gravel to any hight that may be required to secure grade. This system has been thoroughly tested and successfully worked by the North Bloomfield Gravel Mining Co. in Nevada county, and at Quartz valley in Siskiyou county, and at the placer grounds of the Yreka Canal Gold Mining Co., same county. In the latter place a No. 2.16 inch elevator was placed in position and operated during a period of nearly three years. It was found that a volume of 650 miner's inches of water under 266 feet of pressure supplied two hydraulic giants for bank washings and bedrock sluicing. It also supplied the elevator and its accessory water-lifter with water for raising earth, sand and gravel piped to a hight of 39 feet.

Siskiyou county contains large areas of valley lands that are rich in auriferous earth and gravel that cannot be successfully worked by any other process.

For instance, on Yreka creek, from Greenhorn gulch to its junction with the Shasta river, a distance of 4½ miles, there is about 1000 acres of gravel known and proved to be rich. It has a grade of only 80 feet to the mile—too light for sluices. On Cotton Wood creek, near its junction with the Klamath river, we find 320 acres of valley land proved to be rich in gold, but grade too light to work it by any other process. The same with Quartz valley, 6 miles long by 2 miles in width, comprising 2000 acres; also on Oro Fino we find 400 acres. On McAdams creek, a tributary of Scott river, the bed is virgin for four miles up from its mouth. The ground being from 60 to 110 feet deep, can be better worked by the "drift" system, as the pay is largely on the bedrock and grade said to be sufficient.

The Hydraulic System.

The gravel deposits previously described, however, are of minor importance in comparison with the immense quantities of auriferous material that has been deposited in older channels of the modern river system lying parallel with but elevated from 100 to 400 feet above the present river-bed. These channels are usually three in number, trough-shaped, with their rims intact, of considerable width and filled with rich auriferous gravel. It is this class of mining that gives pith and moment to hydraulic mining on the Klamath river and its tributaries from Scott Bar to the Pacific ocean.

Ruby City Mines, W. T.

EDITORS PRESS:—A few lines from this new and progressive mining camp will be read by many of your California readers. As this is so far in the interior, but little is known as yet of its immense wealth. The mines in the Ruby district are opening up rich and satisfactory to the owners. The Arlington has recently made an extensive opening in their mine by cutting through the entire thickness of the ledge for the satisfaction of finding the hanging-wall, which proved to be 14 feet wide exclusive of the width of tunnel run on footwall, making the full width of ledge 20 feet between walls. About 50 pounds of the rock was shipped to Portland, taken as an average of the entire ledge. Various assays made showed silver, $340 per ton. As soon as the result was made known on the streets in Portland, stock began to raise and a boom was the result. The Arlington Co. can boast to-day of having 50,000 tons of ore opened ready for stoping. The ledge varies from 6 to 20 feet wide, with black sulphides of silver regularly disseminated through it; it also produces a small percentage of copper, zinc blende, antimonial silver and galena. One point of good character about the ledge is that wherever a large swell of an unusual size occurs, it is by far richer than the small portions of the ledge. A great many mining men will naturally ask the question why the owners of such a wonderful mine do not put up machinery and turn out silver bars. It is for this reason: the camp is situated about 160 miles from a railroad, which makes hauling of machinery and supplies rather expensive at the present time. In the meantime the N. P. R. R. Co. are building a road toward this camp as fast as possible. They completed 45 miles last winter, and by this fall of 1889 expect to have it within 60 miles of Ruby. Then freights of all kinds can be delivered so as to make mining profitable. During this time several of the mines will be extensively developed ready for machinery of large capacity, when silver bars can be shipped through the country with safety.

Montana capitalists are operating day and night on the famous Fourth of July claim recently purchased by them with good results. Steam hoisting works are now on the way for more extensive operations. The Modoc Chief is also working four men. The owners, Messrs. Murray & McPherson, have a splendid prospect, and one that will yet yield to them handsome sums of money, as the mineral obtained is of the highest grade. I can say that none are more deserving than the two enterprising and energetic miners above mentioned. Little has been done in the War Eagle or Idaho, owing to a deal of stock. These properties are owned by St. Paul and Spokane Falls capitalists. These mines are developed to an extent to prove them to be good properties. The mines of Conconully are opening up rich. The Lone Star is working about 17 men, sinking with a small steam hoisting engine and with a Cameron pump. They crosscut the ledge about every 25 feet with satisfactory results. The Wannacut Lake district is furnishing good gold sulphurets containing average assays of from $50 to $300 per ton. Work will not be extensively carried on until the railroad gets nearer; then several claims will be developed in a way to justify the owners to invest in machinery. The construction of buildings is steadily going on in the city of Loup Loup, which is the business center of all the principal mines. A MINER.

Economical Mining.

We take the following description of the admirable work in the Terrible mine at Ilse, Custer county, Colorado, from the *Mining Industry*. When the amount of timbering that has to be done is taken into account, it is a wonderful record. It is probably the largest mine in Colorado and was closed down owing to the low price of lead.

It is purely a lead mine, and the only one in the State that has been worked exclusively for that metal. It is owned by the Omaha and Grant smelting people, and its ore is used by them to supply the lack of lead that is sometimes experienced. The ore is exclusively a lead carbonate, entirely free from sulphur, and carrying very little silver. The mine is a vein, dipping about 70° from the horizontal, and measuring 119 feet from wall to wall. Its walls are rhyolite, there being no lime found in the country. The ore body, as it is mined, is 87 feet in width, and it is timbered with square sets. An average of 57,000 feet of timber has been used monthly during the past year. The ore is concentrated without any hand sorting, 10 tons being put into one, which averages 68 per cent lead. For concentration, Cornish rolls and Hartz jigs only are used. The average daily product of the mine during the past year has been 150 tons, but 1000 tons could be easily produced with the present opening and hoisting facilities. It is now 300 feet deep. It was expected that the character of the ore would change below water-level, which was at a depth of 100 feet, but it has not changed; no galena, zinc, or sulphides have been found. The shaft is vertical, 5x15 feet in the clear, fitted with a single deck-cage that carries two cars. Sinking the shaft, including timbering, cost $16 per foot. The entire cost of hoisting the ore during the past year, including fuel, engineers, pumping, etc., it is reported, has amounted to but 13 cents per ton; and the entire cost of putting the ore on the cars, including mining, timbering, hoisting, manager's salary, and hauling nine miles to the railway, has been but $1.46 per ton. This is the cheapest mining ever reported in Colorado. No man has yet been killed or injured in the mine, and it is said to be the best sample of good work and timbering in the State.

Allanite.

[Read before the Santa Barbara Society of Natural History by DR. LORENZO G. YATES, F. L. S.]

This mineral was named after Mr. T. Allan, who discovered it among mineral specimens taken from East Greenland to Scotland by Mr. C. Giesecke. It has since been reported from one locality in Norway, two localities in Pennsylvania, East Bradford and Bethlehem; from Franklin, N. J., and some few other localities furnish varieties of the species. Now Santa Barbara claims the distinction of furnishing a new locality.

This mineral is a peculiar combination of some of the rarer metals cerium, lanthanum, didymium, and sometimes yttrium and traces of glucinum, silica, alumina, lime and iron being always present; magnesium and water in nearly all of the reported analyses, and occasionally manganese, soda and copper. It is quite varied in its composition and appearance, and although neither beautiful to the eye nor of commercial value, it is very interesting to mineralogists, and adds one more species to the list of the minerals of California.

Riverside.

Our Correspondent in San Bernardino County.

Riverside is the name of a thriving and beautiful city, and the title of a colony or settlement which embraces 56 square miles. All of this region is incorporated, and the city proper is merely the nucleus of the large colony. There is no similar area on the Pacific Coast, if indeed in the United States, so beautifully planned, so thoroughly tilled, and so productive of the luscious fruits of earth. We append below an interesting description of Riverside, lately issued by the Board of Trade of that place, and the engravings used herewith are from the same source. As the pioneer and most remarkable colony in California, the sketch deserves to be read carefully, and few will read it without interest and admiration:

It is but 18 years since a small band of hopeful men, wearied with the cyclones, blizzards, and other inclemencies of the Northwestern States, east of the Mississippi, sought a place upon the Pacific Coast for a more congenial home. After much investigation they decided upon Southern California, and finally selected a few thousand acres of land upon the south bank of the Santa Ana river, in San Bernardino county, including that portion of the elevated plain upon which the city of Riverside is located.

When a retrospective view is taken of the times in which this settlement was made, the condition of the country, financially and politically, and the discouraging nature of their surroundings, it must be admitted that these pioneers "builded wiser than they knew," and that to most persons their venture seemed a visionary one.

Irrigation Necessary.

Southern California was an arid section, subject to long periods of excessive drouth, with an occasional wet season. No crop of any kind could be relied upon with any certainty without irrigation, and irrigation as introduced by the Padres and their successors was of a very primitive character—requiring no expensive structures to turn the water from its natural channel and conduct it along the lowlands bordering the stream.

These settlers were, however, more ambitious; they were not satisfied to locate upon the low flat lands bordering the river, but selected the high mesas where unobstructed views could be had of the magnificent horizon around them, and where health and strength were to be inspired from every breeze that crossed the plains from mountain or sea.

This required comparatively a new departure for Southern California. The water for irrigation (which was the life of the enterprise) must be conducted out upon the mesas miles away from the channel of the river, and hundreds of feet above it—through rocky hillsides and across deep arroyos, requiring a higher order of engineering skill than had heretofore been given to it, and a far greater expenditure of money. Therefore, instead of receiving encouragement and cordial support from the settlers upon the adjoining well-watered territory of the San Bernardino rancho, they were frequently ridiculed and discouraged by the statement that they would be compelled to abandon their project, and that "their structures would ultimately be hauled away for fuel."

It must also be remembered that they came among a people largely composed of descendants of the Spanish, and a mixed Spanish and Indian race, speaking a foreign language and naturally suspicious and jealous of Americans. They were of totally different habits and customs, with whom it was difficult to communicate, and from whom no information was to be had in regard to fruit-growing by irrigation (the principal occupation in which the new-comers proposed to engage (or the varieties of fruit best adapted to this soil and climate. The plains upon which they located were simply pasture-lands, destitute of water even for domestic use, and, owing to the deficiency of the annual rainfall, had for centuries yielded but a scanty supply of feed for a few months each year to roving bands of cattle and sheep, and from June to November were dry and barren as a desert.

Construction of Flumes and Ditches.

Cut off from all associations with their kindred, and with exceedingly limited and irregular means of communication with them, and subject to the difficulties above named, it must be evident that there was not a place upon the Pacific Coast whose foundations were laid more upon the "evidence of things unseen and the substance of things hoped for" than this colony of Riverside. Yet, with probably more of the disappointments

VIEW OF NORTHERN PORTION OF THE CITY OF RIVERSIDE.

and discouragements allotted to the average settler in new places, they persevered; and with limited means and experience in such matters, constructed dams, flumes and ditches to control and lead the waters of the Santa Ana river out upon the thirsty and apparently barren lands.

Unlike non-irrigated sections of the State, it required nearly a year's time and the expenditure of some $50,000 before the waters of the Santa Ana were flowing through the new channels to the original town plat of Riverside; and no planting of trees or vines could be safely done until the water was available in quantity and permanency. Several years more elapsed before its distribution gave even a slight promise of the rich fruitage that would result to the settlers from this large expenditure of time and money. The first plantings were made in the northern portion of the city as now incorporated. This is the principal business center of the city, in which the hotels, churches, schools, postoffice, and business houses are grouped, and the additions to these are fast displacing the beautiful blocks of orange trees that surrounded the earlier homes of the pioneers.

The Experimental Period.

The building of a home and the securing of profitable returns from horticultural investments is not accomplished in a year or two by even those familiar with all the necessities or advantages of even a favored land like Southern California. It was especially more difficult and discouraging for those who were only accustomed to the soils, climate, methods of cultivation, and productions of a semi-frigid country.

Up to and including the year 1874 the growth of the settlement was quite limited, only some 1500 acres having been brought under cultivation to that time; but sufficient had been accomplished to encourage others to locate around and unite with them.

During the years 1875 and 1876, the Riverside Land and Irrigating Company was organized. It purchased all the lands and water rights of the original corporation, the Southern California Colony Association. It also purchased some 3500 acres from Messrs. W. T. Sayward and S. C. Evans and the same number of acres from the Tin Company tract, and by these purchases consolidated all the contiguous landed interests in a territory nearly fifteen miles long and three miles wide, including all the water rights that had been appropriated from the Santa Ana river for these lands, for domestic use, irrigation and manufacturing purposes. It expended during these and succeeding years some $200,000 in enlarging and extending the first canal, in constructing the lower canal and the distributing ditches and structures required for such an extended system of irrigation—the largest and most comprehensive at that time in California.

The new territory was subdivided into ten-acre lots conveniently located upon broad avenues, with cross-streets intersecting these every half mile. Magnolia avenue with its northern extension, Brockton avenue, is 20 miles long, extending from the business center of Riverside in a southwesterly direction to the base of the Coast Range of mountains, and through South Riverside. Seventeen miles of this distance is an air line; and the avenue through this portion is 132 feet wide, divided by rows of handsome evergreen trees into two roadways and two sidewalks.

Riverside's Growth.

The growth of the settlement steadily increasing, constant additions to the systems of water supply were required; and during the years 1885, 1886, 1887 and 1888, large expenditures were made for water, both for irrigating and domestic use.

The growth of the colony from its foundation to the present time is best shown by the following summary of the population and wealth of the place: Population, 6000; acreage under cultivation, 10,000; number of citrus fruit trees, 650,000; number of raisin grapevines, 1,350,000; number of acres of alfalfa, 600; number of deciduous fruit trees, 200,000; assessed value of property for taxation, $4,000,000; annual value of products of farm and orchard, $1,100,750; length of main canals, 50 miles; length of distributing canals, 125 miles; length of pipe lines of all sizes, 42 miles; length of streets and avenues, 175 miles; length of street railways, 15 miles; cost of water system, over $1,000,000; cost of street railways, $73,000; cost of gas works, $30,000; cost of church property, $100,000; cost of school property, $125,000. Incomes from fruit farms for past year: Citrus fruits, $630,000; raisins, $357,000; deciduous fruits, dried, $80,000; hay, nursery stock, etc., $33,750.

The number of acres of land in the immediate vicinity of Riverside's business center adapted to the growth of citrus fruits and the raisin grape and supplied with water for irrigation under the different systems, are as follows, viz.: Riverside Land and Irrigating Co., and Riverside Land Co., 12,000 acres; Gage system, 12,000; Vivienda Water Co., 3500; North Riverside Water Co., 2000; Jurupa Land and Water Co., 10,000 acres. In addition to these there is within the same territory an area adapted to alfalfa, corn and vegetables, mostly river-bottom lands, equal to 5000 acres, making a total now supplied with water and ready for cultivation 44,500 acres. These lands are capable of sustaining in a bountiful manner a population of 50,000 people. We have therefore room at Riverside and its immediate vicinity for 44,000 more people than we now have.

Oranges and Raisins.

The fame of Riverside as an orange-producer is almost world-wide. It was here that the first trees of the celebrated Washington Navel orange (which took the first prize at the World's Exposition at New Orleans) were planted, and to-day the orange products of the place consist mostly of that variety. They bring the highest price in the markets of the East, and practically rule the orange markets of the United States. Riverside raisins are also becoming equally famous and valuable. About 4000 boxes of these raisins were sent to London last year, and they brought better prices than the celebrated layers from Malaga. During the season the several packing companies at Riverside give employment to more than 2000 people.

Riverside is located on the new main line of the Atchison, Topeka & Santa Fe railroad, completed and in operation to San Diego via Santa Ana and Oceanside, and seven miles southeast of the Southern Pacific railroad at Colton, and connected with it by the Motor railroad. It is 53 miles in a direct line southeast of Los Angeles, and some nine miles southwest of San Bernardino, and ninety miles due north of San Diego, all county seats of their respective counties.

Thirty-three square miles of the colony tract are divided into 5, 10, 20 and 40 acre tracts for small fruit farms. Twenty-one square miles are yet used for grazing purposes, being at present above any system of irrigation. It can, however, all be irrigated from the upper tributaries of the Santa Ana, and will be, as soon as the increase of population demands it.

The Business Portion of the City of Riverside.

The business part of Riverside is well constructed, and contains several fine brick blocks. The Rowell hotel and the Arlington House are the two largest structures in the city at present, though these will soon be eclipsed by a fine opera-house now in process of construction. The Rowell is an excellent hotel for tourists and commercial travelers and is largely patronized. The Glenwood is a splendid family hotel, with the most comfortable arrangements possible for the accommodation of sojourning visitors. As indicated in the foregoing description, the city has a splendid water supply, has a gas company, and is moving for an electric-light plant. The business streets are well graded and macadamized and lined with sidewalks of artificial stone. The residence streets are beautifully shaded. There is a fresh, inviting look to the place, and one is loth to leave a city so highly favored and so well kept. The traveler who wishes to see California thoroughly, should by all means visit Riverside. H. G. P.

THE WATER GAS "BOOM."—No invention has made more noise in metallurgical circles of late, says an English writer, than that of water gas. There are now three companies formed for the exploitation of the idea in different parts of England, and it is stated that a fourth to introduce it into the Birmingham and Wolverhampton district is now in the course of promotion. In the case both of the Yorkshire Water Gas Company and the Derbyshire and Nottingham Water Gas Company the directors have closed the lists of shareholders some days before the date originally fixed.

THE Barnes Sulphur Company of Utah have struck an eight-foot vein, 98 per cent pure, 60 feet down from the apex.

PUBLIC BUILDINGS AT RIVERSIDE, SAN BERNARDINO CO.

1—High School. 2—Y. M. C. A. Building. 3—Congregational Church. 4—Episcopalian Church. 5—Methodist Episcopal Church.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

CHROME DIGGING.—Livermore *Herald*, June 15: Messrs. Pitcher and Knight put L. Diteman to work last week in the Ab. Mendenhall chrome diggings on Cedar mountain, and he struck the metal at once and began taking out ore. By Monday night of this week he had out 200 sacks, getting 22 bags that day. There seems to be plenty of ore, and it is probable that the force will soon be increased. Ab. Mendenhall will do the hauling for the present. No industry ever inaugurated in this section ever put so large a proportion of money invested into circulation as that of chrome mining.

Amador.

ALPI.—Amador *Ledger*, June 15: At the meeting of the directors last week, a modification of the agreement with the owners was made, whereby the monthly installments of $500 for the purchase of the property are suspended until July, 1890. Whatever money is derived from assessments in the meantime is to be expended in putting up a mill and developing the property. A five-stamp mill is to be put up as soon as possible. The purchase price will remain at $10,000. With one year to develop the mine and test the quality of the ledge, the company ought to know by the expiration of that time whether or not it is a desirable investment. At the mine the tunnel has been driven 80 feet beyond the shaft, making about 150 feet in all. At the face a crosscut is being driven across the ledge. The ore at this point looks better than any heretofore encountered.

MISCELLANEOUS.—We last week stated that W. Petrie had offered to move the machinery of the Ilex to Bright claim east of Jackson, and spend $2000 in prospecting. The negotiations have not assumed so definite a shape as stated. There has been some idea of moving the works either to Bright's claim or to the Gwinn mine, Calaveras county, but it is uncertain as yet. The pipe for the Amador gold mine hoisting works passed through Jackson Tuesday. It comes from the Risdon Iron Works, San Francisco. There are two parties negotiating for the purchase of the Mahoney mine at Sutter Creek. Reports say that some very fine ore was struck in the 700-foot level of the Wildman this week. It showed plentifully of free gold.

DRYTOWN CON.—The shaft, 300 feet deep, is free from water. Sinking will be commenced this week. It is proposed to go at least 200 feet deeper before any drifting is done. The ground is soft, and it is expected to complete the sinking inside of four months. The 280-foot level shows a fine-looking ore body, six feet wide. It is soft, free-milling rock, and carries considerable sulphurets. Competent judges estimate at it from $5 to $9 per ton.

Butte.

FORBESTOWN MINES.—Oroville *Register*, June 13: The Golden Queen mine is about one-half a mile down the gulch from the little village of Forbestown. The Stow mine immediately adjoins the works of the Golden Queen, being on the east side. The Stow people claim that their sulphurets will yield about 40 per cent gold, but that their process will only save half of the gold or even less. The owners of the Stow mine use the Huntington mills and have also erected chlorination works which will treat three tons of sulphurets every 24 hours. The Golden Queen has about 1500 feet of tunnels, all timbered. The vein has a thickness of about eight feet running northeast and southwest and lays almost flat. The ore contains about ten per cent of silver, no lead or zinc, very slight traces of copper and a percentage of tellurium. The Golden Queen has ten stamps in operation, the mill being run by a six-foot Pelton wheel under a pressure of 250 feet. The crusher is a "Gates ore-breaker," driven by a small Pelton. Mr. Geo. C. Hunter is superintendent, a gentleman who has had large experience in quartz mining in Australia and New Zealand as well as in California, and is very justly proud in that he saves all his free gold and clears the sulphurets from the quartz. We examined the refuse and it was almost impossible to detect any sulphurets in it. This system of running the pulp through the pans and over the blankets and timing it just right to get the best results, enables him to save the free gold, and then by continuing the process of thinning with water and by the action of gravity, he clears the sulphurets from the debris. In erecting the works he had left a space for the erection of another building to contain machinery to aid in cleaning the sulphurets, but he has not found it necessary to put them in. They send their sulphurets to San Francisco to be worked.

El Dorado.

MUD SPRINGS DISTRICT.—Placerville *Observer*, June 19: The new hoisting works, manufactured at Placerville by H. S. Morey, for the Church mine, is the finest plant of its kind in the county, and works to perfection. The work of enlarging the main shaft at this mine is progressing as rapidly as possible and a fine job is being made of it. We have heard it reported that new hoisting works are to be erected at the old Springfield mine.

DIAMOND SPRINGS DISTRICT. — The Equator mine, north of the Springfield and Church mines, on the same line, is promising most favorable results. The east tunnel is in about 1100 feet, crossing in its line three distinct ledges of gold-bearing ore. The first, No. 1, is about 600 feet from the mouth of the tunnel, and is over seven feet between walls. One hundred feet farther is No. 2, nearly 15 feet wide, and about the same distance still farther on is ledge No. 3, about twenty feet wide. According to samples taken, these ledges all contain ore of fair grade. The amount of water coming in at the face of the tunnel would seem to indicate its near approach to a larger vein of ore. The ore taken out in crossing the ledges, Nos. 1, 2 and 3, is the same in character as that taken from the famous old Keystone mine at Amador City, which has yielded its millions. These ledges are now in condition to admit of ore being taken out at a very low rate per ton. D. C. Morgan is opening up the old Bond mine, south of Diamond Springs and near the Equator mine. Blair Bros. are delivering a large lot of lumber on the ground, and Philias Cote of this city is erecting hoisting works. It is reported that a mill will be put up as soon as the hoisting works have been completed. The Griffith Consoiidated mine has temporarily suspended operations.

NOTES.—The so-called Rudd Pulverizer, placed on the Steuart cement gravel mine a few months ago, has proven to be a complete failure. It will not pulverize the gravel or save the gold. The gravel in this mine is very good. At the Gignac mine development work is being pushed with vigor.

Fresno.

KING'S RIVER DISTRICT.—Fresno *Republican*, June 15: E. H. Barton, Civil Engineer and United States Mineral Deputy, has returned from the Minarets in the King's River mining district, about 90 miles northeast of this city. The mines are at an elevation of 11,000 feet above the sea level and received their name by reason of the resemblance of the peaks to minarets. The district is of a volcanic formation of green porphyry and slate mixed with gray hornblende. It abounds in silver ore, carrying a large percentage of bismuth and gold. The ore is easily worked by the smelting process. One of the mines known as the Sierra has been bonded to Mr. Selby of the Selby Smelting Works in San Francisco, and the Wheat mine has been bonded by C. D. Wheat. A bonus of $10,000 has been placed on the bonds. The remaining in the group have been bonded to an English syndicate for $2,500,000. The syndicate has now a carload of provisions and material at Madera to forward to the mines. S. E. Holcomb is at Madera, and will go to the district as the superintendent for the syndicate. Mr. Barton says that the quartz is of a permanent formation, and that the ledges in extent and in promise surpass anything that he has ever seen in Nevada or California.

Inyo.

MINING REPORTS.—Inyo *Index*, June 15: From several directions come encouraging mining reports, and it is not improbable that Inyo county is even now on the eve of a mining boom of no small proportions. No section of the Pacific Coast offers as much inducement to prospectors as can here be found. There are now a number of excellent openings for mining investment in this county, certain to pay handsome dividends for a great many years, but which lie idle because their merits are unknown to mining capitalists and investors. Could any one of these properties be taken hold of and developed by a big company, the result would insure the speedy sale and working of others. The only present difficulty is the financial inability of the holders to develop these future bonanzas and erect the expensive machinery necessary for their profitable working.

GOLD ORE.—Inyo *Independent*, June 15: Kehoe & Barnes are taking out some very rich gold ore at the White Hill. The ore is from a blind ledge found in prospecting for silver-lead ore. An incline is now sunk on the ledge to a depth of about 50 feet; it is getting wider as it goes down and dips to the east at a very steep incline; in fact the vein is nearly vertical. Samples of the ore brought into town would go far up in the hundreds of dollars per ton, if not thousands. At present the vein is about 20 inches wide. It is intended to send a lot of the ore to the Maxim mill soon for working.

CASEY.—The mill at the Casey mine, north of Laws, is running about 16 hours each day. Fourteen men are employed in the mine.

Napa.

AT THE PALISADE MINE.—*Calistogian*, June 12: Preparations are being made at the Palisade mine to more than double the output of bullion there. The reduction works were constructed with the intention finally of increasing the number of stamps to 20, ten now being used. But for certain reasons Mr. Grigsby concluded that a pulverizer used in connection with the stamps now employed would answer his purpose better, and a machine of this kind has therefore been purchased. It will do about as much pulverizing as can be done with ten stamps. A new rock-breaker, having important improvements designed by Mr. Grigsby, has been procured, and is in operation. Its capacity is much greater than is at present required at the works. It breaks the rock or ore nicely and easily, and is a great improvement on the one previously used. The hoisting works in King canyon are not yet in working order. When they are completed the 300-foot level of the Palisade vein will be worked. High-grade ore is found there, and will now be mined. This mixed with lower grade, an average value will be obtained much greater than that of the ore heretofore worked. With this increase, and the crushing capacity of the works doubled, it will be seen that the amount of bullion produced must necessarily be far greater than is now obtained.

Nevada.

THE COE.—*Tidings*, June 12: Superintendent White informs us that the water in this mine has been lowered to a point below the 400-foot level and that now the shaft and drifts are being placed in repair. It is probable that pumping will be continued until the mine (550 feet in depth) is entirely clear of water.

Placer.

WEST POINT.—*Herald*, June 15: G. W. Snyder, foreman of the West Point mine, was in town Monday. Mr. Snyder says that gravel of wonderful richness was struck last week. From one panful gathered from the richest part of the lead, 18 ounces were taken. The channel is 300 feet wide and the gravel rolls out an average of $11 to the carload. This mine has paid regular dividends right along since it was opened, and from present prospects seems destined to rival the most famous mines on the divide in richness.

FOREST HILL.—J. C. Scott of Forest Hill reports everybody is encouraged by the good news from the Red Point mine. At the Dardanelles the water has been got under control, and sinking to find the bedrock is going on uninterruptedly. The Baker Divide Co. will begin to run their main tunnel ahead right away. Breece & Wheeler are taking out good pay. The channel has taken a turn to the eastward.

Plumas.

RICH STRIKE AT INSKIP.—Greenville *Bulletin*, June 12: In a note from Charles H. Stokes we learn that a rich strike was made about a mile from Inskip last Saturday by R. E. Calloway and P. H. Riffe, in head of Dutch Gulch, yielding $10 to the pan in a small quartz vein. There are numerous quartz claims in the vicinity of Inskip which only require capital to develop them.

Shasta.

QUARTZ DISCOVERY.—Shasta County *Democrat*, June 8: A new gold quartz discovery was made by an old prospector named Brown, about two weeks ago, on the old Gage place on the divide between Shasta and Centerville, that promises to make a rich mine. Two claims were located, one on the Gage place and the other just off and adjoining. The Gage place is deeded land and belongs to Mr. Walden, who is at present farming in Happy Valley. Brown sold the outside location to Jim Beecher of Anderson, and a Hayden Hill miner named Hall, for $1000, and last week they were offered $5000 profit on their bargain. Beecher & Hall are sinking on their claim, and we are told they take out as high as $4 to the pan. This discovery has caused quite an excitement in that vicinity.

REDUCTION WORKS.—Redding *Free Press*, June 15: The Ottawa Reduction Works will be ready to reduce ore on Monday. There is plenty of ore ready to be roasted and submitted to the patent bath. The projectors of this enterprise have abundant faith in the result of this new process for extracting gold. Whether that faith is well founded or not will soon be determined.

Sierra.

THE COLOMBO MINE.—*Tribune*, June 14: Messrs. John Mooney, Wm. Petaluma, Mort Mooney, Jake Moss and J. W. Conely are the ones who have the Colombo mine leased. They commenced last week to fix up and get things ready around the mill and mine. A dispatch was received from San Francisco Wednesday, stating that the pipes and plates sent for had been shipped. As soon as they arrive, and the company can get them rigged up, they will be ready to start the mill going. The above parties have leased the mine for two years.

FIVE-STAMP MILL.—*Mountain Messenger*, June 15: The Garibaldi Mining Company is about to build a five-stamp mill in Gold Valley, just opposite the site of the old Gold Valley sawmill. Water for power will be taken out of Gold Valley creek at the bridge above. There will be sufficient water the year round.

GOLD BLUFF.—J. S. Jaquith was here last week to look at the Gold Bluff mine, with a view to erecting pumping machinery on the same. We understand that he reported favorably upon the project, and that work will soon be commenced. It is proposed to take the water from Costa's ditch in through the upper tunnel and down the shaft to the lower tunnel, and use it upon a Pelton wheel under something over 200-feet pressure. There is also some talk of putting a new mill upon the property.

FIR CAP.—Work has been commenced again in the Consolidated Fir Cap tunnel. This mine comprises some 340 acres, and is situated on the ridge between the rich old mining camps of Fir Cap and Monte Cristo in this county.

THE FRENCH COMPANY, at Barnes' Ravine, are running their hard bedrock tunnel; with seven men employed are making good progress and expect to reach gravel every day.

THE WIDE-AWAKE new tunnel is in over 60 feet, 40 of which were made last week. They will have to go 600 feet to the front channel and 200 feet farther to the back channel.

A HUNTINGTON MILL is being erected upon the Montpelier claim, just above this place on the North Fork, to be run by water from the Montpelier flume.

Siskiyou.

QUARTZ AND PLACER.—Yreka *Journal*, June 19: The Good Enough quartz ledge at Humbug is certainly a good enough claim for anybody, paying over $120 to the ton at the last crushing. From 21 tons of ore crushed in the McCook mill at Forks of Humbug, last week, the yield was over 150 ounces. It is owned by Charley Humphrey and Thornton Thomas, and located in the gulch close to the site of the old Eliza mill, averaging about two feet in width. There seems to be plenty more of just as rich quartz in sight, and it is believed to be the richest quartz mine yet discovered in Siskiyou. Work has been resumed at the Montezuma placer claim at the south fork of Scott river, with prospects of a good yield this summer as long as the water supply is sufficient to furnish the immense flume. F. Hellmuth has started up the old Cummings quartz-mill on Boulder creek, south fork of Scott river, and is now crushing some very fine-looking quartz. Crowley, who owns a good placer mine at south fork of Scott river, has bonded to a San Francisco company, who are now testing it with a likelihood of taking the claim and working it on an extensive scale. The men employed by the Odd Fellows in sinking a well at the cemetery for water, struck a quartz ledge at 27 feet down, the ledge being 18 inches thick, but they have found no water. The work will be continued with prospect of finding both gold and water. The Schroeder & Werner quartz mines at head of Deadwood creek are paying well, and the mill is kept going steadily, with a large force of men employed. This mine is destined to be one of the most extensive and permanent in the State, and by next season there will probably be twice as many men employed as at present.

Tuolumne.

NOTES.—*Democratic Banner*, June 14: It is reported that the Kanaka mine near Groveland will soon be sold to San Francisco parties. E. J. Richards, A. Colby, Wm. Suttle and Robt. Watson are about ready to put up hoisting works on their mine at the St. Cyr ranch. Everything is looking well for a bonanza. The Golden Gate mine, under the supervision of Mr. W. G. Long, is proving itself to be one of the best mines in the county. The ore taken out is of such grade as to warrant the expenditure of considerable money by the company, and arrangements are now perfected for the building at once of a ten-stamp mill and chlorination works. The material necessary for the construction of the works has been ordered and work will be commenced in a few days. It is said that a new system of operations will soon be inaugurated at the Buchanan mine, through the introduction of electricity. A survey and estimate for an electric plant of sufficient capacity to run all the machinery at the mine has been made and forwarded to the owners of the property in San Francisco, and it is believed that the company will make the change, as the expense of running by electricity as compared with the present mode of operations will be a mere nothing. Dr. Tibbets, of Columbia, was in Sonora Saturday and reports that his mine on the Stanislaus river, fourteen miles from Columbia, is looking well, and that a ten-stamp mill with all the modern improvements is being rapidly constructed. This mine is well prospected, and bids fair to become a substantial and valuable adjunct to the many paying industries of Tuolumne. It is in a district heretofore but little prospected but which has always been looked upon as good ground by mining men. The Mary Ellen mine, owned by Mr. Cruikshank, near Groveland, is in splendid condition, and from Mr. Louis Blanding, who is getting up a concentrator for the mill of his own design, we learn that the vein is about four feet in width, and will pay about $40 per ton in free gold and that the sulphurets assay as high as $1800 per ton. The new ten-stamp mill is about to start up, and under most favorable circumstances. The operating power will be steam.

Trinity.

NEW RIVER.—*Journal*, June 15: Messrs. Colgrove and Mullane were in town this week from New River. We are indebted to Mr. Colgrove for the following items: Ladd & Clements are running their mill night and day with plenty of good ore in sight. Mr. Colgrove is working 12 men in the Excelsior. The stamp-mill is running steadily and the mine is looking well. The tunnel on the Ridgeway is in 430 feet, and they have 300 feet more to run to strike the ledge. A sawmill, belonging to the mine, is already built, and a stamp-mill will soon be constructed. The Sherwood mine is looking well and has some good ore in sight. The Toughnut, leased by Fairburn & Fulmorn, is paying well. Nicholson & Miller are working a small crew of men and are doing well. The prospects of the camp for a successful season are very bright. W. S. Lowden, who has just returned from the New River country, informs us that the parties who leased the Hardtack last fall have struck a very rich vein of ore in that mine. The extent of it is not yet known, but at last accounts the indications were favorable for a large body of ore. A Mr. Irvin has made a new discovery that prospects very well, and he is confident that it will develop into a good mine with a reasonable amount of work.

NEVADA.

Washoe District.

BALTIMORE.—Virginia *Enterprise*, June 15: Are extracting ore of good grade from the crosscuts on the 225 and 338 levels. Both places are quite wet.

SAVAGE.—On the 400 level the joint west crosscut was extended 15 feet. There is considerable water coming in from the face, and the ground is very heavy and requires close timbering. From No. 1 and No. 2 west crosscuts we are stoping ore of fair grade. Are also extracting ore from the old stopes in the north and south drifts. On the 500 level west crosscut No. 2 was advanced 12 feet. The face is in vein porphyry. In the south drift are extracting ore from the old stopes. During the week hoisted 461 cars of ore. Shipped to the Rock Point mill 484 tons and milled 490 tons. Average battery assays, $23.96 per ton. Bullion yield in May was $27,940.25. Ore milled, 2170 tons.

CROWN POINT.—The 500 raise is up 50 feet, having been advanced 8 feet during the week. The top is still in hard blasting ground. Have opened the 13th floor, 400 south stope, and find the pay ore narrowing rapidly and of poorer quality. No change to report on the 350, 160, 450 or 700 stopes. The 400 north stope is looking and yielding about as usual. Shipped to the mill during the week 711 tons and 570 pounds, the average battery sample of which was $18.26 per ton.

BELCHER.—The 1100 raise is up 83 feet in soft porphyry. The 1100 south drift was advanced 41 feet, making its total length 224 feet. Expect to connect with the west crosscut this week. The 1000 and 1200 south lateral drifts are out 83 and 89 feet respectively, with no change in the ground to report. Have just started a west crosscut on the 200 level from the shaft.

CONFIDENCE.—The joint Challenge, Confidence and Imperial north drift on the 500 level is in a distance of 668 feet from the Yellow Jacket shaft. The face shows porphyry. The joint Challenge and Confidence raise from the east drift on the 1250 level is up 15 feet, having been commenced during the week. The face shows quartz and porphyry.

HALE & NORCROSS.—Hoisted about 1200 cars of ore during the week, and shipped and milled nearly 1000 tons. The stopes are yielding their usual quantity of ore, and active prospecting work is going on.

CON. IMPERIAL.—The north drift on the 300 level is now in a distance of 114 feet from the south line, having been advanced 30 feet during the week. The face shows porphyry.

CHOLLAR.—Prospecting on the 550, 750 and 850 levels. Are not hoisting ore now, as there is not enough water to run the Nevada mill to its full capacity.

CHALLENGE CON.—The work, which continues to be jointly with Confidence, is described in the report from the last-named mine.

JUSTICE.—The mill and machinery are working steadily and well, and the usual amount of prospecting is being done.

EXCHEQUER.—Active prospecting work is going on on the 332 and 500 levels, though there is no change to report.

BULLION.—Drifting north in the ledge on the 760 level. There is no change to report in the formation.

ALTA.—The usual work is reported from this mine, and extracting the same quantity and quality of ore.

YELLOW JACKET.—Are shipping about 100 tons of white gold rock daily to the Brunswick mill.

SILVER HILL.—Drifting northwesterly in a promising quartz formation.

POTOSI.—About the usual prospecting work is being done.

ANDES.—Drifting west on the 175 level.

SEG. BELCHER.—The 1100 raise is now up 73 feet, having been advanced 18 feet during the week. The top shows streaks of quartz of good grade.

Have put in a blower during the week, which will enable them to advance more rapidly.

Golconda District.

SHIPPING COPPER.—*Silver State*, June 12: The Adelaide Copper Co. has 15 tons of copper ingots at Golconda, ready for shipment. Last year copper averaged producers in the United States about 14½ cents per pound, but since the disruption of the French syndicate, the price has dropped to about 11 cents a pound. The Adelaide copper will doubtless command a higher price, as it carries considerable silver.

Pioche District.

MANGANESE ORE.—*Record*, June 8: Nearly every miner who has lived long in Pioche has noticed the black croppings of a ledge which runs back from the R. & E. works in a southerly direction and shows strongly at the surface near the Divide over which passes the Bennett Springs road. It has been called the "Iron Ledge," everybody supposing that iron was the most important element in its composition. A few years ago a number of tons of ore were taken from the surface where the road crosses, but, bearing comparatively little silver, supposedly in an iron gangue, and no smelting furnace being at hand, it was left unworked where it was taken out. It remains there yet. A short time ago a sample was sent to Salt Lake for analysis, when the surprising discovery was made that the "iron" ore was manganese ore, carrying 37 per cent manganese, 10 per cent iron and 3 per cent zinc—an ore in which the silver, treated with salt and heat, chloridizes easily to 90 per cent of the assay contents, and which, thus treated, leaches freely. The croppings show plainly at intervals along the ledge, a total distance of say 1000 feet. The ledge ranges in width from 3 feet to 18 feet, runs west of north and east of south and dips westerly at an angle of about 30 degrees. Supt. S. T. Godbe's samples show the croppings at some points to contain but little silver; but in most places high assays can be had, and the average of the ledge where an incline has been sunk 30 feet, about 500 feet southerly from the R. & E. shaft, is 28 ounces in silver. At the most southerly point sampled, the average was 30 ounces. Small bits of galena, which are considered more as indications than as a factor in the ore, are occasionally found. But expert testimony is to the effect that 20-ounce ore, of the character and in the quantity now being extracted, will pay well. This being true, the Pioche Consolidated Co. will not have to depend entirely on developments below the water level for a paying property, and one which, there is a probability, may prove a bonanza.

RAYMOND SHAFT.—The work of raising the lift pump out of the sump, to the station at the 12th level of the Raymond shaft, occupied the force employed in the pump compartment most of the week, but was successfully accomplished. It was thought at first to have gone down but 30 feet, but it proved to be at the bottom with 70 feet or more of pump columns attached to it. The work of retimbering the shaft and repairing the large pump and machinery has been done under the supervision of Mr. E. A. Shear, who came here from Park City, Utah, for that purpose. The work has progressed steadily and satisfactorily since its commencement, and by the time the new boilers, now going in, are ready for use, the pump will be ready for work. The cost, too, of the repairs, though great, has been materially less than was expected. The necessary receiving and supply tanks are in place, and we may soon look for a stream of water from the mine running down Main street.

IN THE YUBA MINE, says Supt. Sam Godbe, we have crosscut from the main incline at the 12th level, 100 feet north to the middle vein. Thence we have drifted west 100 feet along the latter, which here gradually approaches the north contact vein. The middle vein is about six feet wide and now shows small streaks and spots of ore in the face of the drift. Near the face a winze has been sunk 30 feet. At the bottom there is about three feet of good ore, partly milling, but the whole carrying enough lead to make it smelt freely.

Rebel Creek District.

MINING SALE CONSUMMATED.—*Silver State*, June 12: Deeds were recorded yesterday from H. H. McColley, J. H. MacMillan and N. Levy & Co., to L. P. Brenan of Philadelphia, for the Golden Era mines, Nos. 1 and 2, and the Great West mines, in Rebel Creek district, and also the Silver Wave mill and water right in the same district. A deed from H. H. McColley to L. P. Brenan for the Flat Creek mine was also recorded. The mines have all been more or less developed, and they carry considerable gold as well as silver.

Tuscarora District.

NORTH BELLE ISLE.—*Times-Review*, June 11: North drift on the 200-foot level extended 12 feet. West crosscut from the 300-foot level station extended 10 feet. Total length, 20 feet. The face shows some spar seams.

COMMONWEALTH.—Stopes 100 feet east of the shaft on the 100-foot level are yielding very rich ore. North stopes, same level, are being opened so that men can soon be put to extracting ore. South stopes, same level, continue to yield about the same amount. The 150 and 225 foot level stopes are looking better than at any time since starting the mill; 245 tons of ore have been delivered at the mill. Shipped Monday, 10th inst., $12,379.13 and $12,000 on hand. The mill is running nicely and doing good work.

NORTH COMMONWEALTH.—Joint crosscut, 225-foot level, extended 15 feet; total length, 85 feet. East crosscut from the end of the south drift, 100-foot level, extended 16 feet, passing into the hanging-wall; total length, 90 feet. The face shows a little water.

GRAND PRIZE.—The stopes on 400-foot level are looking and yielding well. Construction work on the concentrator is being pushed and will be in running order about the 1st of August, by which time sufficient high-grade ore will be on hand to begin milling also.

DEL MONTE.—Joint crosscut, 225-foot level, extended 15 feet. North drift, same level, extended 12 feet. A seam of black spar continues, carrying some high-grade ore.

NEVADA QUEEN.—Winze from 450-foot level has been sunk 10 feet; total 30 feet. Cut into the ore at a depth of 20 feet—it is now about 30 inches in the bottom. Assays range from $112 to $329 per ton. The ore is solid and regular. South drift from east crosscut, 150-foot level, of Commonwealth has been advanced 17 feet. The ore is low grade.

BELLE ISLE.—Crosscut west from the end of north drift on the 250-foot level, extended 19 feet; total length, 24 feet. The face is in favorable-looking ground.

ARIZONA.

MOHAVE COUNTY.—*Miner*, June 15: A thirteen-pound bar of bullion was shipped from the express office Thursday. At the Moss mine things are getting in good working shape, and good ore is being encountered and the ore track in the mine is about finished. The Flores mill made a run last week on Tintic mine ore, and the Rogers Bros. will probably have their ore from this mine worked at the Flores mill hereafter. A strike of high-grade ore has been made in the 400-foot level of the C. O. D. which bids fair to prove of a more permanent character than any strike beretofore made. The Hudgeons Bros. this week made a shipment from the Prince George north, on which they have a lease. The ore body is reported as being six feet wide, and assays something over 120 ounces per ton. The Oliver Bros., who are working the Prosperity on a lease, are taking out large quantities of high-grade ore and will make a shipment before long. Thomas Steen, the superintendent of the Rattan mine, reports that mine as looking better than ever. Drifting has commenced on the 200-foot level, and the mine will be fully developed before more machinery is added. Miners all unite in saying that the mining outlook is better in Mohave county at present than at any time in its history. Miners are all taking out ore and capital is looking this way for investment, and the indications are that considerable Eastern capital will be invested in Mohave county mines this year.

WALKER DISTRICT.—Prescott *Courier*, June 12: D. Boaz and J. C. Brown arrived in Prescott yesterday, from Walker district. Mr. Boaz is an officer of the Dixie Co., and, we believe, the organizer of it. Mr. Brown is the head of the Kansas City firm of Brown & Faulkner, who are heavily interested in the Dixie. His business in the district was to examine the mill and mines of the company. This he has done and has stated that he is well satisfied with the property, much better than he thought he would be. His statement is that he found the mines large, the country cool, well-timbered and pretty well watered. He will go East well pleased with this part of Arizona; well satisfied with its mineral wealth, etc. E. H. Witherell, merchant of Jerome Junction and general freighter for Mr. Clark of the United Verde, informs us that his teams are kept very busy hauling coke and other supplies to mines and smelters and bringing out bullion.

WALNUT GROVE.—The *Courier*, a short time ago, spoke of the discovery, in Walnut Grove district, of small and large pieces of silver, by placer miners. Since then the discoverers of the floated treasure followed the lead in regular prospector's style and were recently rewarded for their labors by finding the ledge or vein, which is very rich in native black sulphuret and horn silver. So we are told by a gentleman who has conversed with the people who found the treasure, and who, yesterday, brought considerable of the rich stuff to Prescott. The ledge is situated near the lower dam of the Walnut Grove Water Storage Co. on Hassayampa creek.

COLORADO.

MOVED.—Idaho Springs *News*: The big hoisting plant formerly used on the main shaft of the Kitty Clyde mine has been moved over to the west shaft where a big bonanza is showing its color. Work was resumed on the Conemara mine this week for the first time in a year. A three-inch streak of rich ore is now exposed. Some enterprising miners have taken hold of the Edwards placer at the junction of Chicago and Clear creeks, and are going to clean out all the pay there is left in it. In prospecting the surface of the Blue Ridge Lode in Spring gulch, W. H. Robertson, the owner, uncovered a big streak of decomposed mineral that shows well in the pan. A large force of miners working on the Champion, are keeping their 50-stamp mill supplied with ore.

DAKOTA.

CHLORINATION WORKS. — Deadwood *Pioneer*, June 12: The success of McPherson's chlorination process has been so fully demonstrated that promoters no longer regard it as experimental. Col. Keith, who has been prime mover, and to whose energy and enterprise is due credit for the works at Garden City, is negotiating for the Gates crusher brought in for the Deadwood Sampling Works, and which never used, has lain idle opposite the court-house for years. This, and an outfit of heavy rolls, put up instead of stamps at the plant, will reduce cost of reducing the ores to $4.50 or less per ton. So far the plant has been operated under many and great disadvantages, and yet has proved a thorough success.

IDAHO.

CŒUR D'ALENE MINES.—Wardner *News*, June 12: The mining regions of America have but one way to grow and from present appearances that is in the direction of the great Northwest. Here there is mineral land enough to accommodate the rapidly increasing population and wealth enough contained therein to amply reward their labor. There is no necessity for people to travel farther and fare worse, when all they can in reason desire is to be found right here in Cœur d'Alene. The prospector versed in his calling is satisfied of the fact and never fails to exclaim "This is good enough for me." The far-seeing capitalists are fast turning their attention to the unequaled field afforded them for investment here and the result of sales already made offer great encouragement to future ventures.

EVOLUTION DISTRICT.—Manager Clement has suspended all operations for the present on the Argentine mine. Several carloads of high-grade ore are lying on the dump and in the ore-houses, and the lode from all appearances contains an inexhaustible supply of mineral.

ELK CREEK.—The work done on the Alma & Nellie property during the last month proves conclusively the great value of the gold mines owned by this company; vast piles of ore have been extracted and the future of Elk Creek looks more promising than ever. Work was resumed this morning in the mill and the 20 stamps will henceforth be kept dropping day and night. J. Cronin is general manager. J. A. Mayer is in charge of the mill, and 30 men are on the company's payroll.

BUNKER HILL & SULLIVAN.—Development work continues on both these mines, keeping a force of men piling up ore in huge masses, showing an accumulation of wealth that cannot be surpassed in the product of any mineral belt in the world. Work is progressing in the lower tunnel to strike the vein, and in the Small Hopes tunnel drifting is to be done on the vein. The air compressor is meeting all expectations and is running two air drills at present.

POLARIS GULCH.—The result of the steady development work on the Polaris mine is gratifying to the owners. Shaft No. 2 is down 115 feet and sinking is continued on the ledge, which is widening as depth is attained.

ROSEBUD GULCH.—T. St. Germain is working on an extension of the Nellie, owned by Horton, Alger & Co. The shaft will be sunk to a depth of 100 feet.

LOWER CALIFORNIA.

THE ALAMO DISTRICT. — *Lower Californian*, June 13: Each day's work in the Alamo district only goes to show the permanency of the mines. At first it was believed that the gold belt was narrow and confined to the immediate vicinity of the Princesa and Ulises, but subsequent developments in the camp show that the mineral belt extends in length and breadth over a greater area than the most sanguine persons at first supposed. The developments in the Sunrise, Rattlesnake and Placer, on the west, in the Buena Vista and Elsinore on the south, in the San Vicente, Scorpion and Moran on the east, and in the Buster, Red Cloud and Chispa on the north, prove that the mineral belt is a large one. Even to the southwest, the Rainbow and others prove that the belt runs into and extends west of Mt. Alamo. Every week new ledges are discovered and the richness of the mines is beyond all doubt. It is a permanent camp.

QUARTZ.—McGrath & Joseph had the work done on the Elephant mine, 17 feet of shaft 5 feet square and 17 feet of drift, for $80 Mexican money. The regular price paid for this work in other mines was $250 to $288. As a rule the rock is quite hard. They take out some rock occasionally from the Texas which fairly makes one delirious. A little wedge-shaped piece taken out a day or two ago, weighed about three pounds and was at least one-third gold. The vein is very small, only two to six inches, and while it may prove to be a pockety vein, many believe it will be a permanent one.

THE SCORPION shows rich ore at 20 feet in the west drift. A new vein has been struck in the Moran at 20 feet. This mine, which is proving to be so rich in the Princesa vein, now has another value added to it in the fact that the Quinota vein is also found in it.

MEN are taking out the usual quantity of gold from the placers. On a careful estimate they will average $1200 a day altogether. Messrs. Wade and Curry struck a pocket of thirty ounces the other day.

THE timber and light machinery of the Torres Co.'s ten-stamp mill has arrived. The boiler, engine and mill were in San Rafael valley Saturday and should be here by the time this is printed.

TONS of giant powder are now here and several mines besides those of the International Company are being worked night and day. Good miners are getting $4 a day on the ledges.

GOOD ROCK was struck in the Chispa mine at the depth of 18 feet. This vein, while not so rich on top, is well defined and regular.

MONTANA.

THE LANDOWNER.—*Inter-Mountain*, June 10: Donald Mitchell, president of the Landowner Consolidated Mining Co., arrived in Butte this morning and gave a reporter some facts in relation to that company. The properties owned by it are the Landowner, Sunday and Hortense claims, and they are situated about 12 miles south of the postoffice of Quartz, in Missoula county. The nearest railroad point is Missoula. The company was organized altogether by Missoula men, and they have six men engaged on development work. The main discovery is on the Landowner, where a tunnel has been driven in to a depth of 35 feet. A vein has been encountered at that depth, and eight feet of quartz has been cut through. The rock is free-milling gold, and the assays, according to Mr. Mitchell's statement, will average about $30. Development work will be systematically prosecuted.

A SHIPMENT FROM VIRGINIA CITY.—Butte *Inter-Mountain*, June 15: R. T. Cooke of Virginia City was in town during the week with a sample shipment from some mines he is an owner in near that place. While his ore will probably not pay very handsomely to ship to Butte, yet with a reduction works on the mine it would be a dividend-payer. Virginia people are anxiously waiting the completion of the Butte and Gallatin line of the N. P. R. R., when they think their time will come, and the probabilities are strongly in favor of their realizing on this.

MINOR NOTES ABOUT BUTTE MINES.—The Germania still continues to improve, the last mill returns going 250 ounces per ton, though the rock assays up in the thousands. Mr. Frudenstein asserts the mine has actually improved 60 per cent in sinking the last 50 feet. Mr. Cal Gates of the Prospector has the station completed on the 100, and will shortly commence sinking again to another 100 feet. The flags of all the prominent mines threw to the breeze the star-spangled banner on the 13th of June in honor of the Miners' Union anniversary. On the 800 of the Mountain View, the leads, both north and south, continue to improve both in quantity and quality as they are extended.

THE FLINT CREEK MINE.—Clint Freyschlag will probably succeed in starting work again in a few weeks on the at one time famous Flint Creek mine in the Georgetown district. Several thousand dollars were spent in impractical prospecting on the property two years ago, but no regular body was found of the wonderful gold rock that set so many people almost wild with excitement at the time. Mr. Freyschlag, however, believes it is there somewhere, and is determined to look further for it.

THE SOUTHERN CROSS.—The 150-foot level, west, in the Southern Cross, has now been driven 108 feet from the shaft all the way in ore. For the last 40 feet they have been in a body of as good ore as has been found in the mine, and prospecting in the pan is "away up." The gold is much coarser than in other portions of the mine.

THE RED LION.—The five-stamp mill at the Red Lion mine has been running now for over two weeks, but owing to the remoteness of its location, nothing definite is known as to the result. The ore is quite low grade, but not so low as to render its treatment unprofitable with proper management.

GOLDEN GATE.—A representative of the Golden Gate Co. went to Cable to-day to start up work on that property. A shaft will be sunk near the line of the Cable mine and the ground will be prospected from the bottom of it with a diamond drill. Work will be actively commenced on Monday.

BROWN'S SMELTER.—Construction work on the Blue-Eyed Nellie smelter on Warm Spring creek is being pushed, about a dozen men being employed. There will be but one furnace for the present. The stack of that is now in place and the smelter building is well under way.

THE CABLE MINE.—The 30 stamps of the Cable mill at last accounts were still dropping on high-grade ore. As there is a three years' supply of ore in sight in the mine, it is probable that the mill will run continuously from this on.

NEW MEXICO.

FROM VARIOUS CAMPS.—Rio Grande *Republican*, June 15: The Toughnut still continues to produce high-grade ore, and "Little Mac" is happy. Ore wagons brought in a shipment from the Comstock this week. A carload goes to Pueblo. A shipment of high-grade ore from the Toughnut was made yesterday by Burt & McLaughlin. It went to El Paso. Lew Cowan has taken a lease on the three claims owned by the Philadelphia Co. He has opened up a good vein of ore on the Girard. Joe and Will Herd, who have been at work for some time driving a tunnel on the Modoc, cut the contact this week at 90 feet. They found ore, but the quality or size of the body has not yet been determined. Bob Gamble and Mart Bergeret were given a claim by Billy Hayden and Jim Robertson, which lies near San Augustin peak. They have found a streak of very high-grade ore, assaying from $800 to $1300 per ton. A. Cowan is going to do some work on the Trump, a claim in the Hawkeye group at Organ. Some good mineral has been shipped from this ledge and Mr. Cowan thinks he has found a blow-out which will show a good body of ore. The Dos Amigos, which has been worked by Sam Barlen, Jack Younger and the Foy Bros., now has a four-inch streak of high-grade ore. The boys started in to do the assessment work, but the ore is good enough to pay them to continue working the claim. Captain Crawford has returned from London to Kingston, and immediately on his arrival in the silver camp put a force of 30 men to work on the different claims which he represented. It is reported that he secured $180,000 with which to develop mines at Kingston. Dr. J. V. Cowan is interested with him in one group of mines.

OREGON.

POWDER RIVER F. & M. CO.—Bedrock *Democrat*, June 10: The Powder River Flume and Mining Co. are getting everything in readiness for extensive mining operations, and are only waiting for the waters, which are unusually high for this season of year, to fall, when they will at once put on foot this gigantic enterprise which has already been proven, by the construction of wingdams, the best and richest diggings now in the West. The gentlemen composing the company are W. A. Cowles, of Battle Creek, Michigan, Messrs. Sicord and Irwin, of Chicago, Major Wilkerson and O. S. Buckland of Sparta. The property is situated about five miles southwest of Sparta and embraces five miles of river where many gulches that have paid largely empty their golden sands, and where Powder river has cut the gold belt and is intersected by a series of gold-bearing quartz ledges, several of which are now being successfully worked. The tributary gulches and intersecting ledges have been the natural gold-feeders of Powder river, and the many hundreds of dollars taken out last season by the ordinary rocker prove the richness of this company's ground, and by honest, capable and economical management (which the reputation of the gentlemen owning the property warrants) dividends can be made to pile up equal to the best days of the "Granite Mountain" for the next quarter of a century.

UTAH.

PARK CITY.—Salt Lake *Tribune*, June 16: Bullion shipments: June 9th, 17 bars Ontario, 8510 ounces; June 10th, 18 bars Ontario, 9120 ounces. The Crescent Co. shipped, during the week ending June 14th, 167,825 pounds of first-class ore; 67,300 pounds of concentrates. Received at Mackintosh sampler for the week ending June 15th, 615,820 pounds Ontario ore; 211,120 pounds Daly ore; 337,530 pounds Woodside ore; 19,320 pounds Apex ore. The Union concentrator expects to commence operations within the next ten days on second-class Woodside ore. The Alliance Company has on hand about 1500 tons of second-class, which will be hauled to the concentrator as soon as it is in readiness to receive it. The Mayflower leasers are doing considerable development work preparatory to putting the mine in first-class shape for taking out the ore. The management of the Anchor Co. have let a contract to bore the shaft to make connections with the tunnel. The works will be completed within 30 days. Mr. Morris Dusseldorf, manager of the Comstock Co., arrived here on Thursday night, and on Friday, in company with Mr. Wm. M. Curtis, made a general inspection of the company's claims. They found everything in good shape, and work will be immediately commenced. A contract has been let to drive a tunnel to the ledge, the work to be under the supervision of Mr. Curtis.

MECHANICAL PROGRESS.

Iron-Workers

Blacksmiths and other iron-workers should be very proud of their calling. Gold has been called the most precious of metals, and so admitted; but as between gold and iron, the world could better dispense with the yellow metal than with iron. Of course we could exist without either; but to be without iron would carry us back centuries and paralyze thousands upon thousands of industries, and take away nearly all the great inventions of modern civilization. This can readily be comprehended when once attention is called to the fact.

The antiquity of iron is an unsettled question, but we have mention of it in the earliest records, and from all times the workers in iron have been held in high esteem, and ofttimes considered chief among the many. The Greeks had their Vulcan and the Hebrews their Tubal Cain. Even in the wilds of Africa, Dr. Livingstone discovered workers in iron, and the novel method they had of working it was surprising. The modern forge is an improvement over the bellows, but the latter, of course, should not be mentioned in the same breath with the rude contrivance of the Africans—an earthen forge, covered with two blow-pipes, acting without any tuyeres, but attached to two upright boxes or valves. In these valves the operator places pistons, which he works up and down alternately with either hand, and thus forces a continuous blast. It is rude but ingenious, and works reasonably well. How would you like to turn a hundred shoes by such a forge? A stone near by answers the purpose of an anvil. In early times the glory of the iron-worker lay in the fact that he was the maker of swords, spears and other implements of war. War was the principal occupation of people then; might was right, and woe to the captives.

Now the scene is changed. The world is peaceful. Agriculture, commerce and the mechanical arts furnish the chief sources of livelihood, and in all these the iron-worker lends a helping hand. The farmers' implements are made by the iron-worker, his horses are shod (occasionally) by the iron-worker, the wheels of commerce are accelerated by his efforts. Without him, it would be the slow ox-team of yore, while he almost, if not actually, personifies machinery. Verily, the legend attributing to the iron-worker the seat at the right of King Solomon, at the dedication of the great temple, is but further proof of that wise monarch's wonderful wisdom.

Some Defects in Axles.

It seems strange that in all of the reported discussions on the subject of a suitable axle for a 60,000-pound car, little or nothing has been said regarding the material and manipulation during the process of manufacture, while the whole stress has been laid upon the suitable dimensions and proportions. It is, of course, taken for granted in these discussions that hammered wrought iron is the material in question, except in a few instances where steel is brought forward. But every car-builder who has had to do with axles knows that there are as great differences existing between makes of wrought axles as between cast-iron car-wheels.

Some short time since, having occasion to use some finished wrought iron, slightly smaller and about the same length as a M. C. B. axle, we conceived the idea of rehammering some old axles and finishing them to our purpose. Before purchasing the old stock, however, we were assured that they were of first-class quality. They had never given any trouble, had never broken, and had been made of carefully selected scrap by a thoroughly reliable maker.

These axles were then drawn out and finished. Of the whole lot, there was not one that did not develop old sand-seams and coal-shuts on being cut into, and 20 per cent had to be discarded on account of the larger size of the defects. Under these unexpected developments, and as we were in a hurry, we decided to take some of the old axles and turn them down to size without rehammering. Here, worse defects were found, and one-half of all the axles tried were discarded. It may be added that nothing was discarded except for defects such as would secure the condemnation of any axle in any shop where the slightest attempt was made to select good clean stock for journals.

This experience merely goes to show that while the outside of the original axle had been worked sufficiently to give a clean surface at the wheel-seat and journal, the core was in a decidedly seamy condition. The hammering had been concentrated where it would tell, and the rest left in an unworked condition. Every mechanic knows the value of the working metals, and it is nowhere more desirable than in the manufacture of axles, especially if steel used.—*National Car-Builder.*

TWO HUNDRED MILES AN HOUR.—The latest invention for rapid transit and the transportation of mails is being introduced by the Portelectric Co. of New York and Boston. It is the invention of John G. Williams of New York, and consists of an elevated railway track of a new design, for a car made of magnetized steel, and running upon a single rail. It has been exhibited in Boston and explained by Prof. A. E. Dolbear of Tufts College, who announced that, after a very thorough examination and testing of the discovery, he was certain that a car could be run from New York to Boston, a distance of some 230 miles, in one hour. He explained that while the new plan will at first be devoted to letter-carrying—and by it there can be a mail from city to city several times every forenoon, afternoon, and evening—it will be entirely possible to carry people as well as the mails, and that this will before very long be done. The working model of Mr. Williams' system of rapid transit has been carefully examined by many electricians and practical business men, and all who have seen it pronounce it the solution of fast transmission for small packages and the mails.

THE MANUFACTURE OF AUGERS.—Although every one is perfectly familiar with this commonplace tool, but comparatively few know the process of its manufacture. In making augers the iron which forms the main or spiral part is welded into the steel of which the tip is made before forging. The bar is then put under hammers and forged into shape. It is then put into what is called a "wringing machine" and twisted up in a rough state into the spiral form, after which it is passed through "crimpers," giving a uniformity of twist. The augers are next put through "straighteners" and revolved, making them perfectly straight, when they are ready for putting on the head, which is the most delicate operation in their manufacture, and requires the work of a skilled artisan. They are then subjected to a "grinding-out" process, which consists of putting them through two rubber wheels to rough-polish the twist. The "fitter-up" then takes hold of them and "lightens" or fits the head; then the filers file down and sharpen the heads, after which they pass through the hands of the polishers, where they are polished and hardened ready for market.

MALLEABLE BRONZE.—A patent has been taken out both in England and France, by Mr. A. Sentex, Mr. C. Marechal and Mr. A. Saunier, establishing a process for producing malleable and ductile bronze bars or plates which are free from cracks and blowholes, are "inoxidizable," and which may be "rolled and drawn with the greatest ease." Moreover, the metal has the appearance and "sonorosity of gold." One and a half kilos of tin are purified by melting under niter. Ten kilos of copper are melted and 50 grammes of equal parts of nitrate and cyanide of potassium are added for the double purpose of reducing the oxides and "fattening" the metal. Then 25 grammes of bitartrate of potassium, with the same quantity of cyanide, are added, and, after poling, the tin is introduced; 25 grammes each of sal-ammoniac and cyanide are thrown on, 1 gramme of "phosphuret of copper" introduced to "impart mildness," and 20 grammes of "Marseilles soap" added, which still further "fattens" the metal. Finally, one gramme of sodium is added at the moment of casting. The metal, if cast in sand, may contain more tin, and if the proportion of tin be reduced, the quantity of phosphorus and sodium may be increased.

NEW DEVICE FOR WIRE-MAKING.—Wire is now being manufactured—whether iron, copper or brass—by a new and greatly improved process, and at a considerably reduced cost. The machine devised for this purpose consists of a series of rolls in a continuous train, geared with a common driver, each pair of rolls having a greater speed than the pair preceding it, with an intervening friction clutch adapted to graduate the speed of the rolls to the speed of the wire in process of rolling. The entire operation of producing the smallest sized wires from rods of one-half inch is done cold. It is alleged that this method obviates the danger of unequal annealing and of burning in the furnaces—in addition to this the wire being more flexible and homogeneous than that made by any ordinary method, and capable of sustaining greater longitudinal strain; in the case of copper wire there is said to be a greatly increased electrical conductivity.

NEW PROCESS OF MAKING COPPER CASTINGS. Messrs. Schneider & Co., Creusot, France, have patented a process, which consists in making, in a blast-furnace, a cupola or a reverberatory furnace, castings having a variable proportion of copper, with a proportion likewise variable, of the ordinary constituents of cast iron. These copper castings are used for the manufacture of the copper steels which serve for the preparation of articles such as sheathing and armor for vessels, cannons, projectiles, bed-plates, steam-cylinders, roll, etc., the articles when desired being case-hardened or hardened in oil. Copper ore is mixed with the charge in the blast furnace, or copper alloys with the charge in the cupola. Also copper filings can be mixed with coal to form a copper-coke, which is used for heating the blast furnace or cupola; or copper compounds can be melted in a reverberatory furnace, with a mixture of steel or iron, under a layer of anthracite to prevent oxidation.

A HYDRAULIC RAILROAD.—At the Paris Exposition there is a hydraulic railroad, which is not very clearly described. The car rests upon a species of skates which rest upon compressed water, but they do not touch the rail. The motive-power is a column of water, but how it works is not given. It is said to be one of the most curious inventions at the Exposition.

SCIENTIFIC PROGRESS.

The Super-Sense of Animals.

The physical expressions which the animals employ to manifest their passions, requirements, distresses and emotions, are precisely similar to man's. They caress with their lips and limbs, show resentment by facial distortion, bites and kicks, and fear by a tremor; they leap with joy, loll with thirst, lag with fatigue, and attack for revenge or reprisal. Even fishes, with their poor, deficient bodies, are able to manifest many mental operations in a manner intelligible to man, as well as to each other. There is no end to authenticated instances of animal sagacity, indicating premeditation, plan, purpose, sense of duty, prudence, gratitude, method, judgment. Animals memorize. They cherish malice, they dream in their sleep, they can count, they have a sense of injustice, a consciousness of error, and notions of forgiveness and reparation. I have seen a brute of a man requite the clumsy caresses of his horse by a thumping blow on the nose. His supreme intelligence did not comprehend the animal's action, forsooth. Now some men get vexed if they are not readily understood. Did the horse show temper—this noble animal whom Job represents as endued with the spirit of the tempest? Did he even resent the outrage? Not by retaliation, although he plainly indicated his keen sense of the indignity. What may we suppose his emotions to have been at treatment so regardless and unprovoked? Yet he presently forgave all. Do not say that he forgot, for at all times afterward he shrank with apprehension when his master approached. Oh! the gentleness, forbearance and long-suffering of the brutes, who oft-times grieve in silence—speechless and unable to utter protest or complaint.

Animals meditate. Dogs have been seen to sit in a fit of abstraction, so that no one could engage their attention, and presently start off with an impetus which showed there was a mental impulse behind it. That was a keen sense of *finesse* displayed by the Newfoundland dog at a seaside resort when he pushed little girls off the pier so that he could jump in magnanimously to the rescue, and thereby obtain the reward of a handful of candy which he anticipated the grateful parents would bestow. He repeated the trick so often that he fell into suspicion and disgrace, but his method showed not only a conception of the efficacy of a virtuous act and its logical recompense, but the advantage of deception when successfully practiced.

A crow which I knew of shammed hunger habitually so as to obtain more food, which he invariably carried off and hid in a wall, and then came back for more. In this way he accumulated large hoards of provender. A certain Java sparrow was able to distinguish the click of its master's latch-key in the hall door from any other person's, and flew to meet him with demonstrations of joy as soon as he entered the house. He never made a mistake. A sagacious mastiff always pulled the door-bell when he desired to enter. A parrot in New Orleans seemed to answer questions categorically, and recognized different persons, calling them by name. The intelligence of insects is perhaps even more wonderful. Fishes exhibit remarkable sagacity, which has been made the theme of writers for 2000 years.—*Forest and Stream.*

The Bottom of the Sea.

Notwithstanding the fanciful pictures which some writers have drawn of the ocean-bed, its desolation, at least in its deepest parts, must be extreme. Beyond the first mile it is a vast desert of slime and ooze, upon which is constantly dripping a rain of dead carcasses from the surface, which carcasses supply the nourishment for the scanty fauna inhabiting the abyssal region—in some places more than five miles from the sunshine, and the microscope reveals that the slimy matter covering this deepest ocean-bed is very similar in composition to the ancient chalk of the cretaceous period, while mixed with it here and there are minute metallic and magnetic bodies, which have been proved to be dust from the meteorites.

At long intervals a phosphorescent light gleams from the head of some passing fish, which has strayed hither from a higher zone. But it is not until we have mounted a good deal nearer the surface that the scene changes for the better. We now meet with forests of brilliantly colored sponges, while the phosphorescent animals swimming about are much more numerous, and the nearer we get to the littoral zone more and more phosphorescent lights appear, till at length the scene becomes truly animated. When only 1200 feet separate us from the sunshine, we come upon the first seaweed and kelp (1200 feet is the deepest limit of plant life in the water), but we must rise still another thousand feet and more and get as near the top as 120 feet before we find any reef-building corals.

As plants do not live in the deep sea, the deep-sea animals either prey on one another or get their food from dead organism and plants which sink down to them. Thus Maury says: "The sea, like the snowcloud with its flakes in a calm, is always letting fall upon its bed showers of microscopic shells." And experiment proves that a tiny shell would take about a week to fall from the surface to the deepest depths. Since sunlight does not penetrate much farther than the littoral zone, there would be beyond this perpetual darkness, except for phosphorescence. Many of the animals inhabiting the continental and abyssal zones have merely rudimentary eyes. But these blind creatures have very long feelers, which help them to grope their way along the bottom. Other deep-sea animals, on the contrary, have enormous eyes, and these very likely congregate around such of their number as are phosphorescent, and may perhaps follow the moving lamps about wherever they go. And so bright is this light on many of the fish brought up by the dredge that during the brief space the animals survive it is not difficult to read by it.

The reason why fishes and mollusks living more than three miles under water are able to bear a pressure of several tons is that they have exceedingly loose tissues, which allow the water to flow equally through every interstice and thus to equalize the weight. When the pressure is removed, they perish. In the Challenger expeditions sent out by the British Government, all the sharks brought up from a depth of a little less than three-quarters of a mile were dead when they got to the surface.

The Speed of Thought.

Some readers have no doubt frequently made use of the expression "quick as thought," but have any of them ever stopped to consider how quick thought is? A writer has made some interesting calculations regarding the comparative length of time it takes to call to mind various every-day facts.

It takes about two-fifths of a second to call to mind the country in which a well-known town is situated, or the language in which a familiar author wrote. We can think of the name of next month in half the time we need to think of the name of the last month. It takes on an average one-third of a second to add numbers consisting of one digit, and half a second to multiply them. Such experiments give us considerable insight into the mind.

Those used to reckoning can add two to three in less time than others; those familiar with literature can remember more quickly than others that Shakespeare wrote "Hamlet." It takes longer to mention a month when a season has been given than to say to what month a season belongs.

The time taken up in choosing a motion, the "will time," can be measured as well as the time taken up in perceiving. If I do not know which of two colored lights is to be presented, and must lift my right hand if it be red, and my left if it be blue, I need about one-thirteenth of a second to initiate the correct motion. I have also been able to register the sound waves made in the air by speaking, and thus have determined that in order to call up the name belonging to a printed word, I need about one-ninth of a second; to a letter one-sixth of a second, and to a color one-third of a second.

A letter can be seen more quickly than a word, but we are so used to reading aloud that the process has become quite automatic, and a word can be read with greater ease and in less time than a letter can be named. The same experiments made on other persons give times differing but little from my own. Mental processes, however, take place more slowly in children, in the aged and in the uneducated.

METEORITES.—From an exhaustive study of the large collection of meteorites at Harvard college, the conclusion has been arrived at that many of the masses of meteoric iron now known are cleavage crystals, broken off, probably, by the impact of the mass against the atmosphere. It is found that these masses show cleavings parallel to the planes of all the three fundamental forms of the isometric or regular system. From all that appears, the theory has come to be entertained that the masses of meteorites were thrown off from a sun among the fixed stars, and that they were slowly cooled while revolving in a zone of intense heat.

SOME CURIOUS COMPUTATIONS.—The energy set free on firing a small pistol is about 600 foot-pounds, the pressure being about 40 tons per square inch. A watch consumes about one fifty-fourth millionth of a horse-power, so that the energy of the bullet would serve it for two years. An Edison telephone transmitter requires about one-thousandth of the energy in a watch; it would therefore be worked for 2000 years on the energy exerted in the pistol. A lightning flash of 3,500,000 volts and 14,000,000 amperes, and lasting one twenty-thousandth part of a second, would run a 100-horse power engine for ten hours.—*Electrical World.*

MICROBES DESTROYED BY STEAM.—The experiments of steam disinfection tried in Jacksonville, Fla., have proved that the steaming process is thoroughly efficacious in destroying microbes in general, and also the yellow-fever microbes. Active germs placed by Dr. Gibier in a gelatine-filled glass tube germinated, showing unmistakable life and activity. Microbes subjected to the steaming process, though for only ten minutes, and under very imperfect conditions, were afterward subjected to the same cultivation, but remained entirely inert.

THE STOMACH AN INHABITED WORLD.—A French scientist claims to have found nine forms of microbes in the juices of a healthy stomach, and concludes that they play an important part in digestion. Every stomach seems to be a little inhabited world in itself.

GOOD HEALTH.

Health of the State.

The State Board of Health reports for the month of May that from 78 towns, with an estimated population of 725,450, there was a total mortality of 885, a percentage of 1.22 per thousand for the month, or an annual percentage of 14.64. There are at present no epidemics of any kind existing in the State, and a light rate of mortality has prevailed during the past month.

The excess of humidity that prevailed during the earlier part of the month, and the increased temperature during the latter half, had the effect of developing malarial and other fevers in quite a large number of localities that, up to this time, had been completely free from them.

The report adds that whooping-cough seems to progress hand in hand with measles, and is apparently influenced by the temperature. As the disease is highly infectious, children suffering from it should not be admitted into schools or crowded assemblies, or wherever other children are congregated.

Measles is quite prevalent; but it is thought that, like scarlet fever, it is the result of a germ and can be prevented. It is intensely contagious, however, and this fact makes the difficulty of prevention proportionately great. So it is recommended that unprotected persons be placed beyond its influence. Scarlet fever nowhere assumes an epidemic or malignant form. Diphtheria and croup were severe only in scattered localities. In Gold Run there were 21 cases in four months.

Three cases of small-pox appeared in San Francisco, one case in Lodi and one case in Stockton during the month. All are now convalescent, without any cases being reported. Typhoid fever is mentioned by very few observers. Cholera infantum is reported from a number of towns.

Dysentery is quite prevalent in many parts of the State. The opinion is daily gaining credence that the excretions in dysenteric attacks should be immediately disinfected and buried, as it is generally believed that the disease depends upon a living germ taken into the stomach, either with the food or through the impurity of the water imbibed. Indeed, so many diseases can be produced from impure water that for prudential reasons all water should be boiled before being used for drinking purposes, especially during the summer months.

The chief causes of death were as follows: Consumption, 146; heart diseases, 80; acute pneumonia, 52; diarrhea and dysentery, 33; cancer, 25.

A REMARKABLE case of injury which occurred a few days since in this city is attracting much attention. Mr. J. B. Hill had the vertebræ of his neck dislocated by the fall upon him of a bale of hay. Three of the vertebræ were shattered and he was otherwise injured. He has been attended with the utmost care and skill, and up to this present time of writing, about six days, he still survives and is nourished with liquids. An egg has now been added to his diet. He still retains his mental faculties, and even in delirium knows the members of his household, and often makes suggestions concerning his treatment. Regularly at 10 o'clock every morning he begins to sink into a semi-comatose state, and remains in that condition until 3 P. M., when he commences to rally. The most serious thing that the physicians have to contend with is the patient's throat, which fills up and nearly strangles him at times. Every attention that one could have is given, and Mrs. Hill says that if good treatment is of any avail, he will certainly get well.

INOCULATION FOR YELLOW FEVER is creating considerable interest at this time among the medical fraternity and others. Dr. Nelson, a member of the College of Physicians and Surgeons of the Province of Quebec, and a late member of the State Board of Health of Panama, read a paper at the recent fourteenth annual meeting of the State Medical Society of Arkansas on the subject of "Yellow Fever," in the course of which mention was made of the work of Dr. K. Girard, late Surgeon-in-Chief of the Panama Canal Company, whose profound faith in the protective power of inoculation was fully shown by his inoculating himself and having a mild form of yellow fever, which was followed by perfect immunity from the disease, and finally the crucial work of Dr. Carlos Findlay and Dr. Delgrado of Havana. Dr. Nelson being perfectly familiar with the work of these gentlemen, he boldly forecast the day when inoculations against yellow fever will take equal rank with the inoculations against smallpox.

PHTHISIS FROM HOUSE SWEEPINGS.—The *Munchener Medicinshe Wochenschrift*, No. 308, reports that Carnet has experimented with the dust obtained from the walls and floors of various dwellings in which tuberculous patients have been, inoculating guinea pigs with it, and carefully excluding all possibility of infection from outside sources. In this way, 21 rooms of seven Berlin hospitals were examined, and bacilli found to have been present in the dust from most of them. Positive results were also obtained with the dust from insane asylums and penitentiaries. The dwellings of 53 tubercular patients were investigated in the same way, and the dust in the neighborhood of 20 patients found to be virulent. It was the case, with absolute regularity, that the dust was always virulent when the patient had been in the habit of spitting on the floor, or in a handkerchief, while it was never so when a spit cup had been employed.

CARE OF CHILDREN'S EYES.—A very sensible decree has recently been issued by the Austrian Minister of Public Instruction, forbidding the use of books printed with small type in public schools, as shortsightedness is so prevalent among school-children in Austria. Scientific supervision might very properly be given to school-books in this country, attention being especially directed to the size of the type, length of line, and spacing of letters and lines. In the works published by the Clarendon Press no fault can be found in these respects, and speaking generally, the school-books of this country are well printed. The chief fault in German books is their adherence to the very dazzling Old English shape of the letters, which certainly severely tries the eyes by necessitating very close attention, and the evil effects of this are aided by the paper being coarse and by the light supplied being usually insufficient.

THE BEST TIME TO BATHE.—The best time to bathe is just before going to bed, as any danger of catching cold is thus avoided, and the complexion is improved by keeping warm for several hours after having the bath. A couple of pounds of bran put into a thin bag and then in the bathtub is excellent for softening the skin. It should be left to soak in a small quantity of water several hours before being used. The internal aids to a clear complexion are most of them well known. The old-fashioned remedy of sulphur and molasses is considered among the best. Charcoal powdered and taken with water is said to be excellent, but it is most difficult to take. A strictly vegetable and fruit diet is followed by many for one or two weeks. —*London Lancet*.

VACCINATE THE CHILDREN.—The State Board of Health recently issued a circular to the various Boards of Supervisors in the State in which the following is set forth: In accordance with the law requiring general vaccination prior to admission to public schools, you will immediately take the necessary steps to ascertain the number of unvaccinated children in your school district and give due notice when and where they can be vaccinated. It is recommended that this operation be performed by a competent physician who shall give a certificate when he is satisfied that the vaccination is successful and confers protection.

USEFUL INFORMATION.

Hints in Regard to Shaving.

Never fail to wash well your beard with soap and cold water, and to rub it dry, immediately before you apply the lather, of which the more you use, and the thicker it is, the easier you will shave.

Never use warm water, which makes the face (of shavers) tender.

In cold weather, place your razor (closed, of course) in your pocket or under your arm to warm it.

The moment you leave your bed (or bath) is the best time to shave.

Always wipe your razor clean, and strop it before putting it away, and always put your shaving-brush away with the lather on it.

The razor, as we have shown, being only a fine saw, should be moved in a sloping or sawing direction, and held nearly flat to your face, care being taken to draw the skin as tight as possible with the left hand, so as to present an even surface and to throw out the beard.

The practice of pressing on the edge of the razor in stropping it soon rounds it; the pressure should be directed to the back, which should never be raised from the strop. If you shave from heel to point of razor, strop it from point to heel; but if you begin with the point in shaving, then strop it from heel to point.

If you only once put away your razor without stropping it, or otherwise perfectly cleaning the edge, you must no longer expect to shave well and easy, the soap and damp so soon rusts the fine teeth and edge.

A piece of soft plate leather should always be kept with razors to wipe them with.

A SUBSTITUTE FOR INDIA-RUBBER.—For five years Mr. Henry Kellogg of New Haven, Connecticut, has been at work on a new substance to be used in manufactures, and he now claims that he has perfected the invention, or at least hit on the proper kind and proportion of ingredients. The substance is termed kelgum, and is calculated to supersede rubber in many uses to which the latter is put. Kelgum is said to be specially adapted to textile fabrics, which, when thoroughly saturated or impregnated with it, become absolutely waterproof, and will not become mildewed, and will not rot. Kelgum is produced from vegetable oils, which are treated so as to leave a residuum of a gummy character, not as elastic, however, as india-rubber gum. Being a product of oil, kelgum is not affected by oil, as is the case with rubber, nor is it changed by the action of heat or light. It can be vulcanized the same as rubber, but without the use of sulphur. Under many conditions it is said to be more durable than rubber, and especially adapted to beltings for all kinds of machinery, sail covers, awnings, tents, mail pouches, carriage coverings, overshoes, trunk covers, bags, book covers, insulation for telegraph and electric-light wires, shoe soles, gossamer waterproofs, window shades, tennis nets and seines, and many other uses. There is very little odor in the substance, and what there is is not disagreeable. When perfumed, it retains the artificial odor indefinitely.

USING AIR FOR FUEL.—Another marvelous discovery is reported at Philadelphia. Whether it is a fact or a fiction we do not pretend to say. It may be genuine, and again some excellent people may be mistaken. At any rate it is being talked about, and we give such information regarding the matter as comes to our hands from various sources. The device is called the Fales furnace. It is described as follows: It burns the air instead of coal. It is done in an ordinary stove or furnace. The device, in itself, consists of a grate 12 inches in diameter, 9 inches deep, surrounded at the upper end by prongs 4½ inches long, and an inch apart at the outer edge. It looks more like an immense hat of cast iron than anything else. This cast-iron hat is set on its head in the furnace or stove, and is filled with coal of any kind. The coal is piled up till it spreads over the top of the hat, including the brim made of cast-iron prongs as stated; on top of this coal is put a little kindling just to start the fire. It has a pipe, but this pipe is not to let the smoke out, for there is no smoke to go out. The pipe is to let in the air that is burned. It is such a wonderful device that the mere statement of what it can do will be received with incredulity and even with denunciation. The heat is intense. We have no comments to make on this astonishing statement. We would suggest, however, that the Franklin Institute could not do a better thing than to make an investigation of this matter and make a statement as to its fraudulency or the magnificence of the discovery.—*Age of Steel*.

THE NEW SUBSTITUTE FOR GLASS.—The new translucent substance intended as a substitute for glass has been satisfactorily adopted in some of the public buildings of London, and various advantages are claimed for it, among these being such a degree of pliancy that it may be bent backward and forward like leather and be subjected to very considerable tensile strain with impunity. It is also almost as translucent as glass, and of a pleasing amber color, varying in shade from very light golden to pale brown. The basis of the material is a web of fine iron wire, with warp and weft threads about one-twelfth inch apart, this being inclosed, like a fly in amber, in a sheet of translucent varnish, of which the base is linseed oil. There is no resin or gum in the varnish, and once having become dry, it is capable of standing heat and damp without undergoing any change, neither hardening nor becoming sticky. Briefly, the manufacture is accomplished by dipping the sheets edgewise into deep tanks of varnish, and then allowing the coating which they thus receive to dry in a warm atmosphere. It requires somewhat more than a dozen of these dips to bring the sheets to the required degree of thickness, and, when this has been accomplished, the material is stored for several weeks to thoroughly set.

WHY THE CAT IS NOT HARMED BY A FALL.—It is quite wonderful to see a cat jump from a hight. It never seems to hurt itself, or to get giddy with the fall. It always lands on its feet, and these are so beautifully padded that they seldom or never get broken. Why does not the animal get a headache after its jump? Why does it not receive a concussion of the brain, as a man or a dog would if he performed a similar acrobatic feat? To answer this, we must examine a cat's skull, when we shall see that it has a regular partition wall projecting from its sides, a good way inward, toward the center, so as to prevent the brain from suffering from concussion. This is indeed a beautiful contrivance, and shows an admirable internal structure, made in wonderful conformity with external form and nocturnal habits.

THE LIGHTEST SOLID KNOWN.—Cellulose is a fibrous substance produced in France, by a secret mechanical process, from cocoanut husk. When compressed, its specific gravity is far less than that of cork. It is the lightest solid known, and therefore invaluable for life-belts and life-mattresses, while in large quantities its buoyancy will make a ship non-sinkable. It is used to fill compartments in a ship's side, and serves to prevent water entering through a hole made by a projectile or rock, because the instant the water enters, the cellulose is expanded by it to an impenetrable tightness. It does not decay or emit any odor, and has been packed in a ship's compartments without undergoing any change. If a mass of cellulose be penetrated by a projectile, it will not be ignited by the friction.

NATURAL GAS was first used for fuel only about 15 years ago. Within that comparatively short time it has become so extensively employed that to-day there are required to pipe it 27,350 miles of mains. In Pittsburg alone 500 miles supply 4268 private houses, 40 iron-mills, 37 glass works, 83 foundries and machine shops and 422 miscellaneous industrial establishments. An idea of its value as fuel can best be obtained when it is realized that the value of 7,000,000 tons of coal is annually displaced by natural gas.

ENGINEERING NOTES.

Engineering Development in the New World.

The address of the president of the British Institute of Mechanical Engineers, reported to the *American Manufacturer* (Pittsburg) by its English correspondent, was chiefly notable for its calling the attention of mechanical engineers to the wide field offered for the display of engineering energy and talent in the western hemisphere, especially in connection with the Republics of North, South and Central America, and with Mexico and her federated States. "Scarcely inferior in number to those of her great neighbor, and certainly not inferior to the United States, in the wealth which was now on the eve of vigorous and practical utilization, Mexico," said the president, "is about to cover her territory with railways, harbors, piers, gigantic drainage works, bridges, viaducts, tramways, etc., and is also requiring the necessary machinery for her mining and commercial enterprises. Chili and Peru are also moving forward with new sources of wealth and in the same direction as Mexico, the nitrates being far greater revenue-producers than the famous guano deposits of Peru. What has for ages been a productive petroleum-field in Peru, considering how crude have been the means hitherto employed in working it, is now being opened with modern machinery, and is yielding large quantities of oil and gas from flowing wells. It may, indeed, probably rival both American and Russian fields, owing to the enormous advantages it possesses in distance and other respects for the Chinese, Australian and Indian trade. The Argentine Republic and other States are at this moment addressing themselves to Europe for capital and scientific assistance. Among the other States may be mentioned Venezuela."

The movement started in New York for the furthering of United States trade is attracting English attention. That during March 500 members should have joined the movement in New York alone is thought significant of the fact that while British traders are on the look-out in that direction, the traders of the United States do not intend to lose any opportunity of increasing whatever hold they at present have upon the South American markets.

THE MISSISSIPPI TO BE BRIDGED AT NEW ORLEANS.—The charter of a company organized for the purpose of building a bridge across the Mississippi a short distance above the city has been published. It is understood that the company proposes to build a suspension bridge which will span the river at or near Southport, in the parish of Jefferson. For some weeks engineers have been at work running lines through the plantations and lands on both sides of the river. The general impression is that Collis P. Huntington, the millionaire president of the Southern Pacific railway system, is the moving spirit of the bridge company, and that he will build the bridge in order to more closely connect his Chesapeake & Ohio and Southern Pacific systems, and to have an unbroken railway line from the Atlantic to the Pacific oceans.

PANAMA.—The latest advices from Panama present a picture so gloomy in its general tone that it is impossible to see anything cheerful there, even by the aid of the few half-lights introduced. Ever since the collapse of De Lesseps' company the canal has been deserted, and now the same spirit of desertion has reached the Atlantic terminus town of Colon. A telegram from Paris on the 13th instant says: "The Cabinet to-day discussed the difficulties of the Panama Canal Co. after the liquidator read his report. The result of the findings will be that the Government will shortly present a bill dealing with the matter." To look for a reinvigoration of the dead forces on the Isthmus of Panama is a forlorn hope indeed.

A RAILWAY THROUGH THE COLORADO CANYON.—The building of a railway through the Grand Canyon of Colorado, which has been suggested, would be a grand affair if it could be accomplished. The trouble, however, would be to obtain a survey of the route—a task of which the Denver *Republican* says: "No one who can neither fly like a bird nor leap like a chamois will be able to make the trip over the falls, through the rapids or along the narrow and dizzy ledges of cliff, hundreds of feet above the water. It does not look like a desirable job. Most tourists would prefer to go around the canyon."

OPENING UP SIBERIA.—It is rumored that an American syndicate, with a capital of $50,000,000, has been formed to construct a railway in Siberia, and that several former and present diplomatic and consular American agents are interested in the undertaking. It is singular how thoroughly these gentlemen share with Sir Robert Morier the view that there is money to be made by the development of Siberia.

FLOWING WATER.—The best form of aperture for giving the greatest flow of water is a conical aperture, whose greater base is the aperture, the hight or length of the section of cone being half the diameter of aperture, and the area of the small opening to the area of the large opening as 10 to 16, there will be no contraction of the vein, and consequently the greatest attainable discharge will be the result.

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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO
Saturday, June 22, 1889.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Plan of 20-Stamp Mill, with Frue Concentrators; A California 20-Stamp Gold-Mill, 453. The English Dam, Sierra Co., Cal.; The Puente Dam, Spain; The Habra Dam, Algiers; The Dyke Dam, England, 461.
EDITORIALS.—Brimetallism in England; Gold-Mills, 453. Passing Events; The Debris Commission; Steel-Mills; The Pacific Power Co.'s New Engine; Dams Which Have Burst, 460.
CORRESPONDENCE.—Northern Counties of California—No. 4; Ruby City Mines, W. T., 454.
MISCELLANEOUS.—Economical Mining; Allanite; Riverside, 454. The Water Gas "Boom," 455.
MINING SUMMARY—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 456-7.
MECHANICAL PROGRESS.—Iron-Workers; Some Defects in Axles; Two Hundred Miles an Hour; The Manufacture of Augers; Malleable Bronze; New Device for Wire Making; New Process of Making Copper Castings; A Hydraulic Railroad, 458.
SCIENTIFIC PROGRESS.—The Super-Sense of Animals; The Bottom of the Sea; The Speed of Thought; Meteorites; Some Curious Computations; Microbes Destroyed by Steam; The Stomach an Inhabited World, 458.
GOOD HEALTH.—Health of the State; Phthisis from House Sweepings; Care of Children's Eyes; The Best Time to Bathe; Vaccinate the Children, 459.
USEFUL INFORMATION.—Hints in Regard to Shaving; A Substitute for India Rubber; Using Air for Fuel; The New Substitute for Glass; Why the Cat is Not Harmed by a Fall; The Lightest Solid Known, 459.
ENGINEERING NOTES.—Engineering Development in the New World; The Mississippi to be Bridged at New Orleans; Panama; A Railway Through the Colorado Canyon; Opening up Siberia; Flowing Water, 459.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 468.

Business Announcements.

[NEW THIS ISSUE.]

Assayers' Manual—Henry Carey Baird & Co., Phil'a, Pa.
Situation Wanted—Mining Engineer.
American Exchange Hotel.
Mining Machinery Wanted—S. L. M. & R. Co., St. Louis.
Smelter for Sale—"Box 28," Elkhorn, Montana.

☞ *See Advertising Columns.*

Passing Events.

The proposed construction of steel works at Vallejo, in this State, is an important move. English capital is to be used. It is stated that work will be commenced in two months and on quite a large scale. The machinery will be sent here from England.

The sale of a number of mines in New Mexico to New York capitalists is a good thing for that Territory, as if they are successful it will attract others. New Mexico has large areas of mineral ground not yet utilized.

The quartz mines of Lower California seem to be yielding well for the little work done on them. The placer excitement has all died out, but interest in quartz has increased. More machinery is going in and the mines are being developed with vigor.

People all over the country are just now examining reservoir dams, being nervous about them since the Johnstown disaster. We devote considerable space in this number of the PRESS to the subject of breakage of dams, and the article is one of general interest. The data relative to the speed of bodies of water suddenly set free will be of special value at this time.

The Debris Commission.

The U. S. Debris Commission have been examining the hydraulic mines in Klamath, Trinity, Siskiyou, Modoc, Nevada and Sierra counties. At the North Bloomfield they are mining on the elevator system, their elevator lifting 90 feet. From the upper end the water is received into a flume, which carries the water to an immense settling basin, about 200 feet deep and 20 acres in area. This is formed by damming a canyon in the vicinity of the mine. All the bowlders, debris, gravel, etc., that are torn down by the monitors are washed to the foot of the pipe, and by the force of the water carried upward into the flume, and by this into the settling basin. The outlet to this basin is at some distance from the inlet, and as there is no noticeable current the sediment is mostly precipitated, and when the water leaves the impounding basin it is comparatively free from slickens.

Of course all the heavier portions that were held in solution have settled. The Commissioners examined the water leaving this basin, and found that it contained one-eighth of one per cent of sediment.

The system adopted by the Spring Valley mine in the Cherokee district, Butte county, seems to be open to no objections. A canal 19 miles long has been constructed from the mine to the waste tule lands in the Sacramento valley. By means of this ditch all the debris from the mine is carried to the marshes and assists in forming valuable lands. It has been found that slickens makes a good foundation for a productive soil. In the Klamath region the commission saw alfalfa growing luxuriantly on 20 feet of debris. The tailings had been treated with a mixture of soil and fertilizers, and the result was satisfactory. In the case of the Spring Valley mine, none of the debris whatever reaches the river, or can in any way become detrimental to any other interest.

Steel-Mills.

The Anglo-Pacific Steel Company was organized some time since, but have done nothing toward building the proposed works here, until recently. The projector has now secured a location at Vallejo, opposite Mare Island, the city having given 100 lots and more having been purchased. The land is given conditional to the works being established. A tract of 350 acres has been secured, southwest of Vallejo, with a water frontage of 4000 feet. Mr. Hammond, the projector, says: "We expect to begin preparations within two months, and will probably have a portion of the plant in operation by the last of the year. The first structures erected will be four main buildings entirely of iron, 64x500 feet in area. A number of other buildings, as store-houses, offices, etc., will also be built. The total investment, including plant and material, will amount to about $1,000,000. When the works are fully in operation we will employ about 1000 men. We have already engaged a number of the principal ones in the East. We will hire what labor we can on the coast and will bring the rest from the East.

"This number of men, with their families and others who will be drawn to the place indirectly, will make quite a city on the start. The new town of Sheffield will be regularly laid out in blocks 250x500 feet, with avenues 60 and 70 feet in width. The company will build houses to rent to the workmen as fast as needed, and we intend to build school-houses, a church, a library building and other improvements for the benefit of the community. Railroad tracks, running into our works and to our wharves, will be built, connecting with the Southern Pacific road which runs through Vallejo.

"As there are no steel-mills on the Pacific coast, and as we will confine ourselves to steel, we will not compete with any other manufacturers here, but will rather give them more work. There is a very active demand for steel manufactures on the coast now and the demand will continue."

THE UNION COPPER MINING COMPANY, Copperopolis, are erecting large works for roasting and leaching the many thousand tons of low-grade copper ore lying on the surface at that mine. The ore was mined several years ago and left on the surface for future work, which time has now arrived.

The Pacific Power Co.'s New Engine.

In the Pacific Power Co.'s building on Stevenson street, near First, a large 250-horse power engine, which is among the finest in the city, has been running for some months. It is a compound condensing tandem Corliss engine with condensing apparatus similar to that of a marine engine, salt water for the purpose being brought from the bay, a distance of 3000 feet. The cylinders are 16 and 28 inch respectively, with 42-inch stroke, and the engine runs 69 revolutions per minute. The bed is what is known as the Porter-Allen; and the cross-head works in locomotive slides.

The main shaft is 12 inches in diameter and the bearings 21 inches long. The quarter-boxes in the main bearings are taken up by means of taper wedges, adjusted horizontally, so that the bearings cannot be screwed up out of line. The crank-pin is 6 inches in diameter and 7½ inches long; the cross-head pin is 5 inches in diameter and 6 inches long.

Each of the cylinders is steam jacketed, as is also the head and receiver pipe between the two cylinders. The steam for the jackets comes directly from the boilers. The condensed water from the jackets flows to a steam trap and from there it drains to a hot well.

The valve motion is of the most approved Corliss type and is operated by means of two eccentrics which operate two independent wrist-plates on each cylinder. One of the eccentrics works the four inlet and the other the four exhaust valves. This arrangement admits of an early closing of the exhaust valves to gain compression, permitting the moving parts to cushion on exhaust steam, so that the engine runs perfectly smooth and without jar.

The details of mechanism are all laid out for the greatest convenience to the engineer. The end of the valve-stems are so constructed that by moving the valve-plates on the opposite side of the cylinder, the valves can be taken out without removing the stems or disconnecting any of the valve-motion gear. The heads are so made that the back high-pressure head and the front low-pressure head come out through the low-pressure cylinder, allowing the piston-rod, with the two pistons, to come out through the back of the engine without having to disconnect any of the other parts. Each of the cylinders has automatic relief valves on each end in case the engine should lock water. The heads are covered with polished iron bonnets which are thoroughly lined with a non-conductor to prevent undue radiation. The cylinders themselves are fitted with asbestos and hair-felt. The governor is of the usual Corliss type fitted with an oil dash-pot.

In the basement, close to the engine, is set the condensing apparatus, which consists of a surface condenser and combined circulating and air pump, with steam cylinder placed between the two pumps. The condenser is of a very neat and compact construction and has 750 ⅝ brass tubes through which the salt water circulates. The condensing water comes from the bay through pipes laid down Mission street and is discharged into the sewers after passing through the surface condenser. A great saving is effected by this plan.

On the suction pipe for the circulating pump is a large air-chamber to overcome the water shock from the long suction pipe. The circulating and air-pumps are operated by fly-wheel and Scotch yoke. The pump has a Myers cut-off valve motion. The air-pump takes the condensed steam directly from the condenser and lifts it into a hot well which is so constructed as to remove the oil, and from there it is pumped by an auxiliary pump to the pair of Babcock-Wilcox boilers.

The old engine ran right up to the time when the new one was connected to the Power Co.'s shafting, which was done in the night-time, so that none of the tenants were inconvenienced in any way, some of them not even knowing that a change had been made. Since the change the Power Company has never had to shut down on account of the new engine, the work going on steadily as before, but with a saving of almost 50 per cent over their old plant.

The engine was built for the Power Co. by the San Francisco Tool Co., whose shops are in the same building.

THE output of the Gallup (N. M.) mines is now 50 carloads a day.

Dams Which Have Burst.

Some Account of Former Disasters—A California Instance.

Although the disaster caused by the overflow and breakage of the Conemaugh dam, Pennsylvania, is far beyond, both in loss of life and property, anything of the kind that ever before occurred, the instance is by no means an isolated one. Both in this and other countries there have been similar accidents, nearly always attended with large loss of life and property. It is worthy of note, too, that several of the previous disasters were due to exactly the same cause to which the Conemaugh break is attributed, viz., the overflow of the dam and its resultant collapse. This would seem to indicate that the question of possible overflow by reason of sudden freshets or cloud-bursts had not been properly considered by the engineers, waste-gates not being sufficiently large to provide for all contingencies. At the Conemaugh dam those in charge, in order to relieve the pressure, claim to have cut a waste-way and built a sluice through which rushed a body of water 20 feet wide and 3 feet deep, but even this did not prevent the flood-water passing over the top, eroding the face and destroying the dam.

The dimensions of this dam are variously given in the different accounts. One report says it was 400 feet in length at the top by 75 feet in hight, about 90 feet thick at the base and 20 at the top. Another description gives the dimensions as 930 feet in length, 90 feet thick at base, 20 feet wide at top and 110 feet high. The inside slope was 2 to 1 and the outside slope was 1½ to 1. The lake was at an altitude of 1700 feet, or 300 feet above the city of Johnstown.

The Habra Dam.

The most noted instance of the breakage of a dam before that of the Conemaugh was that of the Habra dam in Algeria, which was caused by the flow of water over the top. The topping of dams by floods is not uncommon, and if the extra strain thus induced is not allowed for, the destruction of the dam is nearly certain. There have been several examples of this in Algeria, where, although the average rainfall is only about 15 inches yearly, a depth of 6½ inches, or more than one-third of the total, has been known to fall in 24 hours.

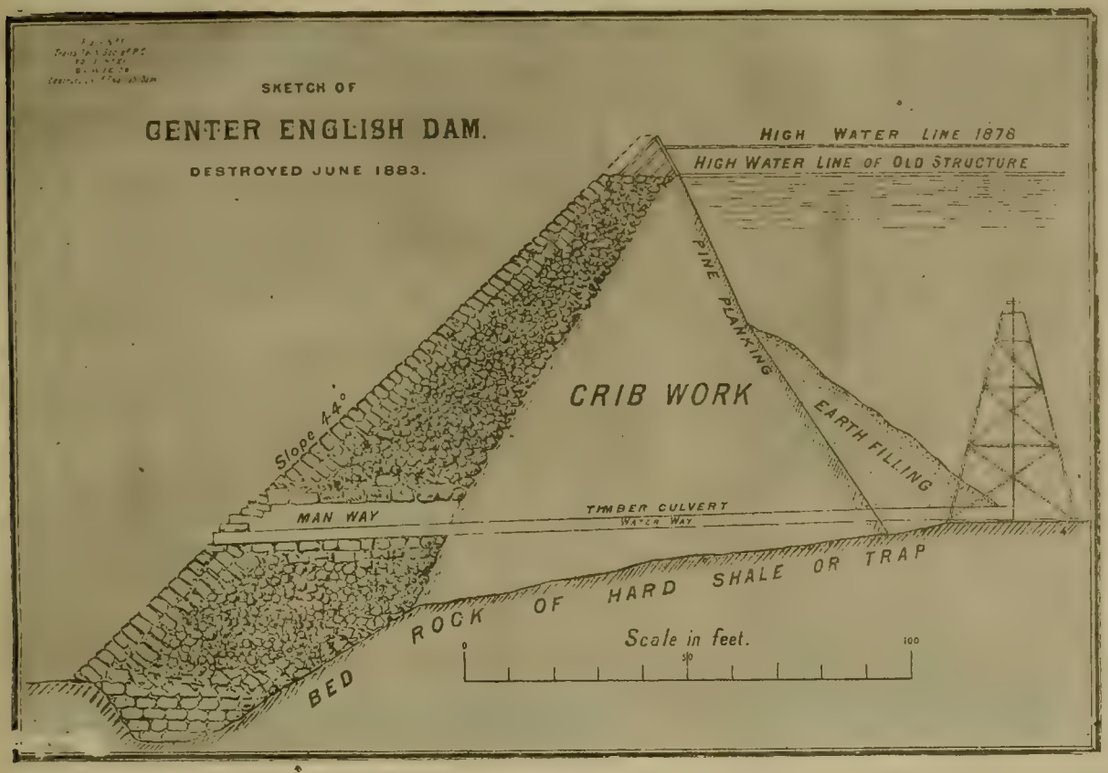
The Habra dam, a section of which is herewith shown, was destroyed by a sudden flood of this kind in 1881. This reservoir was intended for the irrigation of a cultivated district bordering on the Mediterranean and for the storage of flood-waters. The hight of the dam was 117 feet and it was provided with a by-wash of 394 feet in width, and outlets for irrigation formed by four cast-iron pipes 31½ inches in diameter through the dam. It was composed of rubble set in hydraulic mortar, the latter composed of two parts of sand to one of hydraulic lime. This dam was 1060 feet long on the crest. It retained a volume of 1050 million cubic feet of water. This immense body of water was suddenly set free by the bursting of the dam, destroying several villages and the city of Parregaux. There were 209 lives lost by the flood. This was a masonry dam.

At the Hamiz dam, also in Algeria, when the water was admitted, signs of weakness were shown and it had to be practically rebuilt. When water was admitted to the Cheurfas reservoir the water began to make its way around the permeable ground at one end. The flushing gate in the deepest part of the reservoir was jammed and 30 feet of the dam was destroyed, causing a flood in the river below. At some distance down stream was the Sig reservoir. The flood rushing down overtopped this dam and destroyed it also.

The earthwork dam of Estrecho de Rientes, near Lorca, Spain, was 150 feet high, and two months after it was filled, in February, 1802, gave way, destroying part of the town of Lorca, devastating a large tract of fertile country and causing the death of 600 people.

Dale Dyke Reservoir.

The Dale Dyke reservoir, Sheffield, England, was suddenly emptied by the breakage of the dam in March, 1864, causing the loss of 300 lives and much property. The greatest depth of this embankment from the ground level to the crest was 95 feet, the top width 12 feet, and the slopes, both on the up and down stream



THE ENGLISH DAM, SIERRA COUNTY, CALIFORNIA.

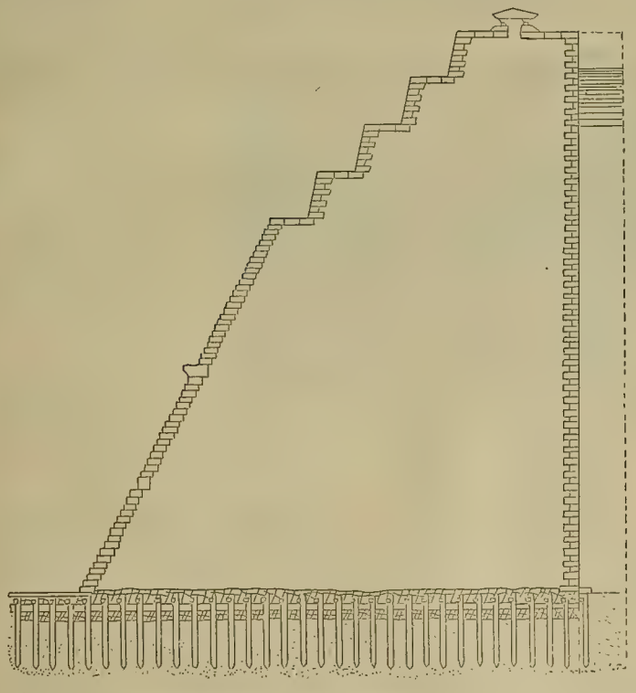
sides, was 2½ to 1. The area of the reservoir was 78 acres. A cross section of this dam is shown herewith. The discharge outlets of this dam were made by laying pipes in a trench under the dam. Those who made an official examination of the dam after the disaster were of the opinion that the mode of laying the pipes was faulty and their subsidence caused a crack and eventually the accident. This view was not agreed to by all the engineers, some of whom thought that a land-slip had caused the break.

The Worcester dam, or rather the Lynde Brook dam near Worcester, on March 30, 1876, gave way and 600,000,000 gallons of water were emptied suddenly into the river. Only one life was lost, but property was damaged to the extent of about $1,000,000.

By the Mill river disaster May 16, 1874, the village of Haydenville, Mass., was swept out of existence and 140 persons were drowned. A guard was watching the dam, and about 8 o'clock in the morning he discovered that an enormous leak had developed out of a small one. He started to give warning to the village of Leeds, just below, but the reservoir broke away before he could reach the village, and the water from a pond of 114 acres in area came down like a wall, carrying away nearly the whole village. Haydenville was swept away and several other towns on the Connecticut river were inundated. Over 300 families were rendered homeless and $1 000,000 worth of property in dams, dwellings, factories, etc., was lost. Roads and bridges were damaged to the extent of $200,000.

By the bursting of the Huron mill dam, near Houghton, Mich., on Jan. 2, 1884, six lives were lost. The money loss was not great. A similar disaster near East Lee, Mass., April 20, 1886, destroyed nine lives, and the damage to mill property, private dwellings and roads and bridges exceeded $150,000.

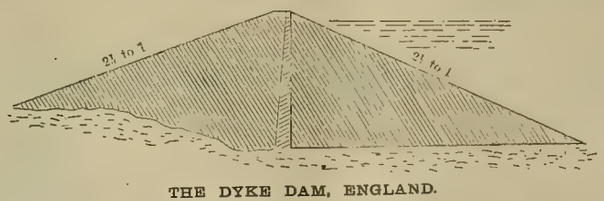
In February, 1852, the Bilberry reservoir, Yorkshire, England, burst its dam, drowning 90 people and destroying a great deal of property.



THE PUENTE DAM, SPAIN.

The Puentes.

The construction of the Puentes dam was considered one of the great achievements of the reigns of Charles III and Charles IV of Spain. It was built during the years 1785 and 1791, and was destroyed 11 years afterward. The maximum hight of this dam was 164 feet, and it was 925 feet long on the crest. The whole wall was built of rubble masonry faced with large cut stones. The dam was finished with a magnificent parapet on which the statues of the two kings were to have been placed. An engraving here shown gives an idea of the cross-section of this dam. The wall was to have been founded entirely on rock, but a deep pocket of earth was encountered and it was unfortunately decided to build the wall at this place on a pile foundation. This pile foundation was built securely and held water to a depth of 84 feet for 11 years, but the water rose to an elevation of 154 feet above the base of the dam and the foundation gave way. The accident caused the loss of 608 lives and over a million dollars in property.



THE DYKE DAM, ENGLAND.

A Dam in Sierra County.

An instance of breakage of dams occurred in California June 18, 1883, when the English dam of the Milton Mining and Water Co. was destroyed. This was on the headwaters of a tributary of the Yuba river in Sierra county, at an elevation of 6140 feet above sea-level. The structure was built in 1856–58. With the exception of the destruction of the Habra dam, this was probably the largest quantity of water ever set free at once from an artificial reservoir in the history of the world up to that time. Taking into consideration the elevation of this storage reservoir and the tremendous descent of the water, 6134 feet in 140 miles, the small amount of damage caused by the accident is unparalleled.

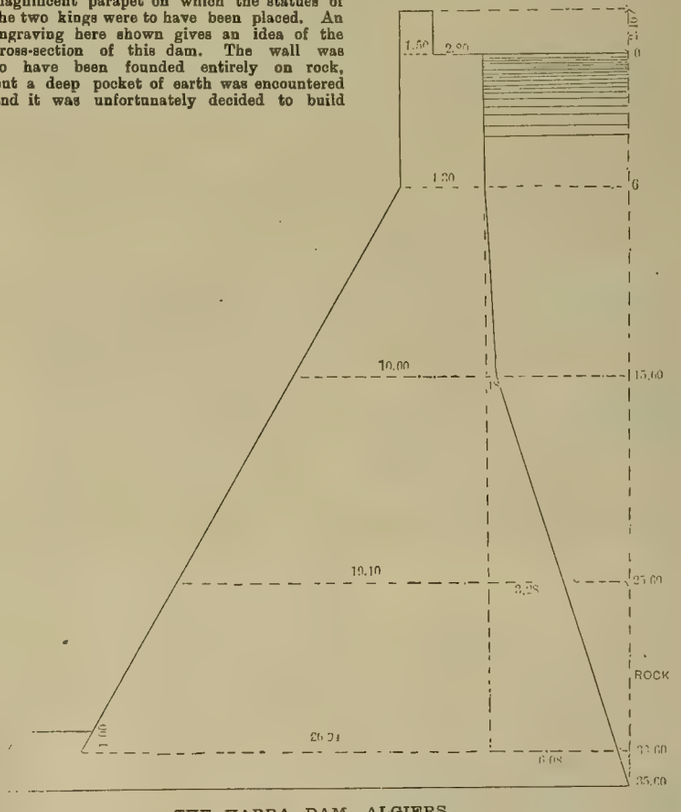
The reservoir covered 395 acres, impounding 650,000,000 cubic feet of water. The middle dam (that which burst) had a vertical hight on the interior of 100 feet, and on the exterior of 131 feet from the deepest part of its foundation. Its total length on the crest was 331 feet, with a minimum length of about 50 feet..

The original dam, which was of the ordinary timber-crib style (the cribs being built of tamarack and filled in with stone), had a total width across the base of 100 feet, measured through the culvert, with a vertical hight of 79 feet above datum line, on the inside face. This face was covered with a heavy pine planking, forming a water-tight lining to the dam.

When this reservoir was purchased by the North Bloomfield Gravel Mining Company, as it then had no immediate use for the water, the waste-way of the dam was cut down eight feet. As a small amount of water was observed flowing under the bottom of the crib of the middle dam, earth was taken from the sides and filled in on the inside of the dam to stop this leak.

In 1876–77 the outer face was overhauled, and that portion of the old crib partially decayed was torn out and replaced with new timbers.

With a view of increasing the capacity of the reservoir, which necessitated raising the crest of the dam, it was deemed advisable to strengthen the structure with a stone facing on the outside. To carry out this improvement, a tramway passing along the entire crest of the dam was built to a quarry about a mile distant. This rock was trammed to the dam, where an outer face-wall of dry rubble stone was gradually raised on a slope of 44°, and the intervening space filled in solidly with stone dumped from cars.



THE HABRA DAM, ALGIERS.

The material used was a trachytic tufa (?) of 2.4 to 2.6 specific gravity, the best there obtainable. It was estimated that in the quantity used the ratio of the dead weight to the pressure on the bottom of the dam was 19,200 pounds to 5400 pounds per square foot, which made the new dam stronger than the old structure.

In 1878, when this stonework was completed to within seven feet of the intended crest, a substantial piece of timber-work, thoroughly braced, having a greater resisting power in proportion to the pressure than any other portion of the structure, was raised on top of the dam, carrying up the inside water-face to the full projected hight. The improvements cost $70,-

000. The high-water mark was raised seven feet, or to a point 86.73 feet above bottom of inner mouth of culvert.

The dam was examined daily, and on the day of the breakage the water was within 16½ inches of the crest, so it still required 2½ inches to reach the waterway or high-water level. Early in the morning the watchman heard two violent explosions and then saw the water pouring through an opening in the upper timberwork over the crest of the stonework. In a few moments the crest in the center of the dam for a length of 175 feet was swept away and an immense opening soon cut to its very foundation. In the space of one hour fully 600,000,000 cubic feet of water were discharged into the canyon below, at the rate of over 166,000 cubic feet per second. In an hour and a half from the time when the explosion occurred the reservoir was emptied of its entire contents of 650,000,000 cubic feet of water.

This immense volume of water rushed into the canyon below the dam, which for the immediate distance of 1000 feet has an average width at the high-water level of the dam of 300 feet and a bottom width of 100 feet.

Mr. Aug. J. Bowie, the well-known mining engineer of this city, read, before the Technical Society of the Pacific Coast, a paper on the destruction of this dam, in which he brought together many new and interesting facts concerning the speed of a body of water suddenly[set free in the manner described.

Speed of Large Bodies of Water.

The canyon has a grade of 500 feet to the mile, and was entirely denuded. The first indications of any deposit from the stone in the dam are observed at a point about 1500 feet below it. Here the canyon widens, and a deposit, which is 8 or 10 feet high, composed of gravel, mud, and rock, extends along the south side some 500 or 600 feet. Stones of various dimensions, containing as much as four or five cubic feet, are observed to have lodged here.

As soon as the break occurred, the news was telephoned along the line, and every one that could be reached along the river was notified of the coming waters.

There are many places in the canyons of the middle Yuba where the flood is believed to have reached a hight of from 75 to 80 feet, and it was observed by those who saw the rush in these places, that the face of the torrent was a mass of timber and trees, no water being visible.

At Freeman's Bridge, 43 miles below the dam, which point it reached at 9:30 A. M., a rise of 40 feet was reported. The water reached the Narrows, a short distance above Smartsville, and 65 miles from the dam, having descended 5850 feet (baro. obs.) in 6 hours and 15 minutes, or at a maximum rate of 10.4 miles per hour, or 15.25 feet per second. Here the river is 285 feet wide at the water-line, and the rise due to this flood was reported to be 35 to 40 feet. This rise was due to the accumulation of timber and trees which held back the water.

At Point de Guerre, 70 miles below the dam, the river is a mile wide, and in 15 minutes it rose 2½ feet, with strong waves washing the shore. This place is 6020 feet below the dam. The average velocity of the flow of the first wave to this place was 9.65 miles per hour, or 14.16 feet per second. Below Point de Guerre a levee was broken and a large volume of water passed over some miles of farming country, destroying, however, only about $4000 worth of property.

At Marysville the indicated rise was 2 feet 8 inches at the highest. From the dam to Marysville is 85 miles, and the wave traveled to that point at an average speed of 8½ miles per hour, or 12.46 feet per second; or from Point de Guerre, 6.66 miles per hour, or 9.77 feet per second, and from Smartsville to Marysville 6.15 miles per hour, or 9.01 feet per second.

The final observation of this flood was made at Sacramento, 140 miles distant from the dam, or

	Miles.
From Smartsville	75
From Point de Guerre	70
From Marysville	55

Elevation of Sacramento above mean sea level at low-water level, 6 feet. Total grade or fall from dam, 6134 feet.

The gauge at foot of K street, on the Sacramento river, registered at 6 P. M., June 18, 1883, 14 feet 4 inches. The first indication of the arrival of the water from the dam was the appearance of muddy water at 6 A. M., June 19th. At 8 A. M. the gauge indicated 14 feet 9 inches. From 2 to 3 P. M. the water was extremely muddy. At 4 P. M. the gauge read 15 feet, at 5 P. M. it registered 15 feet and ½ inch, which was the makimum hight of the wave. At 6 P. M. the gauge stood 15 feet; at 7 P. M., 14 feet and 11½ inches; at 7:30 P. M., 14 feet 11 inches; and at 8 A. M., June 20th, it registered 14 feet 2 inches, or 2 inches below its register of June 18th.

The total time occupied by the wave in passing Sacramento was 26 hours, and assuming that the entire quantity of water from the dam was discharged by 6:15 A. M., June 18th, the mean between 5:30 and 7 A. M., when the dam was entirely emptied, the average velocity of the flow between the dam and Sacramento was 3.8 miles per hour, or 5.58 feet per second.

Water Ways of California.

The capacity of the water-ways of this State in comparison with the requirements of the drainage area is insignificant, and it is a well-established fact that the river channels without the streams overflowing their banks on the adjacent lowlands are or were always wholly insufficient to contain at high flood water, the drainage of the country.

In substantiation of these facts may be cited the report of the State Engineer, 1880, pp. seven and eight, where in speaking of the Sacramento valley, it is stated that it has an area of 4769 square miles.

The watershed with the drainage tributary of the Sacramento in combined area, is more than 2½ times the superfices of the valley itself. The Sierra Nevada side, drained by the American, Bear, Feather and Yuba rivers, Butte, Chico, Rock, Deer, Mill and Antelope creeks, has an area of 8298 square miles, with elevations from 7000 to 11,000 feet, receives annually from 24 to 102 inches of precipitation in form of rain and snow. The entire drainage basin of the Sacramento river aggregates about 25,000 square miles.

As the rise of water caused by the destruction of the English dam, occurring as it did at midsummer, raised the waters at Marysville only two feet eight inches, and at Sacramento only 8½ inches, it is evident to any engineer, from an examination of the official maps of the State of California, and of the map attached to the report of the "Debris Question," by Lieut. Col. G. H. Mendell, Corps of Engineers U. S. A., to the Secretary of War, that had this flood taken place during high water, it would never have been observed by a marked increase in the level of these streams.

This would be due to the fact that the increased water-way area over the lowlands (which are river channels during periods of high flood) is so immense when compared with the area of the river channels alone, that with this addition of 650,000,000 cubic feet spread over this vast surface, it is very questionable if it would have noticeably affected the water level of the rivers.

These facts, the result of Mr. Bowie's investigations, are given to show that the bursting of dams of the high mining or irrigation reservoirs in our mountains would cause *local* damage only. This is the first time that data as to the speed of large volumes of water suddenly set free could be obtained, but the circumstances were favorable and Mr. Bowie has contributed valuable information in obtaining it.

The Fordyce Dam.

In this connection we give the following concerning the Fordyce dam in this State: A correspondent of the Nevada City *Herald*, writing from Washington, in Nevada county, says: Reading of the terrible destruction of life and property at Johnstown by the breaking of the Conemaugh dam, it is pertinent to ask: What would be the result if the Fordyce dam should give way? It might not result in 15,000 deaths, but it would sweep all from the dam to Marysville. The lake in the Conemaugh dam was three miles in length, with a dam 100 feet high to hold it back. The Fordyce dam has a wall 170 feet high and the lake behind it extends back a distance of six miles, holding double the quantity of water the Conemaugh did. It is affirmed that there is no danger of it ever giving way, because it is built of stone and solid masonry; but circumstances may arise that would break it. An earthquake, for instance, would open it and let the flood escape. In view of possible emergencies, either there or at Bowman's, would it not be policy to have telephonic or telegraphic communication down the river, so that immediate warning could be given in case of danger?

Commenting upon the communication, the *Herald* said: The Fordyce dam is composed of solid masonry about 100 feet high. On the base it is over 100 feet thick and on the top 25 or 30 feet. The inner surface of the dam pitches down at an angle of 45 degrees; the outer surface slants at about one inch in eight. The Yuba river, when the dam was built, had a rocky island in the center. The dam was built across this prominence, after it was blasted down, so that it is braced by a solid mass of rocks. There is a gate on the bottom of the dam capable of letting out a whole flood of water and reducing the depth of the water in the lake in the heaviest freshet. Watchmen are always at the dam to regulate the flow of water, and there could be no combination of circumstances that would cause any break in the structure or raise the water above a prescribed point. The area covered by the reservoir when the dam was 75 feet high was 750 acres, giving a storage capacity of 725,000,000 cubic feet or 325,000 24 hour inches. Since the dam was raised to 100 feet the capacity has been increased. The reservoir is something over three miles in length, we are informed. Both the Fordyce and Bowman dams are so built that they will never be disturbed. They are as permanent as the Rock of Ages. They were built not for a fishing pond, but for mining, and the best engineering skill was employed in their construction. The Fordyce dam cost in the neighborhood of $175,000.

DOCTOR OF SCIENCES.—Prof. Geo. Davidson, A. M., Ph. D., of the United States Coast and Geodetic Survey, has been notified by the trustees that the University of Pennsylvania, on the 5th of the present month conferred upon him the honorary degree of Doctor of Sciences. Prof. Davidson is a graduate of the Central High school of Philadelphia, from which he was taken by Prof. Bache and placed in the Coast Survey, where he has served without a single leave of absence from June 1, 1845.

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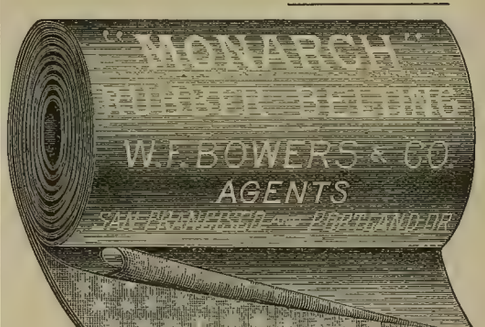

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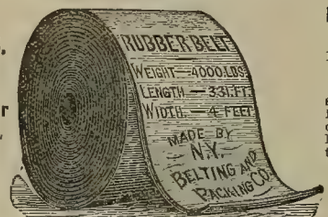

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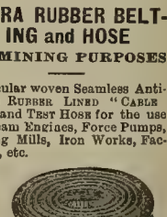

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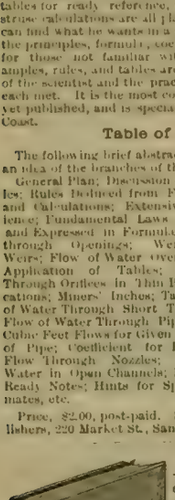

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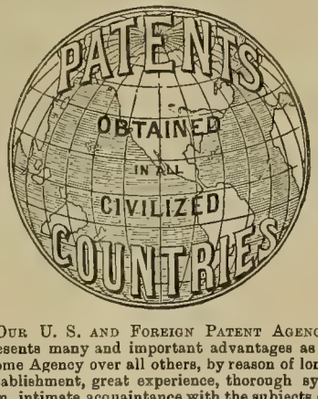

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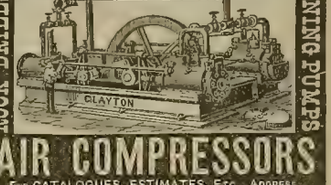

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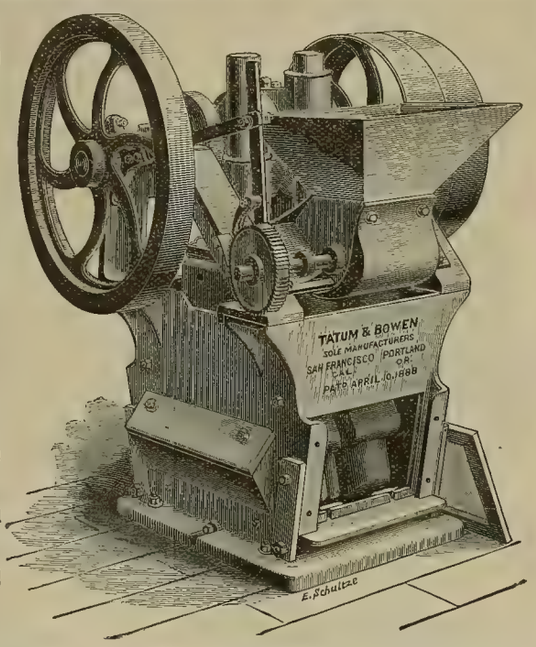

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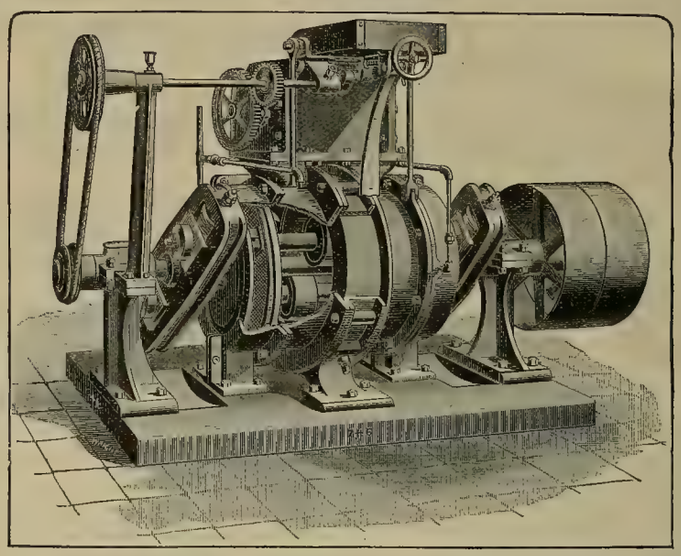

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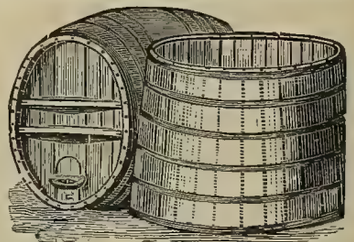

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A TORSION PENDULUM.—An improvement in clocks has been shown the British Association for the Advancement of Science by W. H. Douglass. The new feature is the torsion pendulum, which, with lever and escapement, may be applied to ordinary works and by its slow rate of vibration makes practicable the conversion of an eight-day clock into one requiring winding only once a year.

Gold Watches.

"Gold watches are so common nowadays that men don't take as much pride in wearing them as they did a few years ago," said a jeweler to a reporter. "The newspaper individual who could sport a gold watch and chain a dozen years ago was considered a person of wealth and property. But he isn't now."

Gold watches are so cheap now that almost everybody can afford to wear them. A few years ago, when a young man came into possession of a gold watch, he generally handled it in quite an ostentatious manner. He often carried it in a chamois leather pouch and was very careful not to breathe on it or touch the case with his fingers. He consulted it every fifteen minutes for the first month, but he soon tired of that. The demand for gold watches was never greater than it is to-day. Watch companies are kept very busy filling orders, and retail jewelers do a good business in this line.

Why is it that watches are so much cheaper now than a few years ago? has been answered as follows:

For one thing, the watch movements are a great deal cheaper. Gold is just exactly the same price per pennyweight. The reduction in price is confined to the movements. The watch movements of the standard American make are very cheap. Those in common use in gold watches of the cheapest grade are from $10 to $20 each, and some of the best movements are worth at wholesale $25 or $30. There is, however, a high-priced, fine American movement which may cost you say $75, but they are not put in ordinary cases. A watch that you paid $100 for a few years ago you can get to-day for $60, and this $60 watch will have a $10 or $15 movement in it. For $50 you should get a movement cased in solid fourteen-carat gold weighing from 45 to 50 pennyweights. The purchaser will get more service out of a fourteen-carat case than he will out of an eighteen-carat.

"How can dealers offer the public solid gold watches for $30 and $35?"

"They are not solid by any means. There are some unprincipled makers who will mark a case of 10 carat outside and 8 carat inside 14 carat, and a 10 and 14 carat would be marked 18 carat. There is no law in America to prevent this. The case is made of a composition which holds a gold-plating finely. The composition is sometimes very heavily plated, and will wear for several years without showing the base metal. There is little difficulty in disposing of them as solid gold cases, and in this way the price is surprisingly low. There is more opportunity for deception in the movement and case of a watch than in almost any other article. The amount of money invested in a watch offers much inducement to experiment. The case manufacturer is not necessarily obliged to know much about the movement of a watch. He makes his cases to fit the standard American sizes of movements, and most makers produce a uniform size."

In regard to descriptions in watch cases we may remark that the watch-case makers of New York are desirous that a law should be passed providing a good sized penalty for stamping cases as of a finer quality than they really are. This is said to be the practice of unprincipled manufacturers, and it works to the disadvantage of those who do an honest business, and tends to encourage dishonesty. It is to be hoped the honest manufacturers will not only get such a law passed, but that they will see that it is enforced. Nothing is more demoralizing to any branch of manufacture than the certainty that unprincipled manufacturers are selling goods in the same line for what they are not, without much prospect of detection and without fear of adequate punishment if detected. We wish the watch-case makers all success. But what about the dealers who consent to handle watch-cases marked 14 carats that are only in reality six or eight carats?

NON-MAGNETIC WATCHES are fast coming into use everywhere. The rapidly increasing use of electricity has long been calling for such a device, and we now have one that can be implicitly depended upon. The device is called for not only from electrical workers generally, but from the time-wearing public as a whole. The difficulty which the Non-Magnetic Company now has is in filling orders. A new-style watch containing the Paillard improvements in all respects, that can be sold for a price ranging from $12 to $18, is to be brought out at once, and will supply a demand that this company has not heretofore been able to fill. The Non-Magnetic people are well pleased over the number of gold medals they won against all competitors while in Geneva.

A NEW ALARM DEVICE.—A substitute for the old-fashioned alarm on a clock has been invented. It is so constructed as to be set to any given five minutes of an hour, the bell beginning to ring at that time and continues to ring until the switch is turned to cut off the electrical current. Instead of winding up and setting the clock in the old way, with this device one has only to turn the switch, thus allowing the circuit to be completed at the time the bell is to ring. In this arrangement the clock and battery are made in a compact form, the cell of the battery being inclosed in the clock case.

ANOTHER BENCH SHOW. — The California Kennel Club talks of holding a dog show in this city next October.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING JUNE 11, 1889.

404,954.—HEADER ATTACHMENT FOR HARVESTERS—Henry Bryan, Modesto, Cal.

404,957.—DUMPING WAGON—Leopold Busse, S. F.

405,023.—COLLAR STUFFING MACHINE—Calvin Ewing, S. F.

405,037.—CORSET—Lucy J. James, Pomona, Cal.

405,215.—COIN ACTUATED RECEPTACLE—F. J. Jones, S. F.

404,988.—STRETCHER BAR—Erich Schmidt, Marysville, Cal.

404,973.—GATE—Hyde & Dotterrer, Davisville, Cal.

405,132.—PISTON FOR STEAM ENGINES—W. J. Thomas, Saucelito, Cal.

405,193.—CART SPRING—L. E. Walberg, Hollister, Cal.

404,983.—SHIP'S WINDLASS INDICATOR—David H. Rivers, * * *

The following list for June 18th, now reported in brief by telegraph, will appear more complete on receipt of advices by mail:

California—Joseph Behm, West Point, amalgamator; Louis J. Borie (assignor of a half-interest to G. F. Chevalier), S. F., machine for affixing postage-stamps, etc.; James A. Christie, Los Angeles (assignor to J. W. Moyle, S. F.), advertising device; Peter H. Jackson, S. F., support for beams, or girders; Ralph P. Waddell, Alameda, sash-holder; Emil M. Dean, Alta, staple-driver.

Oregon—John H. Wait, Junction City, automatic safety railway switch; Isaac M. Woodle, Albany, veterinary surgical instrument.

Washington Territory—Franklin W. and E. Gaines, Colfax, fruit or vegetable cooker.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GATE.—Fred W. Hyde and A. Z. Dotterrer, Davisville, Yolo county. No. 404,973. Dated June 11, 1889. The invention relates to that class of gates which are adapted to be operated by the approaching and receding traveler without his having to alight from the vehicle. The patent covers certain constructions and combinations of devices.

DUMPING-WAGON.—Leopold Busse, S. F. No. 404,957. Dated June 11, 1889. This dumping-wagon consists of a wagon having a centrally divided floor, the sections of which are hinged to the sides of the wagon-body, so as to swing outwardly and downwardly, and in combination therewith of a windlass and mechanism whereby the sections may be drawn up and closed after the load has been discharged, and a means for locking and unlocking the sections.

STRETCHER-BAR.—Erich Smith, Marysville. No. 404,988. Dated June 11, 1889. The invention relates to that class of devices used in connection with draft harness and commonly known as stretcher-bars. The object of these bars is to spread the draft connections to an extent sufficient to apply two singletrees to them so that a double team may be used. The object is to provide simple and effective end connections for the bar, which will hold it in place and prevent it from binding, said connections being readily removable to permit their use for other purposes.

HEADER ATTACHMENT FOR HARVESTERS.—Henry Bryan, Modesto, Stanislaus Co. No. 404,954. Dated June 11, 1889. This invention relates to a means for connecting the header portion of a combined harvester with the thrashing mechanism in such a manner that the header-frame may be raised and depressed with relation to the thrasher-frame and independent of the mechanism by which it is tilted, so as to raise and depress the cutter-bar. The object is to raise and lower the whole frame of the header so that it may be used in very tall or in very short grain without tilting the header to such an angle that the heads will fall off toward the front and be lost, which is the case where the adjustments depend altogether on the tilting of the frame.

SHIP'S WINDLASS INDICATOR.—David H. Rivers, Stoneham, Mass., assignor of one-half to Nicholas Smith, S. F. No. 404,983. Dated June 11, 1889. When the anchor is dropped, it is desirable to know how much cable is paid out, and when all is in readiness, the wildcat having been unlocked from the remainder of the windlass, is held temporarily by the brake-band or compressor, and when it is allowed to rotate, its contact with a frictional roller rotates a shaft, and through this shaft the gearing in the indicator-box. The index-hand will thus be caused to move over the dial, and when it indicates that a sufficient quantity of chain has been paid out, it may be stopped and held by the compressor. If for any reason it is desired to heave in a portion of the cable, or to shorten it preparatory to tripping the anchor, the index-hand, which is movable, independent of the gearing, is turned back to zero, and the amount of chain hove in will be accurately indicated on the dial and index-hand.

Excursion to Ukiah.

EDITORS PRESS:—The recent excursion to Ukiah via North Pacific Railway was one of the most enjoyable and successful events of the year. The fare was placed at $2 for the round trip, a distance of 120 miles. Eleven hundred people, made up of families and a goodly number of ladies, embarked on the steamer Tiburon at the foot of Market street. At Tiburon, two trains were made up and the excursionists sped over the road through tunnels and valleys at a high rate of speed, only stopping for water.

The Petaluma valley is 16 miles long and about 10 miles wide and one of the richest and most productive in the State. From Santa Rosa, the county seat of Sonoma county, northward through what is known as Russian River valley, there is one succession of villages, lovely homes and small farms under a high state of cultivation, surrounded by orchards, vineyards and fields planted in corn, vegetables and cereals. As you approach the attractive village of Cloverdale it appears to be walled in on the east, west, and north by great gray hills covered with bushes, stunted oaks and craggy rocks. From Cloverdale to Ukiah, a distance of 30 miles, the route is one of the most romantic, picturesque and interesting to the traveler in the United States. The railroad follows the Russian river about 10 miles of the distance, and considering the topography of the country, it may be classed as one of the triumphs of modern engineering.

The Ukiah valley in Mendocino county is walled in by high mountain ridges, the valley being from one mile to five miles broad, and the fertility of this section has become noted in the production of hops. This part of our State has been isolated from the traveling public, and the residents led a quiet and happy pastoral life, until the steam-whistle a few months since seemed to awaken them from their Rip Van Winkle slumber. Ukiah City is laid out on a plateau, and has special advantages in climate, fine water, and a rich country adjacent thereto that has the reputation of being one of the best fruit belts in the State. The Palace hotel, a large brick structure, kept by Mr. I. N. Stapp, is the headquarters for the stages that go out from this place, of which there are three lines, owned by Messrs. Force & Curtis, viz.: Ukiah and Mendocino, daily, except Sunday, fare $5; Ukiah and Hydesville, 35 hours without stopping, daily, fare, $15; Ukiah and Blue Lakes and Lakeport, daily, except Sundays, fare $2. On this occasion, as these fine turnouts swung in front of the Palace hotel, the veteran Jehus reminded the excursionists of old times in California. It was hot, 96° in the shade, and the celebrated Vichy Springs, three miles distant, were well patronized.

The management was under Mr. W. H. Menton, general traveling passenger agent for the N. P. R. R., and no accidents or hitch occurred during the day. There were general expressions of pleasure and satisfaction among the excursionists, and a desire to take another ride to the city of Ukiah. This great concourse of people was landed at the foot of Market street at 8:50 P. M.

J. C. H.

ACADEMY OF SCIENCES.—At the last meeting of the Academy the secretary reported the addition of 94 volumes to the library, and a letter from J. F. Houghton, presenting a piece of tapa cloth from the Samoan islands, was read. Walter E. Bryant, who, with T. S. Brandegee, made an exploration of Lower California under the auspices of the Academy, extending over the months of February to June, read a report on new varieties of birds discovered on the trip, together with their habits, nests and eggs. There were five varieties discovered—the horsefinch, sparrow, jay, Belding's warbler and yellow-throat. He had 11 eggs of Belding's warbler, the only eggs in any collection. These were found at Comondu, near the lower end of the peninsula.

DAKOTA TIN.—Richard D. Atkins, the English mining expert who has been examining Dakota tin mines, has left for England, whither he goes to make arrangements with capitalists largely interested in the Black Hills tin mines. The mines are exclusively owned by American capitalists, but Englishmen have loaned money to develop the property and will control the mines under contract for five years. The output in six months will be 100 tons of block tin daily, equivalent to seventy-five tons of white tin, more than enough to supply the American demand. Atkins says it is the richest deposit he ever saw, and the formation of the soil makes it much easier to work than the tin mines of Cornwall.

NORTHERN COUNTIES OF CALIFORNIA.—The series of articles now being published in the PRESS from the pen of James H. Crossman furnishes valuable data concerning a region of which little has been written. While assistant in the field for the State Mining Bureau, Mr. Crossman visited all these counties and made notes, which he has now completed, so that he writes from personal observation. There are many peculiarities in the mining regions of the section referred to, and these Mr. Crossman has noted. The articles are worthy of preservation for reference, being descriptive of a region of great future importance.

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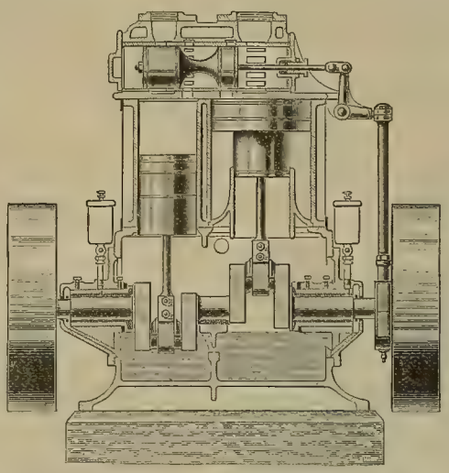

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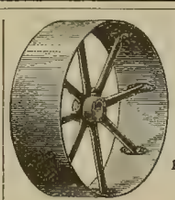

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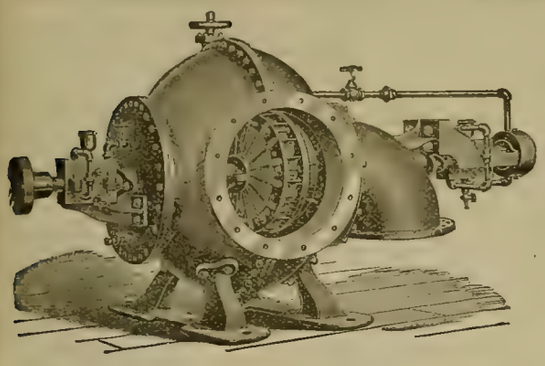

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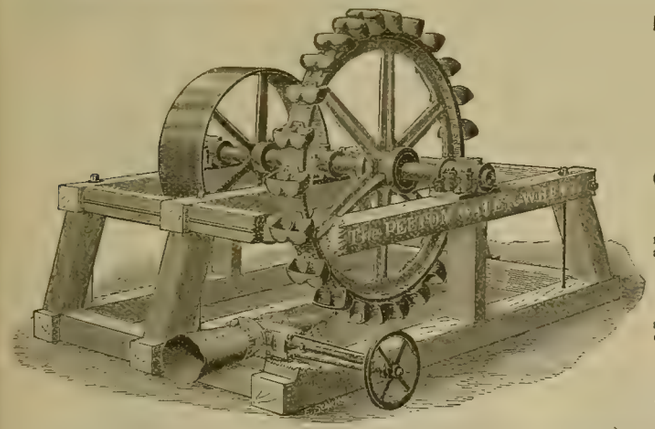

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JOHN W. QUICK, Proprietor.

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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, June 20, 1889.

General trade continues to show more activity in all lines, with a perceptible increase in the volume of goods going out on distributive orders. Traveling salesmen of leading firms in this city report that the outlook throughout the coast is of the most flattering character for a large and healthy trade.

The local money market continues easy for call and short paper, but slightly firmer, except on gilt-edged security, for long-term paper. The disbursements so far this year in this city on buildings are largely in excess of the like time in any former year since 1885. For the first five months of the calendar year they aggregated nearly $4,000,000. Other large cities report a proportionate large disbursement. These sums soon find their way back into the general reservoir for disbursing again. For the week ending last Saturday there was placed on realty in this city $419,830. One of the loans was for $140,000 at 6 per cent a year.

Exchanges on the East are in buyers' favor under freer offerings.

There was imported by sea the past week the following treasure: Coin, $7717; silver bullion, $150,000; Mexican dollars, 75,000.

SILVER—The market has held stronger throughout the week at 92⅝@92¾c. Japan has been a free buyer for two or three steamers past, with yesterday's (Wednesday's) shipment to that country, it is claimed, meeting present wants. The supply of available silver is quite light, with a still further decrease in the output looked for in the Nevada and Arizona silver mines. This opinion is based on the decreasing water supply at Virginia City, Nev., and also the managers of the leading Comstock mines driving all important work toward the west, in the direction of the gold lode.

MEXICAN DOLLARS—The market has held very strong at 74 cents for new. The demand was largely from the Chinese for shipment by this week's outgoing steamer for Hongkong. The imports are not excessive, while the bulk coming to one firm admits of better prices than if there was competitive selling.

New York telegrams came through to-day (Thursday) quoting silver at 91⅞c. In our market we are unable to obtain quotations, although 92⅜@92½c is probably about what can be obtained.

QUICKSILVER—Receipts the past week aggregate 953 flasks. The exports by sea aggregate 50 flasks to Mexico and 1 to Victoria. There was shipped overland in last month 1980 lbs. The market is steady at full prices. The demand for home use continues good.

LEAD—The local market is unchanged, although a firmer tone is reported in sympathy with the East. There was shipped by sea the past week 20,017 lbs. to Victoria, B. C.

TIN—Exports by sea the past week were as follows: To Victoria, B. C., pig, 8070 lbs.; tinplate, 159,100 lbs. The market continues in buyers' favor for both plate and pig, both on spot and for shipment.

BORAX—The exports the past week aggregated 40,619 lbs. to Chicago via Canadian Pacific railroad. The shipments last month via Southern Pacific aggregate 276,520 lbs. The market continues firm, with a good inquiry at the East.

LIME—Receipts the past week aggregate 3942 barrels. The market is steadier and firmer, with a good demand reported.

IRON—Imports the past week aggregate 145 pigs from Irondale. The market is still flat, with consumers only buying in a small way. Spot prices are below the English parity, and therefore holders are slow in selling at any further concessions. Eastern and European mail advices report strong markets, with prices strengthening. In England there are 290 iron vessels under construction, which is a larger number than for over a decade past. Besides these, the Navy Department of Great Britain will have more vessels underway soon. It is this that gives strength to the iron market abroad.

COAL—Imports the past week were as follows: Coos bay, 350 tons; Nanaimo, 4634; Tacoma, 8900; Puget Sound, 2870; Departure bay, 2400. Total, 19,154 tons. The market for household is without any change to note, but for Australian there is a firmer tone, owing to an advance in ships in Australasian waters. The rate asked there now is 14s for this port, against 12s and 13s a short time ago, which makes the cost of coal delivered here $7.00 a ton. For late August and all September loading, probably cargoes at $6.75 could be had. Large consumers continue indifferent. They do not appear disposed to anticipate their wants except at concessions, preferring to take chances on forced sales by vessels having coal as ballast, or else having coal for wheat exporters who fetch it here to help pay expenses so as to reduce the wheat freight hence.

Eastern Metal Markets.

By Telegraph.

NEW YORK, June 19, 1889.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42	91¾	$12 10	$3 92½	$20 20
Friday	42	92	12 10	3 95	20 20
Saturday	42	92	12 10	3 95	20 25
Monday	42	92	12 10	3 97½	20 25
Tuesday	42 1-16	92	12 00	4 00	20 10
Wednesday	42 1-16	92	12 00	4 00	20 00

NEW YORK, June 19.—Lake Ingot copper went to consumers to a fair extent, at 12c; casting brands, 10¾@11¼c, with sales. Pig lead closes firm, and in fair demand; spot, $3 95@4; near futures, $4@4.02½, including 'Change transactions. Borax is firm at last rates. Under a moderate supply, quicksilver advanced to 64@66c, following the recent London advance to £9.

COL. R. H. RANLETT left this week for Boston on business connected with the copper interests of this coast.

San Francisco Metal Market.

WHOLESALE.

THURSDAY June 20, 1889.

ANTIMONY	— @ 14
BORAX—Refined	7½@ 7¾
Powdered	7½@ 7¾
Concentrated	7 @ 7¾
COPPER—	
Bolt	26 @ 27
Sheathing	26 @ —
Ingot, retail	16 @ 17
do, wholesale	13 @ 14
Fire Box Sheets	— @ 26
LEAD—Pig	4½@ —
Bar	5 @ —
Sheet	8 @ —
Pipe	7 @ —
Shot, discount 10% on 500 bags Drop, ₱ bag	1 45 @ —
Buck, ₱ bag	1 65 @ —
Chilled, do	1 85 @ —
STEEL—English, lb	16 @ 20
Canton tool	9½@ —
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Toe Calk	4½@ —
TINPLATE—B. V., steel grade, 14x20, P. S.	4 60 @ 4 65
B. V., steel grade, 14x20, spot	4 85 @ 4 90
Charcoal, 14x20	6 25 @ 6 75
do roofing, 14x20	5 12½@ 5 25
Pig tin, spot, ₱ lb, asking	21½@ 22
do, do, prompt shipment	— @ —
QUICKSILVER—By the flask	45 00 @47 50
Flasks, new	@ —
Flasks, old	37 @ —
COKE—Eng., ton, spot, in blk & sks, resptvly	18 00 @20 00
Do, do, to load	13 00 @13 25

IRON	Spot.	To Load.
Glengarnock ton	27 00 @—	27½@ —
Eglinton, ton	26 00 @—	26½@ —
American Soft, No. 1, ton	— @31 00	31½@ —
Oregon Pig, ton	— @30 00	— @ —
Clay Lane White	— @ 24 50	25 @ —
Shotts, No. 1	28 50 @29 00	— @ —
Bar Iron (base price) ₱ lb	2½@ 3	— @ —
Chrome iron ore, ₱ ton	— @10 00	— @ —

Lumber.

Pine, Fir and Spruce.

	RETAIL.	JOBBING.
Rough Pine, merchantable, 40 ft	$19 00	$16 00
41 to 50 ft	20 00	17 00
51 to 60 ft	22 00	19 00
61 to 70 ft	26 00	22 00
1x3, fencing	21 00	18 00
1x4, "	20 00	17 00
1x3, 1x4 and 1x6, odd lengths	18 00	15 00
Second quality	16 00	14 00
Selected	23 00	21 00
Clear, except for flooring	30 00	27 00
Clear for flooring	1 00	.....
Clear V. G. No. 1 flooring	5 00	.....
Firewood	13 00	9 00
Dressed Pine, flooring, No. 1, 1x6	31 00	28 00
No. 1, 1x4	33 00	29 00
No. 1, 1¼x4, 1¼x6, and odd sizes	36 00	32 00
All sizes, No. 2	26 00	23 00
Stepping, No. 1	43 00	34 00
Stepping, No. 2	33 00	24 00
Ship timber and plank, rough	26 00	17 00
Selected, planed 1 side, av'ge 40 ft	28 00	23 00
" " 2 " " "	30 00	25 00
" " 3 " " "	32 00	27 00
" " 4 " " "	34 00	29 00
Deck plank, rough, average 35 ft	34 00	31 00
Dressed, average 35 feet	39 00	34 50
Pickets, rough, ₱ M	19 00	15 00
½x1½, 4 ft long, ₱ M	5 50	4 00

Coal.

TO LOAD.

	Per Ton.		Per Ton.
Australian	$ 6 75 @ 7 00	Cardiff	9 50@10 00
Liverpool St'm	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	6 00
Scotch Splint	8 00	Seattle	6 00
West Hartley	9 50	Coos Bay	5 00
Greta	8 00	Cannel	10 00
Westminster Brymbo	8 00	Egg, hard	17 50
Nanaimo	9 00	Cumberland, in sacks	18 00
Sydney	$ 8 00	do, bulk	17 50

Getting Around the Alien Act.

The simple, ingenious, straightforward way that the Lady Franklin Company has adopted to get around the difficulty raised by the demagogic alien law, which tried to prevent our miners from seeking the aid of foreign capital by refusing to allow foreigners to acquire title to mining properties, will doubtless be followed by other mine-owners who want to place their mines abroad. The man wishing to dipose of his properties will, until this section of the alien law is repealed, instead of selling out right, give a lease on his property for a long term of years at a rental of $1 a year, while the real consideration will be paid him just in the same way it would have been paid if he had sold outright. This appears to be an extremely simple way of getting around this clause of the alien law, which has already proved detrimental to our mine-owners. Far better, though, than getting around the difficulty, even in this simple way, would be the repeal of this obnoxious section of the law. Calls for its repeal have been heard from all the mining regions of the West since its passage, and it is to be trusted that it may be removed from the statute-books.—*Sierra County (N. M.) Advocate.*

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Mt. Diablo, June 14, $7721; Chollar, 14, $14,322; total for May, $32,525. Hale and Norcross, 14, $6878; Commonwealth, 15, $12,000; Standard, 15, $11,149; Alice, 12, $20,946; Hanauer, 15, $24,500; Bluebird, 14, $23,104.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS
Andes M Co	Nevada	35	25	Jun 12	July 18	Aug 8	J J Hawkins	309 Montgomery St
Bella Union Quicksilver M Co	Cal	7	20	May 21	June 24	July 15	A Halsey	328 Montgomery St
Best & Belcher M Co	Nevada	43	25	June 6	July 11	Aug 1	L Osborn	309 Montgomery St
Buena Vista Petroleum Co	California	34	50	Apr 24	May 30	June 27	J Morizio	328 Montgomery St
Crocker M Co	Arizona	7	10	Jun 14	July 19	Aug 13	A Waterman	309 Montgomery St
Equitable Tunnel & M Co	Utah	34	5	May 14	June 20	July 15	C J Collins	1018 Market St
Eureka Con M Co	Nevada	12	50	Jun 12	July 15	Aug 7	H P Bush	306 Pine St
Gould & Curry M Co	Nevada	62	30	May 1	June 5	June 27	A K Dustrow	309 Montgomery St
Gray Eagle M Co	California	13	05	May 15	Jun 25	July 16	O H Bogart	327 Pine St
Inyo Marble Co	California	6	5	May 14	Jun 24	July 24	G W Luce	205 Front St
Morgan M Co	California	13	15	May 9	Jun 17	July 8	C S Neal	230 Montgomery St
Nevada Queen M Co	Nevada	5	50	June 3	July 9	July 30	H Deas	309 Montgomery St
Opair M Co	Nevada	55	50	May 11	Jun 16	July 2	E B Holmes	309 Montgomery St
Final Con M Co	Arizona	8	13	May 15	Jun 21	July 12	A Cheminant	328 Montgomery St
Quartz Mountain M Co	California	21	40	Jun 17	July 22	Aug 15	E Hestres	247 Sansome St
Seg Belcher & Mides Con M Co	Nev	3	25	June 4	July 8	July 29	E B Holmes	309 Montgomery St
Sierra Nevada M Co	Nevada	95	25	June 7	July 11	July 31	E L Parker	309 Montgomery St
Tetrakoff M Co	California	2	10	May 18	Jun 18	July 13	W J Garnett	308 Pine St
Union Con M Co	Nevada	38	25	May 13	June 19	July 10	J M Buffington	303 California St
Weldon M Co	Arizona	13	10	May 13	Jun 18	July 9	A Waterman	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DAT
Homestake M Co	Dakota	C Stumpp	309 Montgomery St		
Live Oak Drift Gravel M Co	California	J Morizio	328 Montgomery St	Annual	Aug 20
North Belle Isle M Co	Nevada	J W Pew	328 Montgomery St	Annual	June 26
Scott Bar M & M Co	California	H Pink	318 Pine St	Annual	July 1
Union Con M Co	Nevada	J M Buffington	303 California St	Annual	July 15

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	May 10
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	Apr 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Mining Share Market.

The little reaction in the Comstock mining share market, outside of the Alta group, mentioned in last week's report, was of short duration, and was followed by a steady shrinkage until a decline of, on an average, 10 per cent was obtained. The setback, if made by the pool for the purpose of getting more stock, was a success, for more margins were uncovered, besides many stocks thrown on the market by disgusted holders. There can be no doubt but the pool is steadily concentrating stocks, yet there is no denying that there is more stock out on the public than is desirable for much of an upward movement. The holdings are chiefly paid for and can only be reached, if it is the pool's aim to get them, by assessments and a continued drag relieved by spurts for quite a length of time. The work going on in the mines indicates that nothing of an important character can be looked for yet awhile. In outside stocks the Tuscaroras and Quijotoas have ruled weak at lower prices, and this, too, in the face of ore reports from some of the mines. There are strong bear reports out on the latter. The Bodies have held fairly steady at firm prices under light transactions. The strength of these stocks, in the face of a strong opposition from a bear clique, causes more or less comment from outside operators.

Reliable news from the Comstock mines is hard to get, owing to those who have been giving information becoming wearied with stocks on the down grade. The work going on in the leading mines is of a very important character, yet it will take time and a large expenditure of money before the value of the work can be demonstrated. How long a distance has yet to be run by any one of the west crosscuts before reaching the west or gold lode, is not known by outside mining-men, and, therefore, everything bearing on the subject is conjectural. That streaks or stringers are liable to be run into at any time before reaching the lode is quite certain, and may prove disastrous to outsiders who buy stocks under the impression that the main lode has been cut. There is more talk of a growing scarcity of water to run the mills. From the Tuscaroras the usual "chestnut" of large bullion outturn and ore developments comes to hand. From the Quijotoas advices are conflicting. Some report that the mines are to be abandoned, while others, again, are of a glowing character and report that a 20-stamp mill will start up on Crocker ore at an early day. From the Bodies our advices, from a thoroughly reliable source, indicate that on the upper levels in Bodie an important development has been made, but the particulars were not obtainable up to the hour of writing. This, no doubt, accounts for the strength exhibited by the Bodie and Mono stocks in the face of a declining and demoralized market for other stocks.

Instantaneous Cure of a Snake-Bite.

The National City *Record* says that a few days ago Geo. Beermaker and Constable Ad. Pearson went hunting for rabbits. While pushing their way through the cactus and sagebrush, they came upon a four-foot rattler which was coiled for a spring, and with swaying head awaited their coming. Mr. Beermaker, who was in advance and did not observe the reptile, stepped squarely upon it, about six inches from the head. There was hissing and rattling, and the next instant, before the unfortunate city clerk could jump away, he felt a stinging sensation in the leg. At this moment Mr. Pearson came up and shot the head of the snake into bits.

They were miles away from the nearest drop of rattlesnake balsam, and they had no ammonia. This was a predicament indeed, and Mr. Beermaker could feel his hair rising with fright. He bared his leg and was about to cut out a huge piece of flesh where he could see a solitary drop of blood oozing out, when Mr. Pearson electrified him with, "Why, you blamed idiot, that's the wrong leg. You couldn't have been bitten there." Then it came out that the clerk had run into a cactus bush.

Beermaker sat down and in a minute was perspiring from every pore. He was relieved, for, as he admitted, a moment before he could feel the deadly poison coursing with lightning-like rapidity through his veins.

MINING SALE.—Some 800 acres of patented mineral land, 20 miles south of Santa Fe, has been sold for $2,000,000 to New York parties. The mines are in Cerillos district.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 28.		WEEK ENDING June 5.		WEEK ENDING June 12		WEEK ENDING June 19.	
Alpha	1.70	1.85	1.70	1.85	1.35	1.65	1.10	1.45
Alta	1.45	1.60	1.45	1.55	1.35	1.50	1.25	1.35
Andes	.60	.70	.60	.70	.50	.55	.30	.35
Argenta	....	....	....	....	....	....	....	....
Belcher	4.20	4.50	3.95	4.30	3.30	4.05	2.60	3.50
Best & Belcher	3.65	3.95	3.70	3.95	3.00	3.70	2.50	3.25
Bullion	.80	.85	.80	.85	.60	.75	.60	.70
Baltimore	.15	.15	....	.2	....	.10	....	....
Belle Isle	.30	.30	.30	.35	....	.25	....	.20
Bodie Con	1.50	2.10	1.70	1.95	1.25	1.70	1.20	1.30
Benton	....	....	....	2.70	3.00	3.50	....	3.85
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.40	.55	.45	.50	.30	.40	....	.30
Commonwealth	4 90	5⅛	5	5⅛	4.60	4.70	4 25	4.50
Con. Va. & Cal	7⅛	7⅜	7⅛	7⅜	7.00	7⅛	6⅝	7⅛
Challenge	3.10	3.15	2.80	3 10	2.30	2.85	1.75	2.30
Chollar	2.15	2.45	2 10	2.30	1.75	2.55	1.50	2.00
Confidence	7⅛	7⅜	6.75	7⅜	6	6⅜	5	6
Con. Imperial	.50	.60	.50	.55	.35	.50	.35	.40
Caledonia	.25	.25	.20	.30	.20	.25	.20	.25
Con. Pacific	....	.15	....	....	....	....	....	....
Crown Point	3.45	3.80	3.55	3.80	2.90	3.65	2.25	3.10
Crocker	.35	.40	.40	.50	.40	.45	....	.30
Central	....	....	....	....	....	....	....	....
Dudley	.20	.30	....	....	....	....	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	....	....	3.00	3.00	....	2.50	....	....
Exchequer	.80	.85	.80	.85	.65	.85	.60	.70
Grand Prize	.65	.75	.80	.85	.80	.90	.70	.80
Gould & Curry	2.15	2.45	2 50	2.65	2.15	2.60	1.75	2.35
Hale & Norcross	3.90	4.25	3.95	4.05	3.55	3.85	3.50	3.70
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	.25	.25	.25	.30	....	.25	....	.20
Justice	1.05	1.15	1.10	1.15	....	1.10	1.15	1.25
Kentuck	....	....	1.45	1.70	1.20	1.50	1.05	1.15
Lady Wash	....	....	....	.35	.35	.40	....	.35
Locomotive	....	....	....	.10	....	....	....	....
Martin White	....	....	....	....	....	....	....	....
Mono	1.60	1.85	1.60	1.65	1.05	1.35	.95	1.10
Mexican	3.40	3.75	3.45	3.75	3.05	3 70	2.70	3.40
Mt. Diablo	....	....	....	....	....	....	....	....
Navajo	.50	.60	....	.60	....	.50	....	....
North Belle Isle	1.35	1.50	1.00	1.50	1.05	1.10	1.00	1.10
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	1.35	1.45	.90	1.50	1.00	1.05	.80	.90
North G. & C	....	....	....	....	....	....	....	....
Occidental	1.50	1.60	1.55	1.65	1.45	1.60	1.25	1.45
Ophir	4.30	4.75	4.40	4.60	4.35	4.60	4.00	4.75
Overman	1.20	1.35	1.30	1.45	1.25	1.50	.95	1.30
Potosi	2.20	2.45	2.10	2.30	1.85	2.15	1.50	1.95
Peerless	.50	.60	.55	.60	....	.50	.25	.40
Pecr	.25	.25	.20	.25	.20	.25	.15	.20
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.45	2.75	2.50	2.65	2.05	2.50	1 80	2.30
S. B. & M	2.75	3.05	2.75	3.05	2.55	2 95	1.50	2.60
Sierra Nevada	2.55	2.85	2.60	2.85	2.20	2.75	1.75	2.35
Silver Hill	.45	.50	.40	.50	.40	.45	.40	.45
Silver King	....	....	....	....	....	....	....	....
Scorpion	.20	.25	.20	.25	.20	.25	.15	.20
St. Louis	....	....	....	....	....	....	....	....
Syndicate	....	....	....	....	....	....	....	....
Union Con	3.35	3.75	3 40	3.65	2.80	3.50	2.75	3.40
Utah	1.05	1.25	1.10	1.15	.90	1.10	.80	.95
Yellow Jacket	3.80	4.00	3.80	4.00	3.15	3.80	2.70	3.15
....	....	....	....	....	....	....	....	....

Sales at San Francisco Stock Exchange.

THURSDAY, June 20, 9:30 A. M.

175	B. & Belcher	2.60	
200	Belcher	2.65	
250	Bodie	1.25	
100	Bulwer	.35c	
100	Con Va & Cal	6.87½	
200	Chollar	1.45	
900	Crown Point	2.30	
1100	Con. Imperial	.35c	
50	Caledonia	.20	
1000	Commonwealth	4.00	
50	Exchequer	.85c	
100	Grand Prize	.70c	
500	Gould & Curry	1.85	
100	Hale & Nor	3.10	
200	Justice	1.10	
800	Julia	.20c	
550	Mexican	3.80	
200	N. Commonwealth	1.30	
150	Nev. Queen	6?c	
000	New York	.50c	
240	Overman	1.00	
550	Occident	1.35	
480	Opair	4 35	
80	Potosi	1.50	
200	Peer	15c	
50	Peerless	2?c	
300	Savage	1.80	
600	S. B. & M	1.65	
100	Silver Hill	.40c	
100	Sierra Nevada	1.90	
400	Utah	8?c	
220	Union	2.80	
390	W Comstock	.30c	
120	Yellow Jacket	2.75	

Don't Fail to Write.

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CHINESE PHEASANTS.—The Salinas *Democrat* says that Hon. Paris Kilburn has recently turned loose a pair of Chinese pheasants upon his ranch near Chualar. These birds are plenty now in Oregon, all having sprung from two pairs turned loose there a few years ago. They are very prolific, raising three broods a year.

E. H. TAFT and O. Livermore, executors of the estate of Frederick Zeile, deceased, have applied to the Superior Court for authority to sell the Zeile mine. The estate owns 18,600 shares out of 19,867 shares of the company.

Brief Notes from San Diego.

A. H. Butler of the Alamo mines, Lower California, has lately returned from a visit to the properties of which he has charge. The mill of his company is the pioneer mill at Alamo and the only one now running. He speaks very encouragingly of the Alamo mines.

The St. Nicholas & San Francisco Gold Mining Co. of Lower California, with office and headquarters at San Diego, report frequent shipments of bullion from their property, which is located two miles from Real del Castillo, 32 miles east of Ensenada. The company has a ten-stamp mill, 40-horse power engine and other necessary machinery, and they have so thoroughly exploited their mines that they are satisfied they have valuable properties. The ore now being crushed comes from the St. Nicholas mine, where three shafts of 80, 90 and 20 feet, respectively, have been sunk, and from which a good quality of free-milling ore is taken. The San Francisco is a more pockety mine, from which $12,000 was lately taken in one pocket.

San Diego now has a good assaying office, conducted by W. S. Young, at 961 Fourth street. Mr. Young is a thorough and practical workman, and makes assays for all classes of metals. By reason of the late increased interest in mining matters at San Diego, this assay office will prove a beneficial institution, and Mr. Young will be kept busy in testing the minerals of Southern California and the lower country in Mexico.

A tray of gold nuggets and dust, displayed on the counter of the Commercial National bank, San Diego, and represented to have all come from Lower California within a short period, convinces many that there is much wealth to be found in that country as developments progress.

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R. G. HUSTON—Montana.

THE Sonora, Sinaloa and Chihuahua railway, work on which is about to be commenced, will tap coal and iron deposits in the Sierra Madres. The mineral will be transported to the west coast of Mexico and from there shipped to San Francisco.

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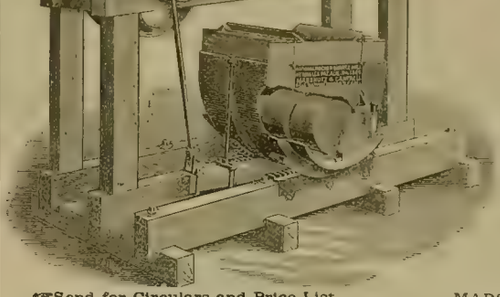

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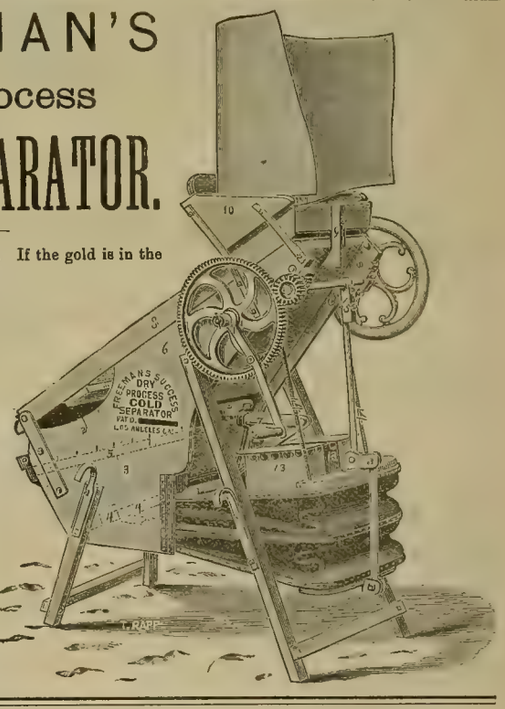

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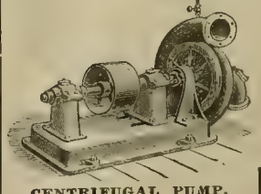

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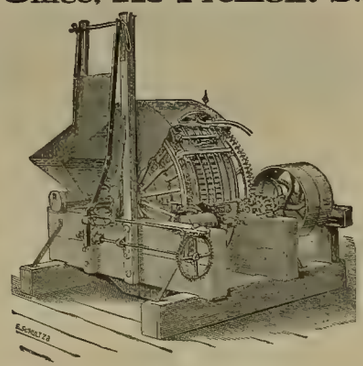
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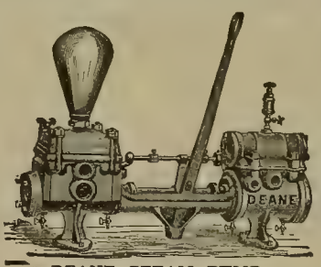

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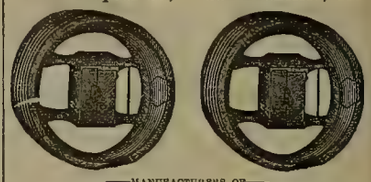
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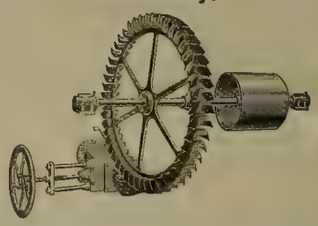
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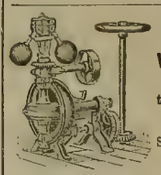
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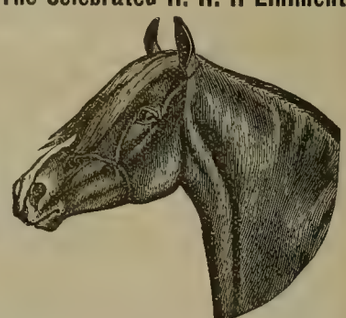
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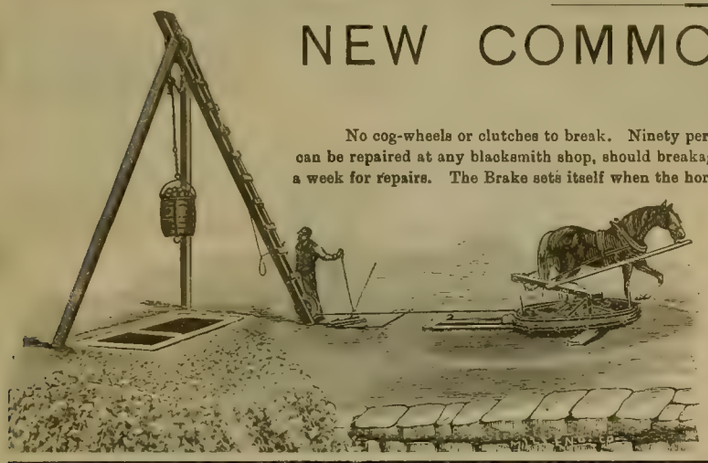

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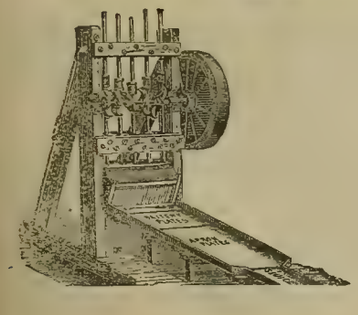

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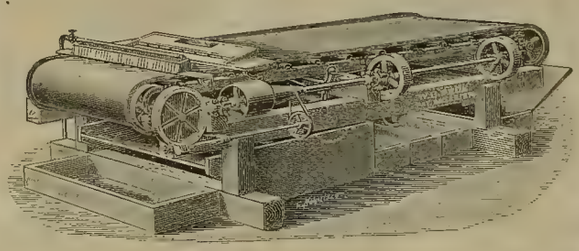

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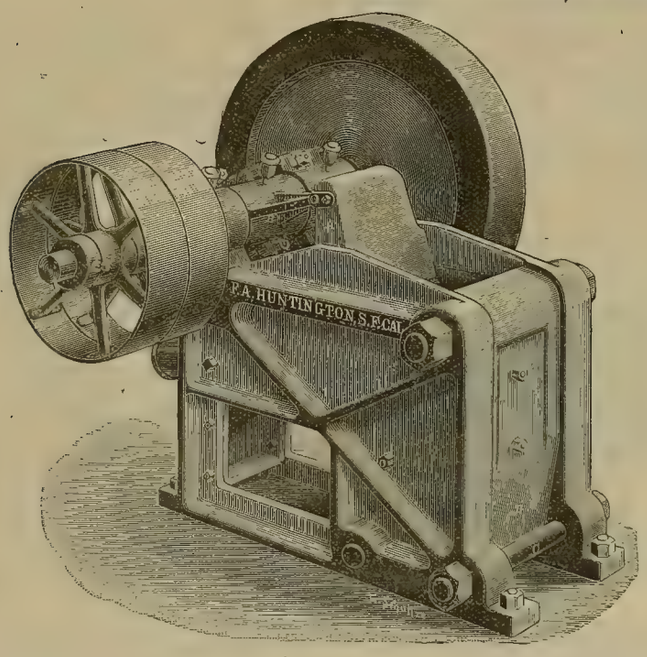

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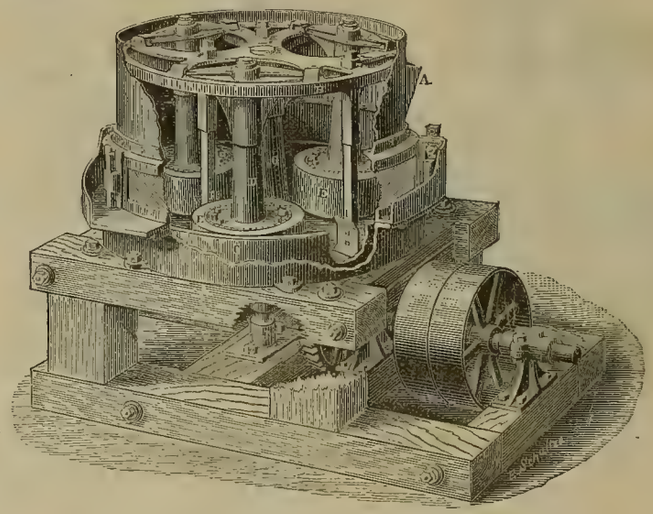

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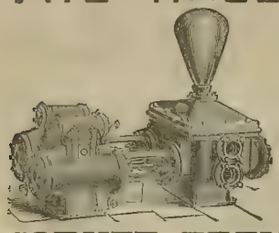

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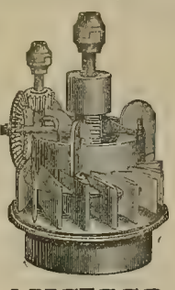

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As the drawings show, the drum is formed by a certain number of perforated and curved steel plates (inclined surfaces) of one-inch thickness. These plates are arranged in such a way that they rise from the periphery inward to the axis of the drum, and thus the end of one plate overtops by some inches the beginning of the next one, and both leave an open slit between themselves. This raising of the inclined surfaces is intended to divert the balls from the circular motion, to let them fall down one step on every octave rotation and thereby increase their grinding effect.

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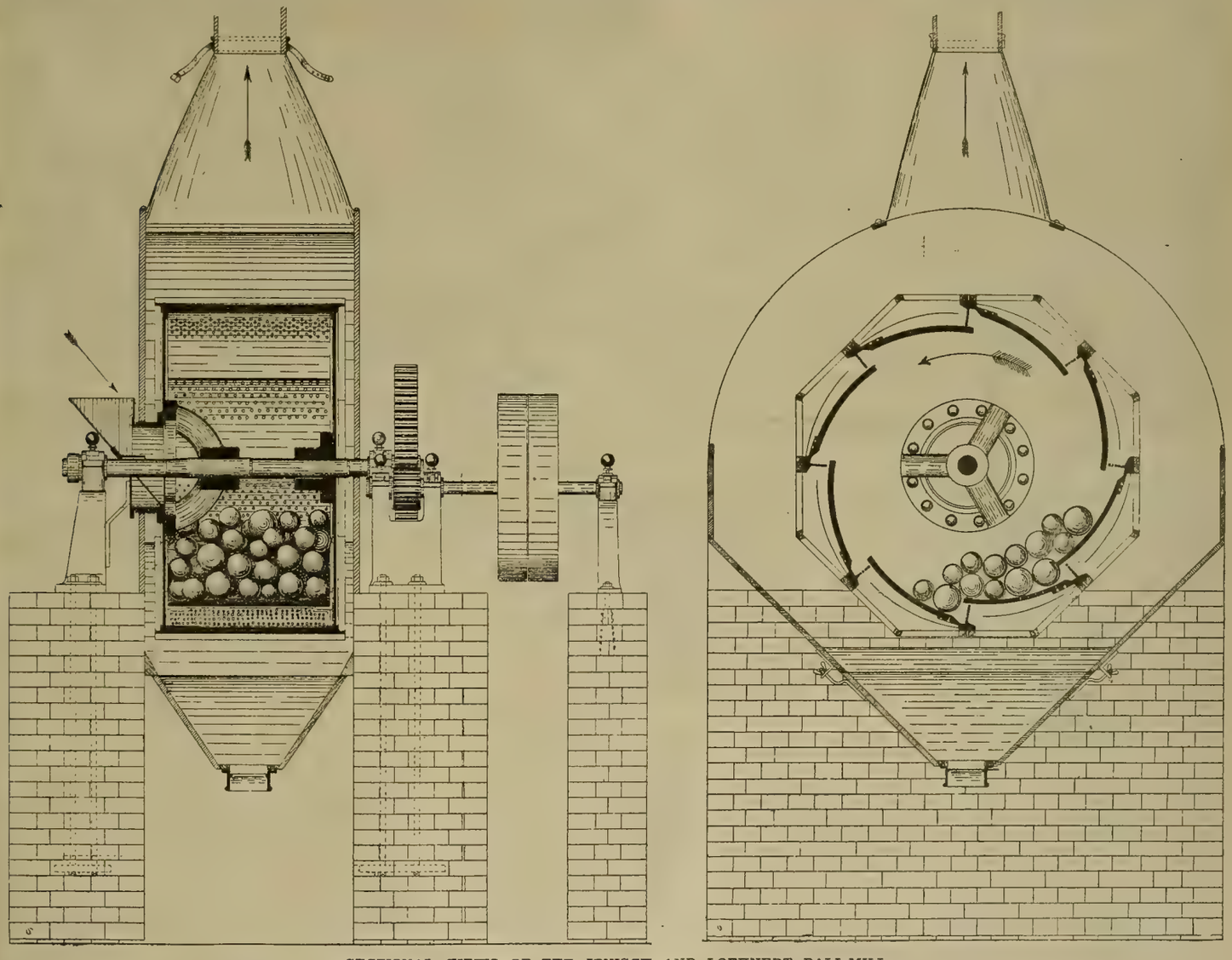

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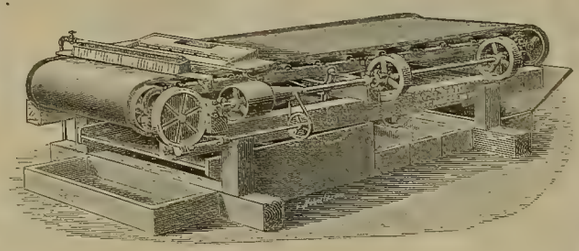

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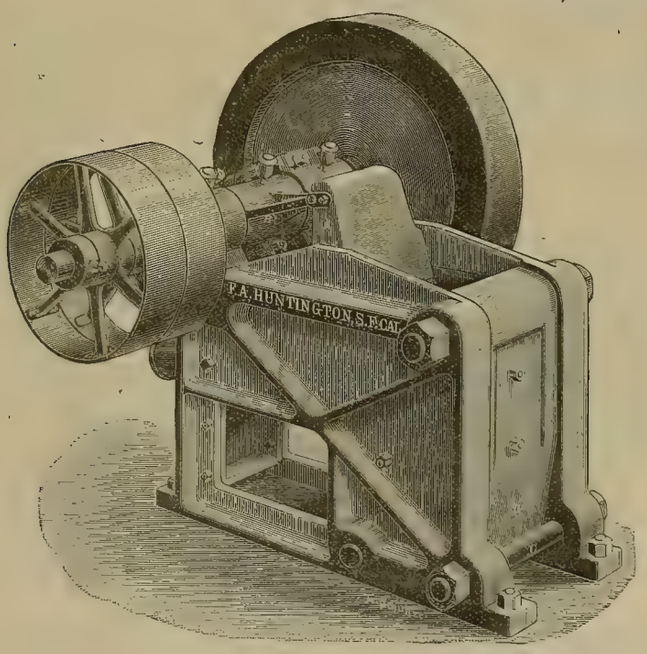

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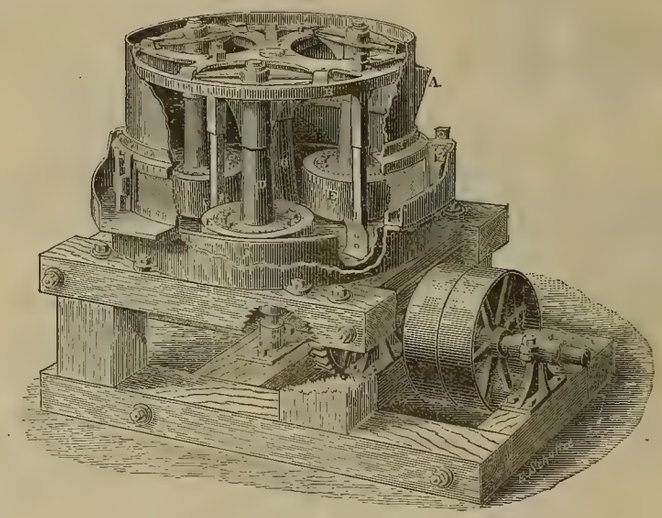

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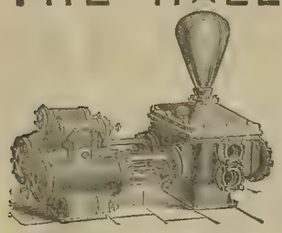

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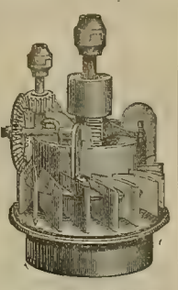

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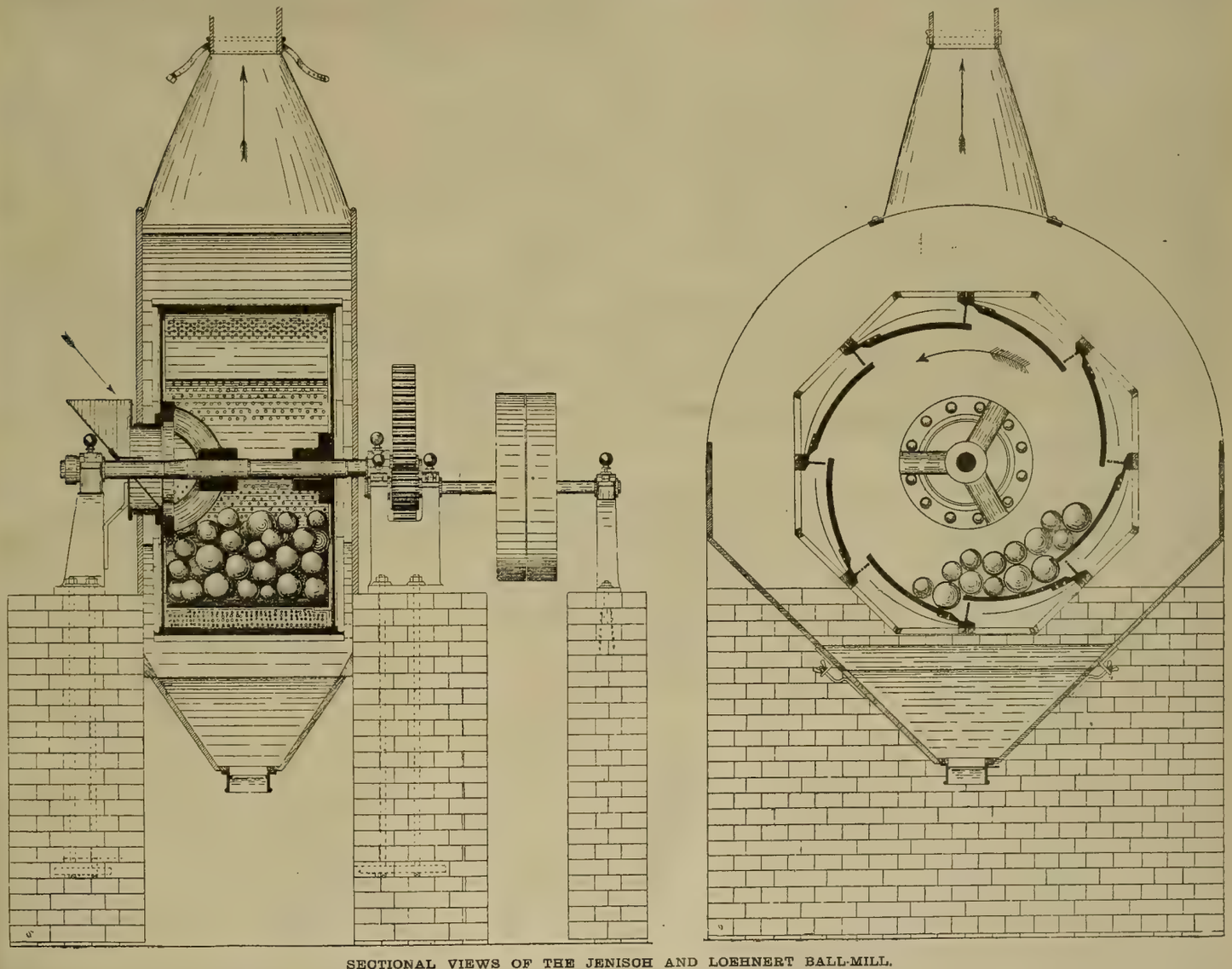

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CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Ione Valley.

[Written for the PRESS by S. L. H.]

As the shadows come slowly creeping
Up the valley and from the west,
And cool winds are lightly sweeping
O'er grain-fields with golden crest,
I in fancy recall the dawning,
So many long years ago,
Of a glorious summer morning
O'er yon glittering peaks of snow.

What a beautiful sight must have greeted the eyes of the tired traveler who first from an eminence of the foothills caught sight of the beautiful valley situated in Amador county and long known by the name "Ione Valley." The wild oats, it is said, stood a waving, level sea higher than a man's head. Two clear streams of water, as yet unstained by mining debris, meandered unobstructed through its length, joining their forces at its lowest point. Immense live-oaks spread their drooping branches to the earth, affording a protecting shelter in summer or winter for the wild deer or wilder natives of the country. Wild vines trailed low, or climbed to the topmost branches of the trees on the banks of the streams, their perfect clusters of purple fruit nestling temptingly beneath the fast-changing and falling leaves.

Rising in picturesque forms on every side of the lovely vale were undulating hills covered with evergreen trees, whispering pines, oaks, chaparral with white, fragrant blossoms, patches of pale-blue myrtle, manzanita bushes with brilliant stalks surmounted with glossy leaves, waxlike blossoms and dainty berries. Here and there was to be seen a brilliant patch of glowing red berries like heaps of fire. Through all the narrow space between the shrubbery, and beneath the dark green trees, shone like yellow gold the luxuriant ripened grass. Silent all, save the riotous song of birds, the chirp and hum of insect life, the rippling of stream and the soothing rustling of the leaves as the light breeze passed through them. The bright blue sky arching grandly above seemed to rest down just beyond the surrounding hills, encircling all in a loving embrace.

How this lovely valley came to be called Ione is a disputed question, although there are some living here still who were here at a very early period of its settlement by the whites. Some claim that it was so named from the frequent utterance of the words "I own," by one of its early settlers by the name of Hicks. When asked by parties: "Whose land is that, or that?" "Whose cattle are those?" "Whose band of horses?" "Whose sheep?" the reply invariably was, "I own it or them," as the case might be. Thus it came to be a saying, "Hicks owns the valley," and it finally became "Ione valley."

Others claim that from its beauty it was called Ione, or named for some beautiful woman of that name. Howbeit, the valley is beautiful, the name is beautiful, and neither, I think, will ever change.

At its upper or eastern end, creeping slowly but surely up the "big hill," nestles the village of the same name. Its numerous cozy homes are almost buried amid trees and clinging vines; fruit of all kinds is abundant, each in its season. Glowing blossoms decorate the yards and fill the air with fragrance. A large, substantially built brick schoolhouse and an efficient corps of teachers speak well for the educational advantages for the children of the place. Four well-constructed churches, each one well attended, speaks volumes for the religious sentiment of the citizens. Two drug stores and as many resident physicians speak assuringly of the means for the speedy restoration to health, should one fall ill. Four well-stocked general merchandise stores and a bountiful meat market stand ready to supply almost any want of the people. Two hotels are well fitted to furnish good food and comfortable shelter for the traveling public.

One weekly paper, the *Ione Valley Echo*, affords a means of advertising and chronicles the doings of the place and vicinity.

In the days of forty-nine and the early fifties, there were rich placer mines near, and many a golden nugget was unearthed and quantities of yellow dust found its way to the Mint from the gulches around and from the neighboring "cities" of "Irish Hill," "Muletown," etc.

Great energy was displayed by the people in this section during the copper excitement in the "sixties," and two valuable lodes were opened—the Newton, three miles east of Ione in the hills, discovered by Dr. Newton, which was profitably worked for years but is now idle; and the Arroyo Seco copper mines, discovered and located by John J. McNeely, three miles to the northwest of Ione. From it some very rich ore was taken and shipped to Swansea, after which the ore passed through was not so rich in copper, but the vein is there and in time undoubtedly will be again worked with profit. There are other lodes of the metal also near.

Where once the wild oats waved in emerald green is now crossed and zigzagged by many lines of fence, cutting up the lovely valley into farms great and small. Orchards in many places have taken the place of the live-oak groves. Vineyards, orchards and wheat-fields occupy much of the space. Black walnut trees have been planted along the line of some of the roads and lanes, and yield an abundance of nuts.

In the northern edge of the valley is the gravel mine known as the Lambing mine. Much money has been expended in perfecting machinery with which to remove the dirt and quicksand so as to obtain the gold deeply hidden below. An immense derrick is used for that purpose.

When this garden spot was in its first early bloom, after being settled by an enterprising class of people from the East, and every one who was fortunate enough to own a portion of its prolific soil felt that he was rich indeed, and every one was prosperous and at peace with his neighbor, and Ione was considered by its residents as the "Eden of California," that greatest of all blights, a floating Spanish grant, embracing I forget how many leagues, was floated over the bare plains west of here—over the dry hills and less promising country on either side, and settling down, took solid root where the land was already in a high state of cultivation, the homes made, the vineyards planted, the orchards in bearing. It floated not in square leagues as perhaps was intended, but narrowed here where the soil was not so good, widened again and strained and reached out so as to take in this home and that grain-field, and still another orchard and vineyard, rested its eastern line just above the village, and all that was lovely and desirable belonged to one man of yellow visage—"Senor Andreas Pico."

As the price of a title to what each had considered his own, and had, in many instances, paid a high price for previously, a sum was required equal to the full value of the land, and the improvement put on the same at the settler's own expense, an effectual check was put upon all industries, and from which Ione is now slowly but surely recovering.

The "Grant" has several times changed hands. The grand early settlers, most of them became impoverished and sought homes elsewhere. Thousands of acres of fairly cultivable land are inclosed by barbed wire fencing into one immense field for stock-grazing—many acres of the richest loam in the valley are devoted to the raising of alfalfa and pasturing of hogs. Still the people hope that one day this place will become one of importance.

The fair grounds and pavilion for Agricultural Fair, No. 26, are located here. The "Preston School of Industry" is to be built here in the near future.

There are extensive beds of fairly good coal that have been worked for years, and are still being worked.

Quantities of good potters' clay are shipped to many places. There is a new quarry, said to be very valuable, of beautiful red sandstone for building purposes, lately opened and from which tons of rock are being hauled daily and shipped. A soil from which can be produced a good quality of anything you may wish to plant, and a climate equal to any other section of the State.

These are simply a few facts in regard to Ione valley, of which much more might be written.

Good Pumping Work.

EDITORS PRESS:—The Eureka Como mine has been drained at a cost of about $2000. They are now pushing their work of exploration on the 300-foot level, as fast as possible, with good indications ahead. We are pumping fifteen miners' inches of water, and a No. 9 Cameron plunger pump does all the work, forcing the water from the 300 level to the surface, and working perfectly. Some may be interested in knowing that a pump of this capacity can do this work. It was an experiment with us, but it has proved satisfactory. We make a saving in wood of two cords per day in favor of the one pump. We formerly used two pumps to do the same work, one of them stationed at the 200 level. S.

IMPORTANT MINING DISCOVERY.—We learn from reliable authority that Mr. A. P. Shively of this place, who has been prospecting more or less for several years in the vicinity of Pilot peak, and southeast of Toano, has discovered during that time many valuable lodes. This spring he again resumed his work of exploring for the hidden treasures, and some ten days ago discovered what is known among old miners as the "Lost Mines." This find is situated southeast of Toano, in this county. One of the ledges is some 30 feet in width, the croppings being bold and prominent, and running north and south. There are also several other valuable ledges, samples of ore from which carry galena heavily charged with silver, and is very rich. The formation is lime and quartz. Our informant states that there is an abundance of wood and water in the immediate vicinity for working purposes. We congratulate our fellow-townsman upon his good luck.—*Elko Free Press.*

IMPROVED TREATMENT OF CHROME ORE.—A Norwegian engineer, Herr O. Olsen, Christiania, has obtained a ten years' patent for a new process for the manufacture of chrome iron. In his process a well-mixed proportion of finely pulverized chrome ore, powdered charcoal, and tar are heated to red heat in a closed vessel, then allowed to cool, and finally remelted in a crucible, together with a certain proportion of pulverized iron ore, powdered charcoal, borax, ground glass, and cyanide of potassium. The proportions of the mixture are naturally kept a secret.

The Lakes of the San Joaquin Valley.

University Experiment Station Bulletin.

The rapid contraction by evaporation of the three lakes of the upper San Joaquin valley, the consequent concentration of their waters into alkaline lyes too strong for animal life, and the nature of the soils laid bare on their margins, have formed the subjects of investigation and discussion in former reports of this department, especially in connection with the reclamation and cultivation of alkali soils. (See reports for 1879, pp. 30 to 39; 1880, pp. 12 to 33; 1882, pp. 56 to 60; 1884, pp. 61 to 69; 1886, revised reprint from report of 1880: "Alkali lands, Irrigation and Drainage in their mutual relations," 45 pp.) It is a matter of regret that it has not been possible to pursue the subject by personal visits as systematically as its practical importance and theoretical interest might have warranted; for we are here in presence of a group of phenomena that have been repeated many times in past geological epochs, and for the study of which, in their physical, chemical and biological aspects, opportunity is not often afforded. Hence, while the information and data here given are of necessity incomplete and fragmentary, they are of interest as affording an insight into processes regarding which but little is thus far on record; and their communication may perhaps serve to incite others having the opportunity to do so, to a closer study of the progressive changes.

For a better understanding of the situation in the Kern and Tulare basins, the following statements from former reports are reprinted:

"A personal examination of Kern lake, and of the region lying between it and Buena Vista lake, as well as of the Mussel Slough country, made under the auspices of the United States census, in March, 1880, satisfied me that in none of these rich agricultural sections could the slightest increase of alkali be safely risked; and analyses subsequently made of the waters of both Kern and Tulare lakes prove that a very few years' use of the water then filling either of these reservoirs would be promptly fatal to the productiveness of the lands irrigated. As regards Kern lake, this was obvious enough from a casual examination and tasting of the water. Having been shut off from the natural influx of Kern river for a number of years, it has been rapidly evaporating and receding from its former shores, so that at the time of my visit a difference in level of over four feet had been produced in 15 months, leaving high and dry a boat wharf built at that distance of time. About 18 months before, all the fish and turtles in the lake had suddenly died, creating a pestilential atmosphere by their decay; and even the mussels were now mostly dead, a few maintaining a feeble existence. A strong alkaline taste and soapy feeling of the water fully justified their choice of evils. The tule marsh, laid dry by the recession of the lake, was thickly crusted with alkali, and the tules were dead, except where still moistened by the water of the lake, showing that the latter was not yet too strong for such hardy vegetable growth, albeit fatal to animal life.

"Buena Vista lake was stated to be in a similar condition, but not yet quite so far advanced in evaporation, and still maintaining some animal life in its waters, having lost its connection with the river more recently. Tulare lake is well known to be full of fish, and as it annually receives the overflow of Kern and the regular inflow of King's river, its evaporation and recession has been much slower; yet its water's edge is now distant several miles from the former shore-line, and as the water of the rivers is more and more absorbed by irrigation it will doubtless continue to recede until a point is reached at which the regular seepage from the irrigated lands will balance the evaporation. This epoch would seem, however, to be quite in the future as yet, for the rate of recession has, apparently, not sensibly changed in the last few years. It is not likely in any case that the water of the lake will be more abundant or less impregnated with mineral matter than is now the case, at the time when the state of equilibrium shall have been reached.

"With the lights now before us, it can hardly be regretted that the old Westside ditch, which was to irrigate the lower country with the corrosive waters of Tulare lake, was not successful. The lake level is now several feet below the bottom of that outlet, and the lake keeps receding annually, and its alkali becomes stronger as the mass of the water decreases. It is difficult to say where it will stop; but if, as is probable, a state of equilibrium is reached whenever the waters of Kern and King's rivers shall have fully filled the parched depths of the plains by a more general system of irrigation, it is not at all probable that the lake water will thereby become fresher; on the contrary, such seepage water will be likely to bring into it the alkali now dried up in the lower strata, and the annual evaporation will concentrate the solution more and more. It would certainly be most desirable to utilize the lake as a great reservoir for irrigation supply; but to render this practicable, it would be necessary first to empty out or displace the mass of alkaline water at present occupying the basin. The discussion of the feasibility of such an undertaking, however, belongs to the province of the engineer corps.

"The analyses referred to above gave the following results (in grains per gallon):

	Kern Lake.	Tulare Lake.
	—1880.	
Date of taking sample	March.	January.
Total solid contents	211.50	81 80
Soluble after evaporation	182.75	71.16
Potassium sulphate		3 24
Sodium chloride (common salt)	115.41	22.77
Sodium sulphate (Glauber's salt)		17 23
Sodium carbonate (sal-soda)	64 37	27 93
Insoluble after evaporation	9.29	8.36
Calcium carbonate	....	2 97
Magnesium carbonate	....	4.95
Silica	....	.44
Organic matter and water	22.43	2 23

"To convey to those unaccustomed to the consideration of such matters an idea of the meaning of the above figures, it may be stated that the solid contents of river waters vary usually from 5 to 12 grains per gallon. The water of Tulare lake, where it is undiluted by the inflow of King's river, is therefore about 10 times, and that of Kern lake about 26 times, stronger than an average river water. Even this, however, conveys but an inadequate idea of the relation sustained by these waters to organic life. The average sea water (containing mainly common salt) is about ten times stronger than the water of Kern lake as regards its solid contents; yet in sea water, fresh-water fish live freely during part of the season, while in Kern lake the fish died at a time when, according to a minimum estimate, the water must have had about twice the strength of Tulare lake, or about one-thirteenth of the strength of sea water. This shows strikingly the deadliness of the Kern lake alkali as compared with sea salt, or, in other words, of Kern lake water as compared with tide water."

Condition of the Lake Water in June, 1888.

Early in June, 1888, at my request, Mr. B. F. Moore, Patron of the Experimental Station near Tulare City, sent a messenger to obtain a sample of the lake water in order to ascertain the progress of evaporation. The sample was taken 2½ miles out in the lake, 8 miles east of the mouth of King's river, not far from the Cross creek fisheries.

The water had a general greenish turbidity and considerable greenish sediment at the bottom of the bottles. This sediment showed under the microscope an abundance of green cellular plants, mingled with adherent fine silty matter, partly silicious, partly calcareous.

A partial analysis of this water (by Assistant Geo. E. Colby) resulted as follows:

	Grains per gallon.
Total solid contents	204.7
Soluble after evaporation	186.9
Sodium carbonate (sal-soda)	74.3
Insoluble part	3.7
Organic matter and water	14.1

The *soluble* part consists chiefly of carbonate of soda and common salt with Glauber's salts.

The *insoluble* part consists of gypsum and carbonates of calcium and magnesium with some silica and alumina (probably clayey matter).

It will be seen from a comparison of this analysis with those made in 1880, that the solid contents of the lake water had increased very nearly 2½ times in the eight years, and that its concentration approximated closely to that of Kern lake in 1880. Yet it appears that an abundance of fish survived, at least of certain kinds, although, as will be seen below, the mussels had already succumbed.

The Condition of Tulare Lake in Winter of 1888-9.

Having been informed in November, 1888, that "the fish in Tulare lake were dying by shoals," I concluded that the water of that basin had by evaporation at length reached the limit of endurance of its inhabitants, who had probably found themselves unfit to survive the altered surroundings. Desiring to verify the facts, I in January, 1889, made arrangements to visit the lake in company with Mr. J. G. Woodbury of the State Fish Commission; but being delayed by imperative duties, I requested Mr. Woodbury to proceed alone, and while making his observations on the economic side of the question, to collect a sample of water and such other data as might present themselves. He accordingly visited the northeastern part of the lake, near the mouth of Cross creek, during the first week in February, and on his return communicated to me the following interesting account, which is here reproduced by consent.

"On the train I met several gentlemen who live along the railroad, opposite the lake, and was told by them that Tulare City was the best place to start from for a visit to the fishing-grounds. I engaged team and driver to take me to the fishery near Cross creek, a distance of about 25 miles, according to the driver's statement, and not less than 20 by my own estimate. At this point the lake receded last year about half a mile, and in consequence the fishermen were compelled to move their position about a mile farther into the lake. Their pound for the fish is half a mile from the shore and their seine is pulled 2½ miles farther out into the lake. It is afterward pulled in by a horse and windlass located about 200 yards from the shore, on a platform where the horse is also stabled.

"They catch about 125 pounds at a haul at this fishery; the fish come in on the seining grounds in warm weather rather than when it is cold; and as the same ground is continually seined over, it seems that the fish must travel considerably to keep it constantly stocked.

"I inquired about the reported dying of the fish. The fishermen said that it occurred last summer and autumn, and that it was mostly catfish, 'greasers' and some of the so-called trout, also some carp, but very few perch. Now it is the perch that is so much valued by the fishermen; in fact, the perch is what they fish for, as the catfish do not sell so well and the greasers are of no account. The 'trout,' of which I did not see any, they say are very soft and do not keep well, also are very insipid.

"The perch is certainly a very fine fish, large, bright and clean-looking; they are also very good eating, as I had occasion to verify. These perch have enormous mouths, and in that of every one in the pound can be seen a 'shiner,' (or 'slick,' as they call the fish) with the tail sticking out of the great mouth, being drawn farther in as the process of digestion proceeds. One perch which I took along to have cooked, I took by the gills, and looking down his big mouth, I saw the tail of a fish, which I readily got hold of with my fingers and pulled out. It was six inches long and only its head partly digested. The fishermen say that all these perch when caught have fish in their mouths, in proof of which he pulled out one at random

with a dip net, and showed the perch with a shiner's tail still out of the mouth.

"The fishermen state that no catfish are now caught, while two and three years ago they would get a wagon load at each haul; also, that trout are now seldom caught, although they used to be very abundant. The men expressed no opinion as to the cause of the death of the fish, but stated that the catfish especially were drifted upon the shore, dead, by thousands.

"Catfish, however, are found by millions at present in the creeks and sloughs that run into the lake. A gentleman who lives on his farm fully ten miles from the lake, and who fishes in a small way for his own table, is of opinion that the destruction of the catfish and carp is caused by their being driven on the shallows by the wind, and left in shallow pools which, when the water recedes, soon become so hot that the fish die. I questioned him very particularly about this; and as he is very intelligent and his father was a fisherman whom he frequently assisted in his work, his views are entitled to weight. He has a boat and sailed around the lake last summer, and states that the deepest part of the lake, in the channel which runs from south to north in the direction of the old outlet into the San Joaquin river, does not exceed 20 feet; that outside of that channel it is generally not over four feet, gradually shallowing toward the shore. Notwithstanding this shallowness, the action of the wind should mingle the different portions pretty thoroughly and render the alkali about even throughout.

"Before starting on this trip he was told that he would have a good wind throughout his journey, as the wind blew from the center of the lake toward the shore. He states that he found it to be true; that he had the wind 'abeam' all the way.

"The two bottles of water I sent you were taken at various distances from the shore out to the fish-pound. Although the fishery is located off the mouth of Cross creek, as there is no water in that creek for several miles out from the lake, the water of that portion could not have been perceptibly freshened by its influx at this season, although some seepage doubtless occurs. The water of the lake is very muddy and has a nasty taste and smell; very much like that of a well about a mile from shore and 100 feet deep, which was, however, drank by the people at the farmhouse as well as by their stock, and left them all healthy. One of the horses of my team, however, was relaxed in its bowels all the way to Tulare, and the same happened to the driver and to myself.

"All the shore of the lake for miles, as far as I could see, was strewn with mussel or clam-shells; the surface of the ground was white with them, and the wheels of the carriage crushed through them as though more than half the substance of the ground was actually made up of shells, as I have no doubt is really the case. They told me that these shells extend here, as thickly as on top, down to the depth of a hundred feet, as shown in the well referred to above. Not a live clam can be found in the lake now.

"I have subsequently been informed that ten years ago there were large numbers of live mussels in Tulare lake and that the hogs used to live on them then; that they would wade out into the lake and plunge their heads under water, get hold of a mussel and hold their noses up in the air and chew them up.

"All the (seven or eight) fisheries are located within four miles of Cross creek mouth; no fishing is now or appears to have been done near the mouth of King's river, 10 miles to northward, for the reason (according to the fishermen) that the water is too shallow.

"For the whole distance of 20 miles from Tulare City the country is of remarkable fertility, almost level, and where put into wheat the growth was strong, even to within two miles of the shore of the lake, where the land had been plowed through solid tule roots. The growth was very compact, strong, and of a beautiful green color, and had stooled out abundantly; which, to my mind, showed that the rawness of the soil or the quantity of alkali had but little effect upon the growth. For long distances among the tules alfileria covered the ground. I had no idea of the value and extent of the arable land of Tulare county until I rode over the immense extent of that plain to the lake. I think the time will come when Tulare will be one of the very best of the agricultural counties of the State.

"Speaking of the future of the lake—it must have been a good deal lower than it is now, for near the mouth of Cross creek there are many stumps which were under water only last year, and among which the fishermen used to get their nets entangled; these stumps are now just at the water's edge. Of course they could not have grown under water. Again, in a little surface well near the landing-place at the fishery, there is at the depth of about 18 inches, all around, a ring of blackish organic matter or mold, quite distinct from the yellowish clayey earth both above and below it. It looked as if it might be decomposed tules, and if so, the water must have been off the ground long enough to allow these tules to be decomposed and made into soil. There are now under this water about 200,000 acres of land of what might be made the best quality, and this land under alfalfa would be worth many times what it is now under water, for fishes. Why would it not be a good idea to drain this lake down four feet lower, to the banks of that channel, into the San Joaquin river, through a canal that would at the same time serve as a water-way up to that old channel in the lake through which boats could go with freight? I think that by this scheme in a short time all the surplus alkali would be drained into the ocean from the lake and the surrounding country, for as the fresh water from the mountains is spread over the land it must sink down and gradually push the more alkaline waters down the canal. So the land would in time be freed from alkali and the canal would be kept full by underdrainage, which the lake now receives and evaporates."

Present Composition of Tulare Lake Water.

The sample of water sent by Mr. Woodbury was quite turbid, partly from fine mud, partly from the presence of greenish micro-organisms. Its taste was flattish saline, and quite nauseous to the stomach. Exposed to the light, it soon became filled with rapidly increasing green gelatinous films and cocci, the exact nature of which was not investigated.

Upon filtration, which progressed very slowly, and did not clear the water completely (as is usual with waters impregnated with alkaline carbonates), considerable organic matter still remained in solution, and had to be removed by ignition before proceeding with the analysis. In presence of an excess of carbonate of soda, this ignition could not interfere with the accuracy of the determinations of acidic ingredients.

The result was as follows:

Analysis of Lake Tulare Water.*

Specific gravity, 1.0050 at 62.5°.

	Grains per gallon.	Parts in 10,000.
Total solids	303.07	51.88
Soluble after evaporation	297.97	47.93
Sodium chloride (common salt)	95.79	16.40
Sodium sulphate (Glauber's salt)	73.76	12.63
Sodium carbonate (sal-soda)	94.74	16.22
Potassium sulphate	15.68	2.68
Insoluble after evaporation	6.57	1.19
Calcium sulphate (gypsum)	1.47	.25
Calcium carbonate	1.07	.18
Magnesium carbonate	2.55	.44
Silica	1.87	.32
Organic matter and water	16.12	2.76

The following table summarizes the composition of the Tulare lake water at the three different periods:

	1880.	1888.	1889.
Date of taking sample	Jan'y.	June.	Feb'y.
Total solid contents	81 80	204.7	303 07
Soluble after evaporation	71 16	199.9	297 97
Sodium chloride (common salt)	22 77		95 79
Sodium sulphate (Glauber's salt)	17 23		73 76
Sodium carbonate (sal-soda)	27 92	74 3	94 74
Potassium sulphate	3 24		15.68
Insoluble after evaporation	8 .5	4.8	6 .5
Calcium sulphate (gypsum)			1.47
Calcium carbonate	2 97		1 07
Magnesium carbonate	4.95		2.55
Silica	.44		1.87
Organic matter and water	2.28	14.1	16.12

The figures in the above table hardly require comment unless it is to draw attention to the extremely rapid increase of the solid contents of the water between June, 1888, and February, 1889, as compared with the effect produced during the previous 7½ years. The latter was about 2½ times or 150 per cent on the whole, or an average of 13 per cent a year; while in the eight months preceding the last examination, the increase was nearly 45 per cent. It should be noted that these eight months were remarkable for very great evaporation elsewhere on the coast, also; and that they formed the end of three years of rather deficient rainfall in the State. The more abundant moisture of the season just passed, may have stopped or perhaps even reversed the process; a point which will receive attention within a short time. It will then be possible to predict with some degree of approximation how nearly the condition of natural equilibrium between the evaporation from the lake surface and the seepage from the streams and irrigated plains referred to above, is being approached, and to forecast the future of the lake and of its inhabitants if left to themselves.

Whether or not it will be expedient to interfere with the natural course of events, either for the establishment of a great irrigation reservoir, or (as suggested by Mr. Woodbury) for the reduction of the lake to a mere water-way in order to reclaim the lands now covered by it, is a question too complex to be discussed here. The answer will in a measure be determined by the decision of another question, viz.: whether the increased saline strength of the lake water is due wholly to evaporation, or in part to concentrated solutions of alkali extracted from underlying beds by the inward seepage. If a consideration of the area and depth lost by the lake within the last year shall show that there has been a distinct accession of alkali salts from the outside, the use of the drained lake-bed as an irrigation reservoir will be of very doubtful practicability, as it would imply an annual addition of such salts to those already contained in the natural soils irrigated therewith.

It is hoped that all persons who may, from their own observation, be able to throw light upon the history of the recession of these lakes, will communicate the facts so as to place them on record. It is with the hope of obtaining such additional data that this bulletin is issued in advance of the general report of which its subject-matter will form a part.

E. W. HILGARD.

Berkeley, Cal., June 15, 1889.

*Analysis by Mr. E. M. Hilgard, Special Student in the Agricultural Laboratory.

THE YAUPON—Ilex Cassine.

Gold-Extraction To-Day.

Gold mining is in many minds still associated with a flannel-shirted, long-booted, gambling class of doubtful manners, who, with pick, shovel and pan, found fortunes in the hill streams of the far West or of the land of the kangaroo. But this race of miners is rapidly becoming as extinct as the redskin of California or the black boy of Australia. As the superficial deposits which attracted the pioneers were exhausted, the aid of machinery and science became essential, and a new order of things began, introducing the capitalist, the chemist and the engineer. Moreover, in their haste to get rich, and with their rough-and-ready appliances, the early diggers only worked the richest ground and passed over tons—acres—of stuff that, with modern methods, would pay handsomely. To convey an idea of the perfection which has been attained in some of the processes of to-day, one illustration will suffice. During a quarter's (three months) working last year of the alluvial deposits of Daylesford, Victoria, some 33,560 tons of gravel were treated, and gave an average yield of 18½ grains troy of gold from each ton of gravel. That is to say, of all this enormous mass of material dug up, passed through the apparatus and redeposited, only one eighteen hundred and fourteenth part was of value, the other 1813 parts being useless. In other words, suppose an acre of land 15 feet deep to be turned over, broken up to the most minute proportions, and bodily removed in order that it might be made to yield up a hidden treasure in the form of fine dust, the whole of which could be easily held in a small coal-scuttle. And this was accomplished presumably at a cost which left a reasonable margin of profit. These results are altogether unparalleled in any other kind of metal mining. As a rule, the metal or its ore forms the bulk of the mass treated. Thus iron often constitutes 75 per cent of the mineral, lead 85 to 87 per cent, copper 78 to 98 per cent, and silver 85 to 99 per cent, while the gold in the case quoted only amounted to .000118, or a little over one ten-thousandth part of one per cent.

A Native Medicinal Tree.

A famous tree with an interesting history is the Yaupon or Cassena, of which a flowering and fruiting branch is shown on this page. It is included in the series of native medicinal growths described by Dr. Vasey, U. S. Botanist, and our engraving is from his drawing. Its botanical name is *Ilex cassine*, and it is a small tree, 15 to 25 feet in hight, or only a shrub, growing in the Southern Atlantic and Gulf States, near the coast, and in the southern part of Arkansas. It is said to reach its greatest development in the river bottoms of Eastern Texas. It is a handsome evergreen. The leaves are three-quarters of an inch to an inch and a half in length, thick, smooth, shining green above, pale beneath, mostly of an oblong or ovate form, sometimes entire on the margins, sometimes with small obtuse teeth. They are alternate and very short stalked. The flowers are in small clusters in the axils or points between the leaf and the twig. They are white and minute, the parts requiring a glass for their plain discrimination. The calyx has from four to six obtuse teeth. There are from four to six sepals and as many stamens. The ovary develops into a small red berry, becoming black, of the size of a small pea. These berries consist mostly of the two to four bony seeds which they contain. The leaves have a peculiar intoxicating property, and were used by the Indians under the name of black drink, both as a medicine and as a drink of etiquette at their councils. Prof. Venable of the University of North Carolina has recently made an analysis of the leaves, and states that they contain a small percentage of caffeine, or the peculiar principle found in coffee, and in the mate, or Paraguay tea (*Ilex paraguayensis*) of South America.

REGARDING the discovery of silver ore in the new district situated 100 miles south of Reveille, prospectors who have recently returned from there say that the ledge discovered by a Mexican is not so large as at first reported. The prospectors have made several locations, however, and it is their intention to revisit that district during the summer and develop their properties.

AN INCH OF RAIN or ten of snow means a gallon of water spread over a surface of two square feet, or a fall of about 100 tons on an acre of ground.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Amador *Ledger*, June 22: The timbers for the additional ten stamps to the Wildman mill are coming in rapidly, and the mechanics are already at work on the job of building. We expect in about six weeks to report the additional stamps in successful operation. Sinking at the North Star is progressing favorably. The contractors threw up the job some time ago, as they were not making their two feet a day, which was required to make wages. The men who have succeeded them, however, are said to be making their two feet without any trouble, and expect to keep it up unless they encounter harder ground. The Lincoln is running light, on account of a slackness in the water-power from the creek. Capitalists are coming in quite freely, looking for mining investments.

MISCELLANEOUS.—A nugget of gold weighing four ounces was taken from the Arroyo Seco gravel claim last Thursday. The Reed & Askey mill is running only five stamps, on account of the breakage of one battery. At a meeting of the Directors of the Alpi Mining Co. held Saturday, B. F. Taylor was authorized to go to West Point in behalf of the company and inspect a five-stamp mill for sale in that neighborhood, with pump and engine, and report as to the advisability of its purchase. At the mine the work of crosscutting the ledge has been completed, proving the vein to be seven feet thick. Another contract has been let to extend the tunnel 60 feet farther, below a point in the surface where some ore was worked many years ago with flattering results.

COSMOPOLITAN.—*Dispatch*, June 22: Sinking is being pushed with all possible speed; the shaft is now down 580 feet; are opening up 300 and 400 levels so as to have everything ready for taking out ore as soon as the mill is completed.

DRYTOWN CON.—They have the shaft all in good working order and started to sink on Monday morning. There is some very good looking rock coming out of the bottom; the walls are 12 feet wide at the bottom of the shaft; the ledge is about seven feet wide but mixed with granite and five feet of porphyry. They will be able to sink 10 or 12 feet per week from now on. There seems to be a change in the ground at the bottom, and they expect to get a better quality of ore inside of 50 feet.

PAUGH.—The tunnel is now in 125 feet on this property. A portion of it was in very hard rock, but now the face is in soft slate; 250 feet more will be necessary to tap the shaft, which is 340 feet deep. After reaching Paugh shaft, will follow Paugh ledge until they strike the Union ledge, which crosses the Paugh; will then follow the Union ledge and tap the Union shaft, which is 360 feet deep. Both properties are owned by the same company.

DOYLE.—Two or three men are working on this mine; 750 feet of tunnels, drifts and shaft have been run. The walls are well defined and are 120 feet apart. On the hanging, a tunnel 225 feet in length has been run, while on the footwall a length of 250 feet has been excavated. It is proposed to get farther in the hill before crosscutting. A crushing of ore from this property, which was made at the Amador Queen mill some time ago, yielded $5 per ton in free gold.

VALPARAISO.—This property, which is situated near the Mokelumne river, is owned by Messrs. Ginochio, Poggi and others, and has been worked on a small scale for a good while. A tunnel 1500 feet in length has been run, and occasional rich spots were found. They commenced making an upraise a short time ago, and last Saturday they were rewarded by finding a nice ledge of good ore averaging from three to four feet in width.

MISCELLANEOUS.—Henry D. Emerson is engaged in the construction of a cannon-ball mill near the Granger mine in Pine Grove. The millsite, which is small, is excavated and ready for the machinery. At present he is putting up a steam engine which is to run the mill, as well as a pump which is to force water from the reservoir below to serve the battery. The Granger prospect is 80 feet deep; 75 tons of ore on dump.

MORLEY.—Our predictions regarding the Morley property, in Hunt's gulch, are about to be verified. From what we can learn nothing has yet been found to show that a mine exists there, and the company are about disgusted with it. At present a winze is being sunk, and if nothing is found the probability is that it will close.

GOVER.—The Gover mill has been closed down for a week; they have been hoisting water from the lower levels in the mine, and could not hoist rock enough to keep the mill running while doing that work.

GINOCCHIO MINE.—W. Parsons & Co. have their Huntington mill ready for work; cannot get water at present. They have considerable good ore on the dump.

HENRY CLAY.—The Crocker tunnel is in 150 feet; the contractors are doing good work; they expect to finish their 300 feet by August first.

Calaveras.

UTICA.—Angels *Monitor*, June 20: The north shaft at the Utica mine is now over 600 feet deep and sinking is still going on. By the sinking of this shaft the fact that the mines of Angels are permanent ones, and that the ledges extend downward to an unknown depth, and increase in richness as depth is attained, is being demonstrated to a certainty.

LANE & TULLOCH.—Work is progressing finely at the Lane & Tulloch mine in the southern part of this town. A large, well-defined ledge has just been discovered. The ore prospects well and the owners are strong in the belief that they have one of the best mines in the country. The mill is kept in continual operation and the battery plates present a healthy appearance.

LINDSAY.—The Lindsay mine, situated about three-quarters of a mile west of this town, and which is supposed to be a continuation of the famous Amador lode, is being worked continually, but on a small scale, owing to the lack of funds to more extensively develop it. This mine is non-productive simply for the want of capital to open it up.

GWIN MINE.—Calaveras *Chronicle*, June 22: We are credibly informed that the parties who have been prospecting the King Solomon mine are to move their milling machinery upon the Gwin mine to work the rock of the old dump on that mine and to prospect a "stringer" of the main lead. Without positive information to that effect, there is reason to believe that this is merely a forerunner of more extensive operations on the famous location. From what we can learn the King Solomon mine has not turned out a success on account of the difficulty to save the gold. The material seems to prospect well, but it does not respond to the practical milling test. The material evidently demands an additional process for successful working.

Fresno.

A RICH MINE.—*Expositor*, June 19: A gentleman from the Mt. Raymond mining district, well known in mining circles, gave us the following information concerning the Star mine at that place. The company now operating that mine are from Montana, and use the same style of reduction works that are so successful in that Territory. The mill only concentrates, the smelting and refining being done at Selby's smelting works in San Francisco. The peculiar feature of the works here is the conveyance of the ore from the mine to the mill. The mine is a mile and a half from the mill, and the ore is brought down by an endless cable; the loaded buckets coming down carry the empties back. The cost of transportation of the ore is 20 cents per ton, and the mill has a concentrating capacity of 150 tons every 24 hours. Ten tons of ore are reduced to one ton of concentrates, making 15 tons per day of the latter. The ore, as it comes from the mine, averages $40 per ton, and consequently the concentrates are worth $400 per ton, making the output of the mine $6000 per day. As to the amount of ore at the mine, it is unlimited. There is a mountain of it hundreds of feet high. There is enough in sight to keep the mill running for 50 years to come, and if the property is handled properly, it will be the biggest paying mine in the United States. The company is now making preparations for the construction of its own smelting works, when it will also double the capacity of its concentration. Mt. Raymond is rapidly growing in population, and no man entering the mining district goes away seeking work.

Inyo.

CERRO GORDO.—*Independence*, June 22: For some time past vague rumors have been current of important mining transactions at the lower end of the valley. It is now publicly known that Archie Farrington and others have got control of the Union group of mines at Cerro Gordo. That group is credited with having yielded about thirteen millions of dollars in the flush times. For several years past good ore has been taken out steadily by parties working under lease. But in the meantime tunnels, winzes and levels were allowed to cave in; and the mines are reported to be in such condition as will require a good deal of expense to put them in thorough working order again. It is said that Mr. Farrington and his partners have secured the mines to work for one year, with the privilege of purchase at a certain price at the end of that time, or sooner, if they decide to buy. These parties have abundant capital and will put the mines in thorough working order and open up new ground. No one who knows the ground has any doubt but that there are ore bodies there as rich as were found in the flush times. The opening up of the Cerro Gordo mines will employ a large number of men and will give immense impetus to mining all along the Inyo Range. The ore body recently found by Dumphy & O'Keefe is said to be five feet of solid silver-lead. This gives all indications of being an immense ore body. It is in the continuation of the old Union ledge. Unfortunately a lawsuit is likely to grow out of this find. Joe Diaz, an old miner, claims an interest in the mine which Dumphy & O'Keefe refuse to recognize. Diaz has gone to San Francisco to consult with Mr. Hawley, another interested party, and to get legal advice. Hon. P. Reddy is owner of one-third of the claim with Dumphy & O'Keefe; so if law is resorted to the other claimant of an interest in the mine won't get it by whistling for it, but will have to clearly prove his right, and so he should. Mr. Farrington will take possession of the Cerro Gordo mines on the first of July and work will be begun at once.

MINING REVIVAL.—Inyo *Index*, June 19: Unless all signs fail, and we don't believe they will, Inyo will soon assume the first place among the mining counties of the Pacific Coast. It is currently reported that a syndicate of mining capitalists, headed by Archie Farrington of Reno, will soon assume control of the famous Union mines at Cerro Gordo; that they will be worked on an extensive scale, and can be relied on to equal, or even exceed, their old-time reputation as ore-producers. There are many splendid mines in Inyo which only await the aid of capital to become valuable properties.

SUCCESSFUL TESTS.—Last week some working-tests were made with the Victor concentrator at the Maxim Mill, the result of which was highly satisfactory. From tailings which had been worked over the second time, and which by assay showed seven per cent of metal, over five per cent was saved. Rich ore was run through and reduced one-half without losing any of its value. Further tests were made on low-grade galena ores and all the metal was saved. The ores worked were from Lookout, and Mr. J. J. Gunn, who was present, says every test was a complete success.

PROSPECTING.—A party of four experienced gold prospectors started from Independence Wednesday morning to make a thorough search for mines in the heart of Sierras northwest from here. They were well equipped and are men who understand the business.

Mono.

THE BODIE CON.—Bodie *Miner*, June 24: During the past week west crosscut No. 2 from north drift, 1200 level, was advanced 11 feet. East crosscut from north drift, same level, was advanced 15 feet. There were employed ten miners and one foreman.

MONO.—During the past week west crosscut from south drift, 1200 level, was advanced 31 feet, and joint upraise with Bodie from south drift was driven 24 feet. Winze from south drift, 1000 level, was driven 7 feet.

Plumas.

BUNKER HILL.—*National*, June 22: The Bunker Hill mine at the head of Poorman's creek is reported paying $5 to the carload. A large amount of ground is being opened up by the main tunnel, and the Bunker Hill is undoubtedly the best drift mine in Plumas county.

Sierra.

EMPIRE MINE.—*Mountain Messenger*, June 22: The Empire mine is at Gold Valley. For this mine a United States patent was issued to Nathaniel Gray, who, two or three years ago, bonded it to E. E. Hellings, upon condition that he would run in the tunnel at least 200 feet. Mr. Hellings took possession and has expended upon the mine a large sum of money in the erection of buildings, mills, etc. In September, 1888, his money gave out and he had not completed his contract in regard to the tunnel. He was obliged to abandon the work, and the mine has reverted to its original owners. On the 19th inst. the Sheriff sold to Giles H. Gray all the personal property in Gold Valley which had been brought there by the Hellings party. Mr. Nathaniel Gray died in April last, and his two sons, Giles H. Gray and George D. Gray, have succeeded to his interests. Mr. Giles H. Gray has been in town during the past week and says that there is a fair prospect that the mine will soon be worked by an English Co. who have bargained to purchase it; if not, he will probably proceed to run the tunnel with a view to working the mine and employing a large force of men In the meantime Archie McDonald is in possession for Mr. Gray. It is said that if Hellings' Co. had expended less money upon the outside in making tracks, building unnecessary chlorination works and useless buildings, and expended it in the tunnel, they would not have lost their right to purchase the mine. The mine was lately examined by English experts and reported upon very favorably.

BUFFALO.—It is possible that another party will lease the Buffalo mine and put in a steam engine on the ground this summer. The ledge prospects wonderfully well—not in base metal as some report—but in pure gold by every acid test, and will no doubt yet be made a paying property.

PRIMROSE.—The owners of the Primrose quartz mine, Hog Canyon, are expected up in a few days, and intend to thoroughly develop their mine this season. Everybody in this vicinity will wish them good speed and success.

Sonoma.

COAL PROSPECT.—Sonoma *Democrat*, June 22: R. A. King and John A. Hillis have been for the last two weeks clearing up and opening one of their coal tunnels on Mark West creek, preparatory to taking out coal for sale. They have put in a new car and track and are now facing a vein of merchantable coal over six feet in thickness.

Trinity.

EAST FORK ROAD AND MINES.—*Journal*, June 22: The machinery for the mill which is being erected by Mr. Peterson has been transported over the East Fork road, which is evidence that the road is in good condition. Other machinery will soon be taken to the mines and the camp will liven up in grand style. Mr. Paxton informs us that as soon as he can complete the desired amount of development work on the Yellowstone to determine what mill capacity will be needed, a stamp-mill will be put up. It will probably take about a month to do sufficient work to enable them to use proper judgment in the matter. On or about the 4th of July the buildings for the accommodation of the workmen will be completed, and at that time Mr. Paxton will increase his forces and push work on the mine as rapidly as possible.

NEVADA.

Washoe District.

HALE & NORCROSS.—Virginia *Enterprise*, June 22: On the 300 level the north drift from the new station is advanced 30 feet. On the 400 level the stopes in the north drift from No. 1 west crosscut continue in ore of good quality. On the 500 level the several stopes are looking well and yielding the usual quantity of ore. From the 600 and 700 levels are extracting usual quantity and quality of ore. Resumed work in the face of the north drift on the 500 level, and also in the face of the north drift on the 600 level, and they have been advanced respectively 20 and 25 feet. During the week have hoisted 1041 cars of ore, and shipped to the Nevada mill 990 tons and milled 930 tons. Average battery assays, $25.50. Have bullion on hand and previously shipped this month amounting to about $38,000.

BELCHER.—The 1100 raise is up 100 feet and the top is in soft porphyry with small seams of quartz through it. The 1100 south drift is out 255 feet, and have connected with the crosscut and started a winze in the vein. The 1000 level south lateral drift is out 106 feet in vein material, showing small streaks of quartz. The 1200 level south lateral drift is out 112 feet in porphyry and quartz, and there is a little water coming in it. The 200 level west crosscut is out 30 feet in hard ground.

SAVAGE.—On the 400 level the joint west crosscut was advanced 19 feet. The face is in favorable looking vein material. From Nos. 1 and 2 west crosscuts are stoping fair-grade ore; also extracting ore from the old stopes in the north and south drifts. During the week have hoisted 505 cars of ore, and shipped to the Rock Point mill 499 tons and milled 490 tons. Average battery assay, $21.70. Shipped $7014 in bullion.

CROWN POINT.—No change to report in the 500 workings. Have raised to the 14th floor south stope, 400, and found the clays have nearly come together there. Are still following the pay south on the 13th floor and find it about seven feet wide and of fair quality. Most of the ore is now coming from the 400 north stope, which looks about the same as last report. Shipped to mill during the week 840¼ tons of ore.

SILVER HILL.—The north drift on the 260 level has been advanced 20 feet through quartz and porphyry; total distance from shaft, 330 feet, Southeast drift, 160 level, at a point 670 feet from the shaft, there is an old raise which has been repaired a distance of 60 feet. The formation is quartz and gypsum, which prospects well in the pan.

JUSTICE.—The north winze is down 40 feet and the bottom shows four feet in width of good ore. No change to report in the north and south stopes. The shaft is down 76 feet, and the bottom is in very hard rock. Shipped to the mill during the week 223 tons of ore, the average battery sample of which was $26.96 a ton.

CHOLLAR.—East crosscut, 150 feet south of north line on the 550 level, is out 55 feet; face in low-grade quartz. The north lateral drift on the 750 level is out 310 feet; face in porphyry with streaks of quartz giving fair assays. The only work done in the north lateral on the 850 level the past week has been confined to repairs.

EXCHEQUER.—East crosscut, 150 feet south of the north line on the 825 level, is out 29 feet; face in clay and porphyry. West crosscut, 150 level, south of north line, is out 40 feet; face in clay and quartz. North lateral drift on 500 level is out north of the Alpha shaft 565 feet; face in hard porphyry.

CONFIDENCE.—The joint Challenge-Confidence and Imperial north drift on the 500 level is in 683 feet from the Yellow Jacket shaft. The face shows porphyry. The joint Challenge-Confidence raise from the east drift on the 1250 level is up 31 feet. The face shows quartz and porphyry.

POTOSI.—The south lateral drift of the 750 level is out 480 feet. Face in porphyry. The south lateral drift on the 850 level is out 416 feet; face in hard porphyry. South lateral drift on the 930 level is out 750 feet south of the Chollar shaft; face in clay and porphyry.

OVERMAN.—Have run the mine six days, extracted 248 tons and 1600 pounds of ore; shipped to the Vivian mill 307 tons of ore. At top of upraise from east drift have drifted south 22 feet, a total length of 44 feet; material, porphyry and quartz.

SEG. BELCHER.—The 1100 raise is up 112 feet, having been advanced 39 feet during the week. The top of the raise shows streaks of quartz two feet wide, which give fair assays.

ALPHA.—500 level east crosscut, 50 feet north of Alpha shaft, is out 29 feet; face in quartz and clay of no value. The west crosscut on the south line is out 80 feet; face in clay.

NEW YORK.—North lateral drift from the northwest crosscut on the 800 level is out 50 feet. Face in clay and quartz. This drift is being run on the east side of the ledge.

ALTA.—The usual work is reported from this mine, and extracting the same quantity and quality of ore. The mill is running steadily.

CHALLENGE CON.—The work, which continues to be jointly with Confidence, is described in the report from the last-named mine.

BALTIMORE.—Are extracting ore of good grade from the crosscuts on the 225 and 338 levels. Both places are quite wet.

CON. IMPERIAL.—North drift on 300 level now in 114 feet from the south line. The face shows porphyry.

YELLOW JACKET.—Are shipping about 100 tons of white gold rock daily to the Brunswick mill.

Bernice District.

BULLION.—*Silver State*, June 22: W. W. Williams brought in from Bernice this week four bars of bullion valued at $3500, making $1400 for the month from his five-stamp mill.

Eureka District.

FURNACES.—*Sentinel*, June 22: The Eureka Con. Co. started up one of their furnaces on Thursday, and will start another the first of the coming month.

Jackrabbit District.

ONONDAGA MINE.—Pioche *Record*, June 22: Active work on this property, by the company, ceased several weeks ago, and the north end of the mine was leased to Dave Meyers and Henry Tracy. This part of the property is entirely undeveloped, excepting the work done of late. A drift was started and almost immediately opened up ore which has increased in quantity and quality until the north end rivals the south end in value. Several carloads have already been shipped from the strike. The south end of the mine as left by the company looks fine, but much of the ore is low grade, and it was thought best to await the starting of the reduction works here, or the advent of a railroad, which, as now surveyed, will pass within two miles of the property, and thus save a material sum in freight.

Jefferson District.

GOOD ORE.—Work is pushed as usual in the mines at Jefferson, and some good ore is being encountered. What is wanted in Jefferson district as well as in all other mining districts in this county is sufficient capital to work the mines in a proper and systematic manner. The deepest hole in the ground is only 600 feet, and yet Nye county has produced and shipped over $25,000,000 in silver and gold bullion.

Jumbo District.

A REGION FERTILE IN GOLD.—Virginia *Chronicle*, June 24: The discovery of another vein of gold-bearing quartz assaying high in the yellow metal is reported, two miles northwest of Jumbo district. The vein has a breadth of 30 inches between walls, six inches of which, next to the hanging-wall, is very high grade, gold being plainly discernible in the ore without the aid of a magnifying glass. The character of the ore is entirely different from that heretofore found on the western slope of Mt. Davidson. It is dark gray in color and pulverizes with a blow of a shovel. It is the only vein so far discovered in that vicinity with well-defined walls of the same material as those inclosing the Comstock lode. The western slope of Mt. Davidson bids fair to become as famous for its production of gold bullion as the eastern slope is for silver.

Mt. Cory District.

THE BIG INDIAN.—Walker Lake *Bulletin*, June 20: Work was resumed last Saturday on the Big Indian mine in real earnest, after a long shut-down. This mine is located near the Cory, and has until recently been the property of McDonald & Crossman. Considerable good ore has been taken out in years past, and a small mill was built by former owners, but owing, it is said, to bad management, the mine did not pay and work was discontinued. Last month Senators John Forbes and E. D. Boyle purchased the mine and will proceed at once to active work. Both gentlemen are experienced miners, and if there is anything in the mine they will get it out. About 10 tons of ore are now on the dump, and if present operations warrant it, Messrs. Forbes and Boyle will erect a new mill, which will be utilized

to crush ore from the Big Indian, North Star and other properties in the vicinity owned by Mr. Forbes and his associates. There are several promising claims in this district, and if the present venture is successful it will give a fresh impetus to prospecting on Mt. Cory. George Dunn is foreman of the Big Indian.

Pioche District.

PROSPECT.—Pioche *Record*, June 22: C. F. Norton and Dr. Nesbitt are said to have a fine prospect in a location recently made near the old Portland mine on the hill east of town. Their prospect shaft, now down about 12 feet, has been in pay ore from the start. Rich pieces of float similar to those now frequently found in the vicinity of the burying-grounds, led to an examination of the hillside, and it is believed the ledge from which the float came has been found. The showing is unusually good.

Tuscarora District.

NORTH BELLE ISLE.—*Times-Review*, June 21: North drift on the 500-foot level extended 15 feet. West crosscut from the 300-foot station has been extended 24 feet.

COMMONWEALTH.—100-foot level: East intermediate drift has been extended 16 feet; total, 200 feet. Intermediate drift from top of No. 14 upraise has been advanced 15 feet. Upraise from west intermediate has been extended up 12 feet, exposing some very fine ore. The stopes north of the shaft are being opened as fast as practicable; they all look well. South of the shaft the stopes continue about as last reported; 150-foot level: No. 13 upraise has been extended upward 11 feet; will make connection with ore body opened above by Saturday. All the stopes on the level are yielding fully as well as at any time heretofore; 228¾ tons of ore have been sent to the mill. Battery pulp, $121 per ton; shipments made, $11,542.16, $13,537.64, and about $12,000 on hand.

NEVADA QUEEN.—No. 1 winze from the 450-foot level has been sunk seven feet. The bottom is all in the vein, two feet being good ore; the balance is low-grade. There is considerable water, but it is being hoisted all right. Average assay of the ore, $164 per ton. South drift from east crosscut 150-foot level has been advanced 11 feet. Some small seams of ore have been encountered, but not enough to pay. The concentrator has been stopped during the last week, water having failed, so we could not run full capacity.

NORTH COMMONWEALTH.—Upraise No. 1 from the end of east crosscut, 100-foot level, has reached a hight of 25 feet, passing through eight feet of ore; three feet of it is high-grade, the top part of the vein carrying considerable chloride.

NAVAJO.—West crosscut from south drift on east vein, 350-level, extended 15 feet. An upraise has been started on the east vein near the south end, same level, showing some high-grade ore.

GRAND PRIZE.—400-foot level: Stopes are furnishing the usual amount of ore. Good progress is being made with the work on the concentration plant.

DEL MONTE.—North drift, 100-foot level, extended 10 feet; the face shows seams of spar carrying some ore.

Tybo District.

RICH ORE.—Eureka *Sentinel*, June 22: Dimick is pushing the work of development in his mine at Tybo with energy. There are large quantities of rich ore in sight.

ARIZONA.

MINERAL PARK AND CHLORIDE.—Mohave *Miner*, June 22: J. C. Cross has a force working on the Elkhart taking out lead ore, of which that mine has plenty. "Rattlesnake" Jim has a shipment ready for the sampler which he will send in at the first opportunity. The Rogers' are taking out a large quantity of good gold ore from the Tintic mine, which improves as it is developed. Charles E. Sherman has shipped a carload of high-grade ore from the Queen Bee, near Mineral Park, and has lots of ore in sight. Martines & Garcia are driving the main shaft of their mine, the Goldback, fifty feet deeper, which will give them a couple of fair stopes. E. J. Edmiston will soon have a carload of ore ready for shipment from the Bridal Chamber mine, some of which carries a high per cent of copper. O'Brien & Chadwick are working the Schuylkill lead mine and have a good showing of ore. A. M. McDuffee having purchased the interests of G. H. Harvey and Barney McCall in the Rustler property, about half a mile northeast of the Tuckyho mine, is now busily prospecting the claim. Dan McKinnon has joined forces with Barney McCall on the Sunset mine, having purchased a one-half interest. It is rumored hereabouts that Frank L. Smith intends to run the leaching plant on the Juno mine. This property has furnished thousands of tons of leaching ore. Down in Blowpipe Flat things are in a lively state. Ewing & Prisk have got their one-stamp mill in operation, and easily crush one and a half tons of ore per day of ten hours, through a No. 6 mesh. The mill is one or two "Injun" power, consequently not very expensive. They have on the dump about 75 tons awaiting to be crushed, while more is coming out of the mine. The Keystone mill at Mineral Park is pounding away night and day on a fair grade of ore, and from what an outsider can see and ascertain, the run promises to be a long and successful one; while the mine is looking well and can keep the mill going without resorting to a "night shift."

BRITISH COLUMBIA.

MCMURDO.—Donald *Truth*, June 15: Little of interest is reported for the week. The McCabe party is out in McMurdo district engaged in waiting; five men are on Toby Creek; John McRae and party are at Windermere mountain; three men are running a tunnel on the Ebenezer near Golden; Cochrane & Brady have sold all their interests on Findlay creek to an English company, it is reported; the Perry Creek Gold Mining Company want five miles more of that creek; a half-dozen men are at work on claims round about Illecillewaet; and twenty-five men are working like slaves out on Porcupine creek. The last-named camp is really the only one near the line of the C. P. R. in which men are drawing pay. It is placer, and the yield for 1889 expected to be up in seven figures.

EIGHT DOLLARS A DAY TO THE MAN.—On Porcupine creek the Elsie Company's last cleanup panned out an even $208, which was the work of one man for 26 days. The Discovery Company have made two cleanups, both satisfactory. The Donald Company, in ground-sluicing for a shaft, cleaned up enough to prove that the surface ground in the deep diggings will pay if properly worked by low-priced labor. The creek is over 12 miles long.

CAUGHT ON.—Neil L. Morrison has succeeded in getting a company to take hold of his claims in the McMurdo district, and is highly pleased with the showing. Neil will superintend the development work.

COLORADO.

NOTES.—Georgetown *Courier*, June 20: George Lane's Headlight lode is said to be in good pay. Dump-pickers on Lamartine sold $1050 of ore for the month of May. The shaft on the Neath mine is being put down as rapidly as possible, with three shifts a day. The Mary Foster mine was sold at trustee's sale last Saturday to Capt. Swaine of Denver for $7600. Ore was milled from the Evening Star last week that returned 488 ounces silver and 17 ounces gold per ton. Dr. G. Kruss and F. W. Schmidt have called the new metal discovered by them in commercial nickel and cobalt, gnomium. Five sets of lessees are employed on the Corvin lode, and all are taking out mineral. Amos & Co. are said to be in excellent pay. E. T. Evans has a new discovery up in Argentine from which he has taken ore assaying 368 ounces silver and 7 ounces gold per ton. The new hoisting machinery on the Financier, Ute creek, started up last Saturday. This mine is reported to be in good ore now. Empire City is being driven to its intersection with the Belle of Empire lode. Walsenburgh people are the interested parties. Four men are employed. Live Yankee at Lawson has been started up by the Two Sisters Co. Work of removing the water is finished and systematic development will soon commence. Ore has been struck at the depth of 75 feet in the Ben Harrison shaft. This property adjoins the Lamartine and is owned by Armstrong & Williams of Freeland. The Burrell has ordered a complete plant of air-compressing machinery for hoisting and drilling in sinking the new shaft. A plat is being graded out for its erection. Pauline Ditch and Mine Co. of St. Louis are working a full force of men on their placers at North Empire. They have about completed a new arastra to be used in treating the large quantities of quartz uncovered by their placer workings. The Lamartine mine gives regular employment to 50 men. The main shaft is over 300 feet deep and the ore body improving. This is but one of the many bonanza mines of Cascade and Trail Creek districts. The average monthly production is 130 tons of first-class ore. Colorado Springs capital has been interested in the Hidden Treasure group on Lincoln Mt., belonging to Markey & Co. Work commenced on Monday; $20,000 is reported from reliable source to have been raised as working capital. This is the property from which the rich gold ore was taken in December of 1887.

DAKOTA.

BULLION.—Deadwood *Pioneer*, June 19: The usual semi-monthly shipment of $170,000 gold bullion was made yesterday by the Caledonia, Homestake and associated mines.

ANOTHER STRIKE.—It was reported on pretty good authority that a strike of excellent ore, better than any before discovered in the mine, had been made in the Uncle Sam, Sunday morning. Four hammers were at once put on to prospect the find more thoroughly.

WHERE IS THE MOTHER LODE?—Where the mother gold lode of the Black Hills is situated has not been satisfactorily determined. While we have the Homestake group, the DeSmet, Caledonia, Deadwood-Terra, and scores of other well-defined ledges, most of which are yielding pay ore and are being profitably worked, not one of them is considered the "parent" to the gold deposit of the Hills. Whether or not there is a general "parent lode" the future may or may not bring forth. In the meanwhile, however, there are not a few who are convinced that the largest and richest body of gold ore the Hills contain is yet to be found. The opinion of Professor Zahn that the mother tin lode is at Nigger Hill, or Bear Gulch, induces some to believe that the mother gold lode is in the same neighborhood. It is a well-established fact that the coarsest gold and largest nuggets in the Hills have been found in placer mining in Bear gulch, Potato gulch and other small gulches in the same section. This strengthens the recently formed idea that the mother lode (always provided there is one) is to be found at Nigger Hill. Two or three Deadwood men have discussed the advisability of prospecting for it, and it is probable an outfit well provided with whatever may be necessary, including sufficient funds to keep them in the field for a reasonably long time, and to enable such developments as may prove advisable, will shortly be forwarded to the scene.

IDAHO.

CŒUR D'ALENE MINES.—Helena *Mining Review*, June 20: A gentleman in from the Cœur d'Alene mining region informs us that times in that section are good, bad and indifferent. Some of the camps are booming, while others are struggling to keep up a show, but on the whole the general outlook promises well for the mining industry. One of the great drawbacks to this section is the low price of lead and the exorbitant freight charges of the N. P. railroad, but the extension of the O. R. & N. road into the mines encourages the miners to new life and hope. All along Canyon creek developments are being pushed ahead as fast as possible. In the Belle, the Gum, the Black Bear group, and the San Francisco mines a good showing is being made. Work on the concentrators is going on as rapidly as possible. The mines around Mullan are all turning out well. The Grouse, Morning, Evening, Central, Little Giant, and Hunter Mining Co. are all splendid mines, and are doing their share toward increasing the mineral product of the country. One of the richest mines in the Cœur d'Alene is the Diamond Hitch, near Burke, the ore assaying from 130 to 700 and 800 ounces per ton in silver. The Tiger and Poorman mines still hold an advanced position among the best mines of the region. The Nine Mile, the Custer, Granite and Panhandle are all rich in ore and have plenty of it. The Mountain Goat, Parrott, Sitting Bull, Excelsior, Grand Central, Pocahontas and Hidden Treasure are great mines, and only require railroad facilities and cheap freight rates to bring to their owners untold riches.

ORE CHUTES.—Wardner *News*, June 22: The ore chutes extending throughout the various districts of Cœur d'Alene are astonishing the most ardent upholders of the country, and property-holders are pushing development work with commendable energy. The prospect of adding, during this season, to the number of valuable mines is extremely flattering, and while the producing mines are doing as well as can be desired, a determined effort to develop the mineral wealth of the country at large is apparent, and the miners and prospectors are working with an energy, at least deserving of success. Where work has progressed steadily through the winter, the summer, most cases, brings the cheering knowedge to the laborer that the locations on which toil and money have been expended are fully up to the standard of Cœur d'Alene discoveries, and an increased interest is consequently manifested in every mining venture.

THE JULIA.—Wood River *Times*, June 19: John Filshie came in yesterday from the Dry Fork of Antelope to have samples assayed. They were extracted from the Julia claim, which he and Dan Dougherty located last New Year's day. The vein is 15 inches wide, all ore, and the assay will determine whether or not it will pay to ship. The Julia is an extension of the Henrietta, which yielded a seven-ton lot of ore that sold in Salt Lake City and netted over $900 after paying all expenses.

THE CHAMPLAIN.—Supt. Knight of the Champlain is employing but a small force at present, owing to the existence of some legal complications which he hopes to see ended ere long, when he will largely increase the working force of the mine and start up the mill.

LOWER CALIFORNIA.

ALAMO.—*Lower Californian*, June 20: The arrival of the ten-stamp mill of the Torres Mining Co. has enlivened this camp considerably. Each stamp weighs 750 pounds, and the plant is being put in place on the site. The mill will do custom work, and much rich ore is on many dumps waiting for the tooting of the whistle. The dies of the Butler mill have again been broken, but Butler's spirit is not, and the mill will soon be running. The finest of water, and plenty of it, has been found on the town site, and a large tank and windmill will be put up at once. Water will be piped all over the town at a low rental, and the pipes are now on the way. Timber, lumber and shingles for the town and mines are expected to be furnished within 60 days. The south end of the Laguna pine region will be tapped by a new road and portable saw and shingle mills will be put in. The price of adobes has lowered from $18 per thousand to $8 to $10. Several contracts have been let for the construction of adobe houses in the new town. They are the best kind of houses for this climate—warm in winter and cool in summer. Not much has been said of the placers lately, but they continue to yield an average (estimated) of $1200 a day. Since the 15th of March, when digging began in earnest in Mexican Gulch, it would be a low estimate to put the average output for the three months at $1000 a day, or a total of $90,000 in gold. Very little of this has reached Ensenada or San Diego, but it is sent direct to the San Francisco mint. There has been little change in the quartz mines since last week. Work is being pushed steadily forward, and the veins hold their width and richness far beyond expectation. Every day adds thousands of tons to the ore in sight. Several promising veins have been uncovered, notably the Baltimore, on the hill northwest and below the Elsinore. Santa Clara is holding her own. The shaft on the Maud S. is down nearly 40 feet, and shows great bodies of ore.

MONTANA.

THE SILVER CHEST.—Phillipsburg *Mail*, June 20: Charles Clark, president of the Bi-Metallic Mining Co., also a member of the Granite directory, arrived in town this week from St. Louis. The object of Mr. Clark's visit this time is principally business connected with the Silver Chest Mining Company, with which he has recently become identified. This property is located in close proximity to Philipsburg, and although its development was not commenced until last fall, already offers most favorable indications, and the time has come when it is necessary to put in machinery for extensive development in a proper manner. Mr. Clark comes forward with the cash, which will assure the extensive explorations soon to be commenced. The machinery has already been purchased, including an air pump, hoist, drills, boiler, engine, etc. The tunnel on the Bluebird, which is one of the principal claims in the group, is already in over 400 feet. This will be continued some 2000 feet farther, and the sinking of a shaft several hundred feet will also be begun at once. Messrs. Tibbetts, McWilliams & Co. obtained a bond from Al. Hudlemeyer and others last fall on these properties, which embrace the Silver Chest, Combination, Trade Dollar, Retta, Bluebird, Viola and the Sunday claims. They are located south of the San Francisco.

GRANITE MOUNTAIN.—The output for the week ending June 20th was 52 bars of bullion, containing 81,645 ounces silver and 124.99 ounces gold. Shipped to smelter 31,720 pounds of ore, carrying 931.4 ounces of silver and 0.56 gold.

THE ANACONDA SMELTER.—*Inter-Mountain*, June 20: There are 300 men on the pay-roll of the Anaconda company at the lower smelting works at Anaconda. Some needful repairs and alterations have been made in the silver mill, and it is ready for business again. The Brueckner furnaces that were injured by the fire have been repaired and are as good as new again. The first shipment of iron for the new smelter building was reported at Garrison yesterday. Material will now be arriving constantly. The building must be completed, according to the contract with Connecticut parties, within 60 days.

NEW MEXICO.

DIVIDENDS.—Silver City *Enterprise*, June 21: The Illinois mine at Kingston paid in dividends in the past five months, $45,000. Again the rumor reaches willing ears that the Graphic smelter at Socorro is about to be started up. The Silver Mining Company of Lake Valley, this territory, has declared dividend No. 2, of $25,000, payable June 20th.

HACHITA.—R. L. Powell returned last week from Hachita, where he had been to survey the American mine for patent. The mine is in splendid shape, shipping two cars of ore per day. The ore is a lead carbonate carrying silver.

STOPING GROUND.—The connecting of the two shafts on the Pacific No 2, at Pinos Altos, will soon be made, at a depth of 226 feet. The shafts are 300 feet apart. This will open up a large amount of stoping ground, in addition to that above the first level, which has not been exhausted. Col. Jack Crawford of Kingston has returned from London and has actively resumed work upon his properties. He brought with him $185,000, which he will expend in development work, the circulation of which will greatly benefit Kingston.

FELL THROUGH.—The sale of the Golden Giant for $50,000 fell through, owing, it is said, to a telegram sent by H. J. Longmaid of Carlisle, stating that the mine was worth but $20,000. The property was examined by an expert who reported favorably on it, and the money was raised, and the sale would no doubt have been made but for Mr. Longmaid's telegram.

TELEGRAPH.—John T. Mitchell and H. J. Walton came in from Telegraph last Wednesday. Mr. Mitchell reports favorably on the future prospect of the camp. A small vein of ore assaying $1250 has been encountered in the Tecumseh tunnel, 150 feet from the breast, which has every indication of permanency.

THE MOUNTAIN VIEW strike with depth is improving and is now the leading property of the district. The London mine, the north extension of the eastern end of the El Dorado group, has been exploited to a depth of 110 feet, with favorable results.

OREGON.

MINERAL CITY.—Bedrock *Democrat*, June 16: From a gentleman who just returned from a visit to Mineral City we learn that times in that camp are getting quite lively. A large number of prospectors are pouring in and new discoveries are reported daily. Two large quartz-mills are being erected on the Egan and Daniel Boone mines. These properties are owned by Portland capitalists and it is the opinion of our informant that their investment will prove very profitable. A wealthy English syndicate, who recently purchased the Black Maria, has ordered a twenty-stamp mill and a large concentrating plant which will be put up this summer. The company intend spending $250,000 in machinery and development work this season. Other properti s are changing hands and the mines of that district promise to prove among the best ore-producers in the country. Work on the Huntington Mineral wagon-road will be pushed ahead as fast as possible and with its completion a new impetus in mining matters will undoubtedly follow.

CORNUCOPIA.—Bedrock *Democrat*, June 24: Good reports come in from Cornucopia concerning the operations of the Oregon Gold Mining Co. Its mill is running and has been for some time on not less than $50 ore and the monthly output will be enormous. Since the recent rich strike in the Red Jacket new confidence has been inspired at that camp and a bright future assured.

UTAH.

PARK NOTES.—*Record*, June 22: Developments in the Anchor are going ahead at a satisfactory rate. After the drain tunnel reached a point under the shaft, north and south crosscuts were run, and lately work in the north drift was stopped. Now the south crosscut is being driven with all possible speed, and it is expected that the ledge will be encountered very soon. The work of boring the six-inch hole from the present bottom of the shaft to the tunnel level, for drainage purposes, is progressing favorably.

CAMP CROSSCUTS.—The Silver Key workings are being cleaned out preparatory to being worked by leasers. No bullion or silver sulphides were produced at the Marsac mill this week, but a shipment is being made up. The Apex is beginning to make a record as an ore-producer which is creditable to the property. During the week over 110,000 pounds of Apex ore, including the leasers' jiggings from the dump, were shipped.

THE DISAPPOINTMENT.—This property, situated up Thaynes canyon, opposite the Crescent, is proving to be a veritable misnomer. The ore body is increasing in size and richness almost daily and several tons of ore are on the dump. As soon as it can be sorted over a little more thoroughly, shipments will be inaugurated. The ore will average $40 to $50 a ton.

ABOUT THE COMSTOCK.—Everything goes well at the new Comstock, adjoining the Disappointment, and three shifts are kept at work. The lower tunnel is being driven with all speed possible, and it is expected that the ledge will be cut by the tunnel in about 60 days. Mr. Dusseldorf expects a carload of supplies, cars, tools, etc., to arrive in a few days.

WASHINGTON TERRITORY.

IRON MINES.—Ellensburg *Capital*, June 22: The greatest iron mines yet found this side of Lake Superior are within a few miles of Ellensburg. These mines are so extensive, so great in magnitude and so rich in iron—the ore averaging 66 per cent—that English capitalists and experienced iron men have been seeking to control them. These English gentlemen have been patiently awaiting statehood that these iron mines might be free from Government requirements, and thence more easily influenced and controlled by foreign capital. If this Territory had been admitted two years ago these mines would now be turning out pig iron. They are declared the equal of Alabama's iron mines. Then, again, there is an abundance of superior coal, that which will coke, and this is next adjacent to the iron mines. All the needed fluxes are in close proximity. This is not all; the Cascade range is rich in mineral. All known minerals, gold included, are here found in a crude state. The Salmon river mines have been developed and proven rich.

MECHANICAL PROGRESS.

SOME VALUABLE INFORMATION ABOUT HOW IRON RUSTS.—The necessary conditions for the production of rust are—first, metallic iron; second, liquid water; third, oxygen; and fourth, carbonic acid—both the latter being dissolved in the liquid water. Water in the vaporous condition, even in the presence of carbonic acid and oxygen, does not affect the metal, except at high temperatures, as in the formation of magnetic oxide of iron. Liquid water with oxygen dissolved in it does not act at ordinary temperatures on iron. This is shown by the fact that ordinary water exposed to the air does not rust iron if the water contains a substance such as lime or caustic alkali. As soon, however, as the lime or alkali is carbonized, the water and carbonic acid begin to act upon the iron, the first result being the formation of ferrous carbonate, which subsequently is changed to bicarbonate and dissolves, and then to reddish-brown ferric hydrate. As in this process the carbonic acid gas is first absorbed and then given off again, the continuation of the process of rusting is not dependent on new carbonic acid absorbed from the air, but the original carbonic acid can carry on the process indefinitely, as long as liquid water is present and oxygen is supplied from the air. Once the process is started, it goes on rapidly, because the porous rust not only does not protect the iron, but favors, by its hygroscopic character, the condensation of water vapor from the air as liquid water. A piece of iron, therefore, which has begun to rust will continue rusting in an atmosphere not saturated with water vapor, an atmosphere in which a piece of clean iron will not rust, because liquid water will condense from such an atmosphere on the hygroscopic rust, but not on the bright iron.—*Kansas City Architect.*

THE FUTURE OF METALLURGY IN THIS COUNTRY.—HON. A. S. Hewitt of New York is, or recently was, on a mission to England, where, in an interview with an English newspaper reporter, as given in the English correspondence of the *American Manufacturer*, he explains the object of his mission as one for investigation of matters connected with the manufacture of steel, more particularly the basic process of making open-hearth steel. Mr. Hewitt first saw the process of making open-hearth steel at the Paris Exposition in 1867. It was then a new discovery, but he predicted that it would in time supplant the Bessemer steel. Within three months after the utterance of this prophecy Mr. Hewitt's company built the first open-hearth furnace in America. "Now," said Mr. Hewitt, in the interview referred to, "while it is true that more Bessemer steel than open-hearth steel is being made, it is also true that the latter has been rapidly gaining upon it." He has been investigating in this country steel works and Admiralty tests in order to determine whether American manufacturers of open-hearth steel cannot produce it more cheaply upon the basic system than by the present acid process. His conclusion is that they can. Basic steel, in Mr. Hewitt's view, is destined to take the place of wrought iron in all the uses to which it is now put. "My visit will probably result in time in the general adoption in America of the basic process. It is well adapted to the Southern States." Mr. Hewitt is convinced that America will make the iron and steel for mankind in the long future. He very correctly puts it: "We have the iron, the coal, the capital, the skill and the energy necessary to do it."

A REMARKABLE METAL-ROLLING MACHINE.—The famous Lick telescope revolves on hardened steel balls one inch in diameter, which were rolled by an improved metal-rolling machine, the capacity of which is said to be limited only by the ingenuity displayed in making the dies. The principle of this remarkable machine is that of two inclined planes, the dies on these planes forcing the metal to the required shape, the adaptability of its operation ranging all the way from the smallest steel boot-calks up to carriage axles, and even larger, all done at a single operation. Such is its diversity of capacity that it will take a billet of iron and at one working produce a carriage axle, journal, shoulder, and threaded on the end, as well as the square body usually made, all in less than thirty seconds; also, two track bolts are rolled together, oval under the head, threaded, all complete, in less than ten seconds, screws for monkey-wrenches ready to put into the wrench being likewise made in the same time. Steel bolts of any diameter, from three-sixteenths to two inches or larger, are thus produced more accurately than by any other method.

INCREASING THE DENSITY OF STEEL.—In working steel by hammering, or drawing it down by the process of rolling, it is a well-known fact that the steel forming the corners becomes more dense by the operation, or has the appearance of being refined, for where drills for cutting stone are used they are found to work much better by having the bit or cutting edge come in line with these compressed edges. In rolling eight-square steel, the line of dense metal comes in the form of a Maltese cross, and as the bit of a rock drill, where power drilling, is made use of, is something of the same form, care is taken to have them coincide. The etching process must show this action of steel to perfection, if a section could be worked off true and even, and polished. After hardening, the etching fluid will take hold of the softer metal with greater freedom, and bring out all the features that can be contributed to the action of the hammering or the refining from the rolling operation.

EXCHANGING EXPERIENCE.—We have already made mention of the fact that the Pennsylvania Railroad Company has imported one of the most improved English compound locomotives for trial with American-built locomotives on its road. We have since seen it stated that an American locomotive is soon to have a chance to show its points on an English road. Possibly the American engine may prove more satisfactory than the English machine has on the Pennsylvania road, although it will have to encounter prejudice which is not likely to yield on short trial. The English compound locomotive is still on its trial and is making a good record. It has been found to make a saving of eight pounds of coal per mile, but the great objection now found is that it is slow in starting. The engine in her trials has hauled some very heavy loads at a fair speed, and when being hard pushed on grades and the like, makes very little smoke, showing the combustion to be much more perfect than upon the other engines of the road. Although the difficulty in starting is a serious objection, the economy in fuel is an important consideration.

TO HANDLE BLOOMS AND BILLETS.—At the Bellaire mill, Pennsylvania, there is now in operation an improved apparatus, devised by O. P. Mason, for facilitating the handling of steel blooms, billets and slabs, in a rolling-mill. The tables by means of which the ingot is led to the rolls have driven rollers on which the ingot lies, and by which it is moved backward and forward as it is passed to and fro through the rolls. A horizontal shaft is arranged on bearings under the rollers, and provided with projecting arms of crescent shape, at right angles to its axis, the arms extending upward between the rollers, and the shaft being operated by a pinion working into a rack actuated by a hydraulic cylinder, the length of the rack being such as to allow the shaft to make one complete revolution. With this construction the ingot, as it lies on the rollers, can be readily moved from one side to the other, the crescent-shaped arms catching the piece on its lower corner and tumbling it over, as the horizontal shaft is put in motion.

IMPROVEMENT IN THE ELECTRIC-WELDING PROCESS.—The ordinary methods of electric-welding by passing the current through the points to be fused together, are not convenient for all purposes, and Professor Samuel Sheldon, of Harvard University, suggests what he believes would be better for many cases. The pole of a powerful magnet strongly attracts or repels the electric arc, which may by this means be driven out sidewise into a point very similar to the point of flame projected from an ordinary blowpipe. At the end of this point the heat is intense, being sufficient to melt large copper wire instantly and to fuse any of the metals. It would serve admirably for welding, and a slight alteration would fit any arc lamp to perform the double function of lighting and welding.

CONVERTING IRON INTO STEEL.—M. Robert of Stenway, France, has patented a rapid mode of converting iron into steel by providing means for maintaining constant relations throughout the whole period of conversion, which is effected by varying the position and volume of the blast. He applies a blast of air to a body of molten metal at a maximum pressure at the beginning of the operation, and after thus overcoming the inertia of the metal and imparting to it the proper speed of gyratory motion, he lowers the level of the blast, without carrying it into the body of the metal, and varies its pressure and volume in accordance with the requirements caused by the reduction in the combustible elements of the iron and the increased fluidity of the metal.

COPPER-STEEL ALLOY.—Schneider & Co. of France have recently taken out a patent for manufacturing steel containing a variable portion of copper, which is to be used in making artillery of large caliber, armor plates, rifle barrels and projectiles. Ordinary copper is used for the purpose, care being taken to prevent it from oxidizing before it is mixed with the steel in the crucible, and the composition contains two to four per cent of copper, the alloy being capable of far more resisting power and more elastic and malleable than simple steel would be. This new material will also probably be valuable for making girders for building purposes and ship plates.

A SOUND FLANGE JOINT.—To make a flange joint that won't leak nor burn out on steam pipes, mix two parts white lead to one part red lead to a stiff putty; spread on the flange evenly, and cut a liner of gauze wire—like mosquito-net wire—and lay on the putty, of course, cutting out the proper holes; then bring the flanges "fair," put in the bolts and turn the nuts on evenly. For a permanent joint this is A 1.

ONE VOLUME of liquid benzine will render 16,000 volumes of air inflammable and 5000 volumes of air highly explosive, but nothing but contact with flame or a white-hot body will touch off the most explosive mixture of petroleum vapor and air.

SCIENTIFIC PROGRESS.

The World Wearing Out

Everybody knows that the world is wearing out, says the Chicago *News*—that the time is coming when we will have no coal to burn in our grates, and no iron to make our grates out of, even had we the coal. A close record of the output of the oil-field discovers the fact that petroleum reservoirs are running dry, and investors have not the faith in the inexhaustible flow of natural gas that the sellers of wells would wish. We know that precious metals are dug out in less quantities than formerly; that the diamond market, in spite of Kimberley, is cornering itself; that mahogany and pine will some day be things of the past, like the buffalo robe and dodo. We are confronted with the fact that the guano deposits will not last forever, that there is a human limit to the production of electricity, and that our children several times removed will have neither quinine, chloroform nor aniline dyes.

Of course this general exhaustion of old earth's treasure-house is some time ahead of us. It will not happen in our day nor in the next century. We can go on burning the candle at both ends for a few hundred years before humanity has to adjust itself to the newer or more economical conditions. But, despite the fact that the time of stress is so far ahead of us that we can look on to it jokingly, it is pleasant to learn that science is getting ready for the rainy day. We are on the eve of a new age and on the threshold of a new civilization. Aluminum, according to nature, is making ready to take the place of steel, and it will be cheaper, lighter, stronger and one-thousand-fold more plentiful and cheap.

Its price now puts the new elements in the debatable land between pure chemistry and practical commerce, and it is a question of time merely when we shall build our houses, our telephones, and our air-ships out of the silvery core of our common clay, instead of heavy and refractory iron.

Heat and food, according to science, we are to gather from the sea in proper fish culture and wise electrical work. The economist brightly believes that we will solve the labor problem before the middle of the twentieth century, and solve it to the satisfaction of both parties.

THE CREATION OR DIFFUSION OF FOGS BY CONCUSSION.—A novel proposal for the dispersion of fogs has been made by a Swiss artillery officer, who has placed upon record his opinion that a phenomenon of this kind recently occurring under his observation was due to a discharge of some pieces of ordnance. This statement has been circulated in France, and has elicited communications upon the atmospheric effects of artillery fire, leading to quite a different conclusion. It has been stated, for instance, that during the siege of Belfort, in the Franco-Prussian war, where an average of 1000 discharges of cannon per hour was registered for many days in succession, firing was frequently suspended on both sides, owing to the dense fogs which settled down upon the field of action. This observation would give ground for the supposition that concussions of the air near the surface of the soil, by interfering with the circulation of air, bring about that congested condition of the atmosphere which is a necessary condition for the production of fogs. This conclusion leads further to the idea that not only the aggregation of houses in towns, preventing the passage of light breezes, determines the production of fogs in such localities, but also that the concussion of air due to the shocks of town traffic may operate in the same way. Further observations are desirable in regard to this matter; but now that the nature and causes of town fogs are so carefully studied with a view to their prevention and cure, it is desirable that every contribution to the elucidation of the subject, however apparently insignificant, should receive its due meed of attention, because if not conclusive in itself it may possibly contain the hint of something that it would be misleading to overlook.

THE HEAT PRODUCING CAPACITY OF THE COMMON AIR.—Speculating upon the heat-producing capacity of the common air, Lorin Blodget, in the journal, *Light, Heat, and Power*, says: "It cannot be unknown to metallurgists, whose works require the highest degrees of heat, that the most perfect melting heat is that of the air-blast upon the incandescent carbon, and as free from actual carbonaceous combustion as possible, the presence of the incandescent surface and the action of a powerful blast being the principal conditions. It cannot be a wholly new principle to assume that the heat is chiefly derived from the burning air-blast. The common air, with its admitted proportions of oxygen and passive or neutral nitrogen, is in reality a compound of oxygen and nitrogen, the gaseous form of heat itself, and which is evolved as heat and converted into sensible heat of the greatest intensity by the blast of air delivered upon a surface of incandescent carbon."

DO LOCOMOTIVES INCREASE THE RAINFALL?—A correspondent of the *Northwestern Railroader* advances a curious theory for the increasing prevalence of floods and rainstorms. He says that there are over 30,000 locomotives in use in North America, and estimates that from them alone over 53 billion cubic yards of vapor are sent into the atmosphere every week, to be returned in the form of rain, or over seven billion cubic yards a day—"quite enough," he says, "to produce a good rainfall" every 24 hours. Estimating the number of other non-condensing engines in use as eight times the number of locomotives, the total vapor thus projected into the air every week in this country amounts to over 470 billion cubic yards. "Is this not," he asks, "sufficient for the floods of terror? Is there any reason to wonder why our storms are so damaging?"

PHENOMENA ATTENDING THE RECENT SEVERE STORM—DAKOTA.—A Minneapolis journal has secured the experiences of residents of Dakota during the recent storms. A gentleman living near Huron is responsible for the following: "The stoves in the houses were so charged with electricity that one could hardly endure the shock that came from contact with them. If you touched your finger to a chandelier, a spark came from it with a crackling noise. Electrical phenomena of a remarkable character were reported on all sides. The air was full of it. A gentleman who lives near Huron told me that a barbed-wire fence on his farm became so charged with electricity that one day when the wire broke, and one end struck the dry grass on the ground, the grass at once took fire. I do not vouch for this, and it hardly seems possible, but it was told to me for fact. A representative of the *Scientific American*, studying the nature of the winds at Huron, and the electrical phenomena which accompanied them, advanced the idea that the atmosphere was so charged with electricity that it only lacked two or three degrees of producing spontaneous combustion. All over the Territory, however near the truth may be, I know that there was enough electricity in the air to help along the fires that were burning there some weeks ago."

SEA BIRDS STILL THE TROUBLED SEAS.—"Oil on troubled waters," says the New York *Tribune*, has proved to be so efficacious in smoothing rough seas that mariners have begun to provide their ships with cans of fish oil and oakum bags, to be used in times of great storms against the buffeting of the waves. Science might have learned lessons from Dame Nature centuries ago and utilized oil for the safety of all men who "go down to the sea in ships." Lieutenant Gibbons of the navy, referring to the use of oil at sea, said a few days ago: "To close observers of sea birds on their own element during bad weather, it must have been shown that, however rough the ocean may be, where there are birds resting on the sea there is scarcely a ripple to disturb them. All fish-eating birds, cape pigeons, petrels, etc., eject oil from the mouth when captured, and doubtless they adopt a similar expedient to aid them in stilling the waves when searching for food in the sea. In the South Atlantic and South Pacific oceans I have frequently witnessed sea birds floating in spaces of seemingly quiet waters when the sea around was rough. The unusual smoothness of the water where the birds floated was evidently induced by the quantities of oil deposited by them upon the water, either voluntarily or involuntarily."

A NAME FOR THE NERVOUS APPREHENSION OF HIGH PLACES.—Among the many curious physical experiments that are now attracting the attention of scientific minds, the one to which the term "acrophobia" has been applied has several points of interest. Dr. Verga has recently described the phenomena in his own case: Though by nature not at all timid, all his courage leaves him when above ground. He complains of palpitations in mounting a step-ladder, for instance; finds it extremely unpleasant to ride on the top of a coach or even look out of a first-story window. This idiosyncrasy forbids him the use of an elevator, and the mere thought of those who have cast themselves down from high places causes tingling all over his person. His acrophobia even goes so far that the thought of the earth spinning through space is enough to cause discomfort.—*Science.*

CURIOUS BELIEF.—Considering the fact that many astronomers are inclined to regard Alcyone, the chief star of the Pleiades, as the center about which the universe revolves, it seems quite curious that many savage and semi-civilized tribes have given this group of stars an extraordinary importance. The peculiar beliefs which they hold concerning it appear to be of great antiquity. It is more than probable that the ancients made much further progress in astronomy and possibly some other sciences than we now give them credit for.

BELLS AS INDICATORS OF MOISTURE.—To inhabitants of Lebbeke, Belgium, the hearing of several small bells four or five miles away is a certain indication of rain. One bell, about six miles distant, is heard twice a year—in March or April and in September or October—and always during the same atmospheric conditions. M. de Ridder finds that not only does moisture favor the transmission of sound, but that contrary winds are not always an obstacle.

IRRIGATION IN EGYPT.—A project is being considered for adding 250,000 acres to the irrigated area in Egypt, the water being taken from a point so high upon the Nile that the canals shall never run dry.

GOOD HEALTH.

The Brain in Sleep.

Sleep is a process of restoration and readjustment, and physicians well know that the healing powers of nature assert themselves most effectually during the entire suppression of volitional control characterizing a deep slumber. In dreams, too, the absence of direct sense impressions and volitional interference seem to favor an automatic function of the brain which, in that respect, might be defined as a method of mental digestion. And just as the process of physical digestion and assimilation eliminates the superfluous elements of food, retaining only those needed for the special purposes of the organism, the brain, during sleep, appears to deal specially with topics of direct concern for the personal interests of the sleeper and to assort and adjust the store of empiric impression (the mental *ingesta*, as it were) after eliminating all unessential and inconsequential elements. Withal, the suspense of conscious cerebration by no means implies an eclipse of the intellectual faculties.

Dreams are not limited to plays of fancy; the brain in slumber may deal with philosophical and abstrusely scientific speculations, or resolve moral doubts which perhaps have puzzled the mind for days, and it is a common experience that the distressing problems of practical life adjust themselves, as it were, in sleep, by a more or less conscious process of the cerebral laboratory In short, there is no doubt that the instinct guarding the welfare of the individual presides over dreams as it presides over the automatic functions of the physical organism. The very suspension of the will-power, with its passions and prejudices, seems, indeed, to enable an inner monitor to decide vexing doubts in accordance with the best permanent interests of the sleeper.

The saving crisis of dangerous diseases which often supervenes in deep slumber may be explained by the circumstance that the complete repose of the volitional faculties enables the organism to concentrate all its energies upon a needed work of repair, and for similar reasons the non-interference of waking prejudices may give the instinct of self-preservation a long-desired chance for removing a baneful delusion as to our best intereat in a proposed mode of action, or as to the true character of designing fellow-men. Something or other in the looks or actions of a marked rascal may have suggested a suspicion of his secret motives, though at the time collateral circumstances observed that misgiving, leaving only a vague, unexplained uneasiness as the direct result of such experiences. But in sleep that impression reasserts itself with a force free from the interference of prejudice, and for a moment removes the mask of false appearances; "the sleeper receives a warning." Similar warnings often correct the impression of false hope. Impending perils may cast a shadow persistently ignored in a waking state, while the mind is calmed by the influence of a self-deluding optimism—the wish that is father to the belief in the insignificance of the threatening danger. But in sleep the voice of the monitor cannot be silenced by such illusions, and warning forebodings often take the form of distinct visions, repeated with a vividness and frequency which at last cannot fail to influence the actions of the individual, in spite of all waking sophisms.—*Dr. Felix L. Oswald.*

THE CURE OF ANGINA PECTORIS, OR BREAST PANG.—Angina pectoris (agony of the chest) carries off many people, the last of whom, according to the newspapers, was the novelist Rev. E. P. Roe, who expired in one day because of its crushing anguish, writes Montrose A. Palmer, M. D., in *Belford's Magazine* for November, 1888. Major-Gen. George B. McClellan (according to the published reports of that time) likewise succumbed after 24 hours of uncontrollable pain. Just how these patients were treated I am unable to say; but Dr. Richardson of London, long before Gen. McClellan's death, had received a prize of 25,000 francs from the Academy of Medicine in Paris, for having discovered an almost infallible remedy for angina pectoris by the administration, in the very small doses, of 1-100 to 1-25 of a grain of nitro-glycerine! This discovery entitles Dr. Richardson to the never-ending gratitude of every suffering man, woman or child, afflicted with angina pectoris. I know a number of persons who always carry tablets of nitro-glycerine with them, and I am equally certain that all these people, by the use of nitro-glycerine, are living in comparative comfort, who would otherwise have fallen under the insupportable torture of that form of heart neuralgia, the most dreadful of all pains.

HEADS UP.—An erect bodily attitude is of vastly more importance to health than most people generally imagine. Crooked bodily positions, maintained for any length of time, are always injurious, whether in the sitting, standing, or lying posture, whether sleeping or waking. To sit with the body leaning forward on the stomach, or to one side, with the heels elevated on a level with the hands, is not only in bad taste, but exceedingly detrimental to health; it cramps the stomach, presses the vital organs, interrupts the free motion of the chest, and enfeebles the functions of the abdominal and thoracic organs, and, in fact, unbalances the whole muscular system. Many children become slightly hump-backed or severely round-shouldered by sleeping with their heads raised on a high pillow. When any person finds it easier to sit, or stand, or walk, or sleep in a crooked position than a straight one, such may be sure his muscular system is deranged, and the more careful he is to preserve an upright position and get straight again the better.

SEVERAL COMMON MISTAKES.—Here is a list made by an exchange, of mistakes which it characterizes as "serious," and into one or more of which the reader will probably find he is in the habit of falling more or less frequently. These mistakes are: To labor when you are not in a fit condition to do so. To think that the more a person eats the healthier and stronger he will become. To go to bed at midnight and rise at daybreak and imagine that every hour taken from sleep is an hour gained. To imagine that if a little work or exercise is good, violent or prolonged exercise is better. To conclude that the smallest room in the house is large enough to sleep in. To eat as if you only had a minute to finish your meal in, or to eat without an appetite, or continue after it has been satisfied, merely to satisfy the taste. To believe that children can do as much work as grown people and that the more hours they study the more they learn. To imagine that whatever remedy causes one to feel immediately better (as alcoholic stimulants) is good for the system, without regard to the after-effects. To take off your proper clothing out of season because you have become heated.

WHY MEATS POISON.—When people are poisoned by eating tinned meats it is not because there was poison in the meat before the can was opened, but because the meat had been allowed to develop the poison of putrefaction after the can was opened. For instance, it was not the tinned salmon that poisoned a family who had eaten it with impunity the first day after it was opened, but it was salmon that was spoiled by 48 hours' exposure to the hot and humid atmosphere. It is very rare that any one is made sick by metallic salts in canned foods. The only metal that may cause poisoning in the case of these foods is lead, and this is not likely to be found in tinned foods. It is, however, possible that poisoning may occur from the solder, but it is highly improbable, from the excellent manner in which the tins are made.

PECULIARITIES OF THE APPETITE.—Wallace says that some of the Pacific islanders will never eat hens' eggs, considering them unfit for food; but they sell them to sailors. The Esquimaux will not eat vegetables, considering it a perverted taste that will indulge in such stuff. The New Guinea natives refuse to eat bread and biscuits, and abhor sugar. On the contrary, such tribes enjoy ants, grasshoppers, monkeys and snakes. Those Malayans that collect edible birds' nests never can be induced to eat of them. African tribes that keep most cattle never taste milk. Salt is where all the world finds kinship, for no nation or tribe but craves it, and needs it. On the whole, we shall have to go back to the old Latin saw for an explanation of such diversities: "There is no accounting for tastes."—*Globe-Democrat.*

USEFUL INFORMATION.

How Carpets are Made and Judged.

"What do you mean by the 'standard?'" asked a reporter of a dealer in carpets.

"Look at this piece of ingrain. You see the threads are interwoven across and lengthwise. Now a thread running across we call a 'pick.' Count the number of 'picks' in an inch. There should be 14. That is the way we make our 'standard.' If there are one, two or three less than 14, you see the carpet is far more loosely woven and less durable, though you wouldn't notice the difference on the surface. An ingrain, you know, consists of several thicknesses or layers of thread woven together—'ply,' as we say—that is, a two-ply carpet is two thicknesses of threads, and a three-ply, three. The three-ply is the carpet of our grandmothers. After having fallen into disuse for many years it is coming again. No, I don't think the rage for the antique has anything to do with it; people are beginning to believe again in its serviceability, that is all.

"So much for the cheaper carpets; the more expensive kinds, the Brussels and the Wiltons, are woven on a rack upon wire running crosswise; the standard is ten to an inch. The wires being drawn, semi-cylindrical tubes of wool are left. This is the surface of the Brussels carpet. The Wiltons differ in this way, that the tubes of wool are woven thicker and higher. The wires here have a knife attachment on the end, and upon being withdrawn by machinery split directly through the top of the tiny tube. A rich and plush-like surface is thus formed. Here you can get effects and delicacy of tints and shades that you can't have in a Brussels carpet. Compare these two pieces," and he threw on the floor, side by side, a Wilton and a Brussels. "Now these are exactly the same pattern. That is evident, made of exactly the same shade and kind of wool. That is not so evident, for it doesn't seem so in the least; their effect is totally different. The plush and velvety surface of the Wilton has a softness, a richness, a delicacy which makes the Brussels look flat beside it. Still you wouldn't notice the difference unless you compare them directly, as we have been doing. This carpet, the Wilton, is thicker and finer and heavier, and handsomer, than the other, but it costs about twice as much. An Axminster? Oh, that is the finest of all."

Concerning Moths.

Regarding moths, says the *Upholstery Trade Review*, many are not aware that the damage done is when the millers commence to fly, as their very presence indicates the absence of the worm. It is to prevent the miller incubating that precautions should be taken. A large proportion of the millers never hatch eggs, but die without causing any harm. The male miller, which does not fly, but runs very rapidly, is quite easily detected by his triangular shaped figure, but, keeping himself out of sight, he is not so easily found. His hiding explains the devious flights of the female in her search. The killing of one male is equal to the extinction of many ordinary millers. The male miller is commonly known by the name of "silver fish."

Carpets are seldom troubled with moth worms except where hatched in a dark, unprotected space, and where it is moderately warm. It is for this reason, no doubt, that carpet-houses are seldom, if ever, troubled by them, the stocks in the larger houses being disposed of between seasons. Nearly all the trouble from moths emanates from the furniture, the burlap inside the outer covering being their best field for work, where they can be free from annoyance and find plenty to eat. Many furniture dealers realize their danger, and cleanse the burlap used with naphtha.

It is when the worms are either tired of their food or it lacks the nourishment that they desire, that they seek an outlet and drop upon the carpet.

Cleansing carpets by the naphtha process is regarded as the surest and most satisfactory, where there is the slightest suspicion of moth eggs or worms. It is especially adapted to pile carpets. Caution should be exercised as to the purity and clearness of the naphtha used and the thorough extraction of the grease, else the dirt adheres more easily than before. Where carpets are to remain in storage some time, the odor can be left in the carpet. A more thorough cleansing can be assured by having the carpet beaten first. A surface application of naphtha will drive the impurities through the article to be absorbed by that which is under it.

HOW TO KILL GOPHERS AND RATS.—A Los Angeles county farmer, says the Chino *Champion*, has discovered that the little beasts of gophers love celery, and that putting poison on this vegetable and placing it in their way is a sure method of killing them. Asa Kimble of Chino says the poison should be put on what they are eating at the time; that is, if they are eating potatoes, put it on them; if trees, put it on the place eaten, and so on with any root, tree or vine they are destroying. An irresistible bait for rats is alluded to by the Washington correspondent of the Cincinnati *Commercial Gazette* as follows: An interesting, not to say valuable, discovery has been made by Capt. Weedin, in charge of the animals at the Zoo. The building is infested by rats, and how to get rid of them has long been a perplexing question. Traps were used, but nothing would tempt the rodents to enter. In a storeroom drawer was placed a quantity of sunflower seeds, used as a food for some of the birds. Into this drawer the rats gnawed their way, a fact which led the captain to experiment with them for bait in the traps. The result was that the rats can't be kept out. A trap which appears crowded with 6 or 8 rats is found some mornings to hold 15.

AGAINST FACTORY WHISTLES.—A movement is on foot in New Haven, Conn., to have the Common Council pass an ordinance prohibiting the blowing of factory whistles within the city limits. The *Register*, speaking of the custom of factory whistle blowing, says: "There is no doubt that they are a source of great annoyance to people who are nervous, who may be ill or troubled with insomnia. In fact, steam whistles and the crowing of roosters is a matter of almost daily complaint which physicians have to listen to. The custom of blowing the whistles probably came from the fact that, years ago, when only the wealthy people were able to own watches, the poorer classes needed something to remind them that the hour for commencing or quitting work had arrived. In these days, however, it is not thought that the average day laborer needs to be prompted about such things, for if he does not wear a gold hunting-case watch, he at least has a Waterbury, which answers all purposes."

A RIVAL TO PETROLEUM.—It seems that there is a future in store for cocoa-nut oil as a lubricant, and it has been found equally serviceable for lighting purposes. A Frenchman in the island of Cuba has just established a factory for the manufacture of this oil. He has imported the most perfect machinery, in order that the oil produced shall be as pure as possible. It is said to be very fluid, to oxidize slowly, and to keep long without turning rancid.

RECIPE FOR AXLE GREASE.—An excellent home-made axle grease is said to be made of two parts tallow, two parts castor oil, and one part of pulverized black lead.

ELECTRICITY.

Electric Motors in Factories.

A late novelty in the application of electric motors to the movement of machinery, says the *Railway Review*, is found in the new factory of an electric motor company in New York City. Each machine is run by a separate motor, thus doing away with a line of shafting and all the belts running to it. The vibration is very much reduced, and the machine shop is far less noisy than the average. A dynamo in the basement furnishes electricity.

Mechanics have for some time used electric motors to run machinery so placed as to make it difficult to get power from a line of shafting or to run machines which travel within given limits, such as transfer tables, traveling cranes, etc. In such cases the use of electricity is especially valuable.

In the equipment of a new shop, electricity thus applied also possesses advantages. The amount of power required to drive a main line of shafting, belts and loose pulleys on the counter-shafts is considerable, and when but a few machines are in operation the power expended at the machines forms but a small portion of the whole. By this arrangement of motors, however, the power furnished is used with but little loss in transmission, and when a machine is not in use, no power is expended in keeping in motion shafting and belting used in transmitting power to it. The motors should run at a given speed with but a small percentage of variation. The possibility of adjusting the speed of the motor to suit special cases and still have a uniform motion, is an advantage which in some classes of work will prove valuable. The results of this application will be watched with interest, and, if successful, may be the means of a much wider application of electricity in machine shops.

CONSTRICTION REMOVED BY ELECTRICITY.—Dr. Dujardin-Beaumetz brought before the French Academy of Medicine on the 13th of March a patient cured of constriction of the œsophagus by the use of electricity. The patient, who came from Nievre, arrived in Paris on Feb. 16th. The œsophagus did not measure more than five millimetres in diameter, and only allowed with difficulty the passage of a few drops of soup. The patient now eats all kinds of food, he has gained 10 pounds in weight, and the œsophagus now measures 14 centimetres in diameter. This is the first instance of the application of electrolysis to the cure of constriction of the œsophagus. We have already, in these columns, recorded the fact of the removal of a needle from the flesh of a patient, which had eluded the search of the surgeon's knife. Another similar case has since been announced by the Hartford *Courant*, as follows: The last patient at the electrical surgery, otherwise known as the Hartford Electric Light Station, was a little girl, from whose foot a broken needle was extracted last evening. She got it in her foot seven weeks ago, and at the time an incision a quarter of an inch deep was made without finding it. Under the influence of the big magnet it came out easily. The piece was about three-quarters of an inch long.

A NOVEL SYSTEM OF ELECTRIC-POWER.—*Practical Electricity* says that a novel system of electric-power is to be installed by the Sprague Electric Railway and Motor Company of New York, in a New Hampshire cotton-mill. A bank of three wheels is geared to a jack shaft, and next to the third wheel, on a large pulley fastened to the jack shaft, and between the pulley and the second wheel is placed a coupling. From the pulley belt on to a short counter is carried a friction clutch pulley belted to a dynamo. When it is desired to operate a motor or to start lights in the mill anywhere, it is only necessary to throw the clutch into action. If lights and motor-power are wanted when the mill is not in operation, the single wheel on the jack shaft is employed by starting the one wheel. This one wheel also drives fire pumps, runs elevators in a storage-house several hundred feet from the main building, and operates a tramway. From the one dynamo these, or any other motors located in the vicinity, can be operated.

WHERE WILL IT END?—One of the most suggestive facts connected with the development of electric-power transmission, says *Electric Power*, is the continual growth of the field to which it seems adapted. Steam has been with us so long that all know its wonderful power, even though they may not comprehend the various devices by which it is applied to useful work. The peculiar properties of electricity, however, its generation at the dynamo, its instantaneous transmission to distant points over a solid conductor, without any visible manifestation of motion, all tend to raise a doubt as to its perfect control. The duty which it has been called upon to perform, for intercommunication, and the supply of artificial light, is but a hint at its unfathomable future. We write of it to-day as the most economical and satisfactory agent for the transmission of energy. Those who ridicule its claims may live to see it take its place but a single step from the very fountain-head of energy itself.

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TABLE OF CONTENTS.

EDITORIALS.—The Jenisch and Loehnert Ball-Mill, 473. Passing Events; Close of the Volume; Reservoir Dams; Silver Facts and Figures; Mining in Japan, 480. Day's Well-Boring Apparatus; Two Notable Dams, 481.

ILLUSTRATIONS.—Sectional Views of the Jenisch and Loehnert Ball-Mill, 473. The Yaupon, 475. Day's Well-Boring Apparatus; The Vyrnwy Dam and Waste Weir; The Furens—The Highest Masonry Dam, 481.

CORRESPONDENCE.—Ione Valley; Good Pumping Work, 474.

MISCELLANEOUS.—Important Mining Discovery; Improved Treatment of Chrome Ore; The Lakes of the San Joaquin Valley, 474. Gold-Extraction To-Day; A Native Medicinal Tree, 475.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 476-7.

MECHANICAL PROGRESS.—Some Valuable Information About How Iron Rusts; The Future of Metallurgy in This Country; A Remarkable Metal-Rolling Machine; Increasing the Density of Steel; Exchanging Experience; To Handle Blooms and Billets; Improvement in the Electric-Welding Process; Converting Iron Into Steel; Copper-Steel Alloy; A Sound Flange Joint, 478.

SCIENTIFIC PROGRESS.—The World Wearing Out; The Creation or Diffusion of Fogs by Concussion; The Best-Producing Capacity of the Common Air; Do Locomotives Increase the Rainfall; Phenomena Attending the Recent Storm—Dakota; Sea Birds Still the Troubled Seas; A Name for the Nervous Apprehension of High Places; Curious Belief, Bells as Indicators of Moisture; Irrigation in Egypt, 470.

GOOD HEALTH.—The Brain in Sleep; The Cure of Angina Pectoris or Breast Pang; Heads Up; Several Common Mistakes; Why Meats Poison; Peculiarities of Appetite, 479.

USEFUL INFORMATION.—How Carpets are Made and Judged; Concerning Moths; How to Kill Gophers and Rats; Against Factory Whistles; A Rival to Petroleum; Recipe for Axle Grease, 479.

ELECTRICITY.—Electric Motors in Factories; Constriction Removed by Electricity; A Novel System of Electric-Power; Where Will It End, 479.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 488.

Business Announcements.

[NEW THIS ISSUE.]

Dividend Notice—German Savings and Loan Society.
Assessment Notice—Gray Eagle Mining Co.
Dividend Notice—S. F. Savings Union.

☞ *See Advertising Columns.*

Passing Events.

It is stated that Secretary Windom will give early attention to the complaints of the miners against the free importation of lead ores carrying silver. The ruling has operated to the great advantage of a few large smelting works, but greatly to the injury of miners. The importation of lead ores in this way should have been stopped long since, but it was only this year that the miners made a concerted effort.

Some attention is being paid to reservoir dams in California, and some very foolish things are being said of the dangers connected with them. The dams here are thoroughly examined at stated intervals, and some of them have been standing for 30 years and upward.

While little is being done in the Lower California placers, the quartz mines seem to be doing very well with promise of good pay in the future, when properly developed.

This number of the PRESS marks the close of a volume, and it is proper to say that this is a good time to renew subscriptions.

Close of the Volume.

Volume LVIII of the MINING AND SCIENTIFIC PRESS closes with this number. On the last page is a very complete index not only of general articles, but of all Pacific Coast patents and local incorporations. A casual glance at this will show how wide a range of subjects has been covered in the last six months, and how fully the branches of industry the paper represents have been treated.

The PRESS is the oldest mining paper in the United States, and for almost the entire period of its existence has been conducted by its present publishers. They may, therefore, claim some considerable experience in publishing a paper devoted to the mining industry. Of late the number and size of the illustrations have been increased, and the paper has had additional pages. This has been necessary owing to increased advertising patronage and a desire to give more space for reading-matter.

The mining field of this coast is now much more fully developed than formerly and covers a much wider area. Regions which formerly had but few scattered camps have now become settled up with towns and a larger population and the mining industry has advanced proportionately. In all these mining towns and camps the PRESS is a visitor. We endeavor to collect what information will be of interest to miner, mechanic and industrial classes; such things as will assist them in their business in the way of methods, processes, systems or machinery, it is our purpose to illustrate and describe. The current mining news is presented in a condensed form, gathered from all quarters. The other special departments are carefully compiled so as to give the greatest information in the least space.

We shall be pleased to have those who have long been readers of the PRESS call the attention of new-comers to the merits of the paper in order that they in turn may become subscribers. The larger our list the better the position in which we shall be placed in the way of improvements.

Reservoir Dams.

One of the daily papers of this city has published an article on the reservoir dams of California, in which some very foolish statements are made. The article is calculated to arouse apprehension among those not conversant with the facts, and also do an injustice to the owners of the dams themselves. There are some very large reservoir dams in the mountain counties, but they are watched day and night and telephonic and telegraphic communication is provided for emergencies. Only one of these large dams in California has ever broken, and that was weakened by dynamite, applied by enemies of the owner.

The article referred to draws an imaginary picture of the damage to be done by the breakage of these dams, in which it is shown that Marysville, Sacramento, the great valley and many small towns would be wiped out or damaged. A little trouble would have shown that this is purely imaginary. The second largest one in the State did break, and no one in Marysville or Sacramento was damaged five cents' worth. The people hardly knew of the occurrence.

In the MINING AND SCIENTIFIC PRESS of last week we gave detailed facts of the breakage of this dam. The experience was valuable in this: that it exactly disproved what the article in the daily paper referred to tries to prove. At no other place in the world has opportunity offered to measure the hight of the wave and the speed of the body of water suddenly released. But here this opportunity was given, and we have published the facts. The result showed much less damage than might have been expected. In the narrow canyons in the immediate vicinity of a dam, damage would be done. But the valleys and cities by the river-side would experience no ill effects. This experience proves.

These "standing menaces to the State," as these dams are called, are not at all standing menaces. A few months since these same papers were urging the Government to build reservoirs to store water for arid lands, while now they hold up as dangerous dams which have stood for years.

Those interested should read the facts presented in the PRESS of last week, where the progress of the wave from the burst reservoir is described and details of its decreasing hight and speed are given during its travels from Sierra county to the Golden Gate.

Silver Facts and Figures.

NUMBER I.

The position of the agricultural societies in the United Kingdom and of State Granges in the United States in favor of remonetizing silver is forcing that question to the front, which promises in the near future to overshadow other political issues, unless the European nations and this country grapple with it and bring about bimetallism. At the last session of the Oregon State Grange, representative farmers belonging to that Order took advanced views on the silver problem, and with no uncertain sound pronounced in favor of free coinage of silver by the mints in this country. This the farmers are forced to, outside of a more liberal supply of metallic currency, so as to raise the price of silver bullion by which the unjust competition of India and Russia farmers in the world's demand markets for wheat, etc., can be brought to a stand. The lower the price of silver the cheaper can Indian and Russian wheat be landed in England, Germany and France; and, on the other hand, the higher the price of silver the more it costs to deliver the above wheat in the European demand markets. It is asserted by monometallists in this country that to have free coinage for silver will make this country the dumping-ground for European silver. This is the special and plausible plea of the "gold-bugs," who, by making silver and all securities based on its price speculative, can turn many pennies in the course of a year into their already overflowing coffers. That this reasoning is fallacious does not admit of a doubt. The United States has grown in population and wealth, taking the two as a whole, ranking any civilized nation in the world, and therefore any advanced step taken by this country on the silver question will not only command attention, but bring about a new order of things. It is safe to assert, and without the fear of successful contradiction, that the United States mints alone can be thrown open to silver without drawing upon the silver from other nations. By free coinage the coinage value of silver would be instantly and permanently re-established for silver bullion. Basing our assertion on the history of the past, it is reasonable to claim that within 48 hours after promulgating the fact of free coinage of silver being re-established by the United States, not an ounce of silver bullion could be bought in any trade center of the world below the coinage rate, less the expenses for transportation and attending charges. That announcement would be a notification to the world that silver bullion of our standard of fineness is a cash sale at 60⅞ to 61d instead of about 42d, the present market price in London. Of course no holder of silver would sell it for less as long as the Mint and Government of the United States was solvent. Besides this, the Latin nations of Europe would soon fall into line and re-establish free coinage of silver. France would only be too pleased to successfully adopt such a course so as to get even with Germany, which demonetized silver to get a financial stab at that country.

In the 13 years preceding 1872, when there was no silver discount in any quarter of the globe, India imported 1,309,867,000 rupees worth of silver bullion, or $314,358,080 worth, and in the 13 years following 1872 India imported 931,997,000 rupees worth, or $223,672,280 worth of silver bullion. In the 13 years of exchange parity between the two hemispheres, and in a period of about half as long of silver yield, India imported 41 per cent more silver in the 13 years of an exchange disparity averaging about 30 to 37 per cent and in a period of nearly double the yield of silver by the mines. Yet there is no man who will deny that silver bullion is salable and exchangeable in India at the full value of 1872 and before, and at a rate of about one-fifteenth higher than our coinage parity.

These are incontrovertible facts which go to prove that the stock of silver of all forms in the Western Hemisphere is reduced to a quantity more than $2,000,000,000 less than in 1851, and about $1,200,000,000 less than in 1873, when the bullion value of a silver dollar at our present coinage par was $1.03 gold. The production of the silver mines of the world from 1850 to 1886 amounted to $2,303,125,000. The silver coined by the nations of Europe and the United States alone from 1850 to 1886 amounted to $1,801,487,760. The silver coinage of India in that period amounted to $1,110,000,000. The coinage of Mexico during the like time amounted to $750,000,000. Other nations, which in 1886 and 1885 each coined silver to the amount of $21,000,000 a year, are not included in the above general footings. The aggregate coinage of 14 nations from 1851 to 1886 amounted to $3,661,487,000. The imports of silver by India from 1850 to 1886 amounted to $1,399,000,000. The coinage of the United States and Europe alone from 1851 to 1886 consumed all the world's product of silver in that period save $504,513,000, but in that same length of time East India absorbed $1,399,000,000, leaving a net abstraction from the supply of bullion of $886,000,000. Including the Mexican coinage in this, that mintage being largely for the Chinese trade, the net abstraction in these two channels alone from the bullion supply of the Western Hemisphere in 36 years is $1,636,000,000 worth.

Mining in Japan.

The Pelton Water-Wheel Co. report an order from the Japanese Government for one of their water-wheeel hoists, similar to two recently constructed by this company for Messrs. Hayward & Hobart for their mines in Amador county.

These hoists are operated by double reversible-wheels with three streams applied to each. The nozzles have separate gates controlled by levers brought to a central station, giving perfect control of all movements, and admitting of such variations of speed and power as may be desired. In this way only the water required to move the load is used, affording great economy of water, at the same time giving ample power for any emergency. They are to operate a double-compartment shaft, with capacity to work to a depth of 2000 feet, and to be equipped with every known appliance for safety.

The Japanese are a progressive people, quick to adopt the most improved mining appliances that experiment has proved of value in this country, the above order being the result of investigation made by Government engineers sent here a few months ago to examine into modern methods of mining on this coast.

SUTRO TUNNEL ROYALTY.—The Sutro Tunnel Co. will collect above $300,000 in royalty on Comstock ore the current year. This will exceed by above $50,000 the revenue of the company from that source during any single year since the completion of the tunnel. The expenses of the company will probably not exceed $50,000 annually. The cost of extending the tunnel one mile west of its present terminus, which will bring it under the peak of Mount Davidson, will not exceed $200,000.

THE bullion yield of the Con. California and Virginia mine the current month will exceed that of May over $30,000, provided the assay value of ore extracted does not fall below the average of that so far produced on June account. The assays so far this month average nearly $3 per ton higher than last month. It requires a gross bullion yield of nearly $330,000 to cover operating expenses and a 50-cent dividend.

THE Copper Queen Co. at Bisbee, Arizona, has another smelter ready for firing up by the first of next month. It will have a capacity of 100 tons per day. The company has now in operation four smelters, one of 100 tons and three of 30 tons each, and the addition of the new one will make the total capacity 290 tons per 24 hours, or in round figures 212,000,000 pounds per year.

G. F. SCHILD of Vallejo, who patented the floating caisson for closing the mouth of the big stone dock at Mare island, has obtained judgment against the Government for infringement. An assessment of damages will be made.

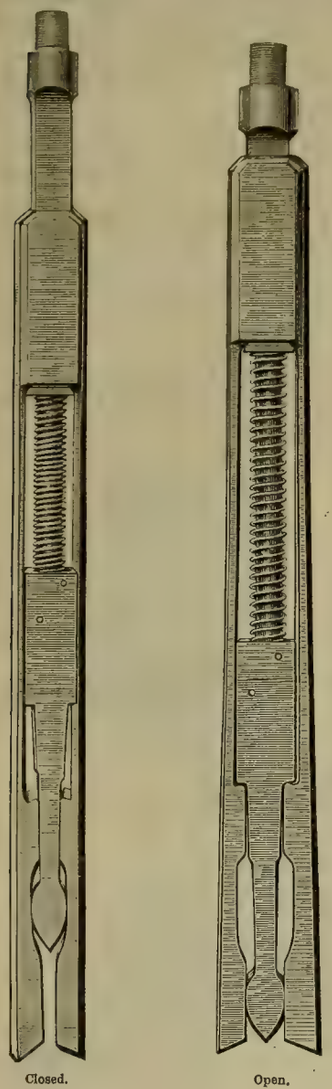
VANADIUM.—A sample of copper ore containing vanadium, from Wolverine district, Nev., analyzed in San Francisco, shows less than two per cent of that valuable metal.

SECRETARY TRACY has decided to grant an extension in the time for the completion of the Charleston by the Union Iron Works.

Day's Well-Boring Apparatus.

Engravings on this page show Day's patent reamer, which is employed for drilling in rock or hard material. The drills or cutting tools have their cutting edges beveled outward, as shown. The shanks of these tools are made of considerable thickness for a short distance above the cutting points, and at one point is formed an offset or shoulder from which the remainder of the shank extends upwardly in the form of a comparatively thin plate, which is sufficiently elastic to allow the lower parts or cutters to open and close as much as may be necessary for the work.

The upper ends are thickened or enlarged. The rods from the surface down come inside the casing. They pass between the two sides of the drill-shanks, and, extending downwardly between the elastic portions, the lower end of the rod is fitted into the upper end of the block



Closed. Open.

DAY'S WELL-BORING APPARATUS.

and is held in place by boring holes through the block, which go one-half into each side of the rod, and placing bolts or rivets therein.

Below the shoulders a spear-point is formed, and the thickened extensions between the drill-points and shoulders are grooved or chambered out, as shown, sufficient to receive the spear-head and inclose it between the sides of the concavities.

The operation is as follows: The spear-head is drawn up until it lies between the concavities of the drill-shanks, the springs being compressed by this action, and the shanks of the drills are drawn in or contracted sufficiently to pass easily down the well-tube or casing. As soon as the lower ends of the drills have passed out of the casing and pass into the hole already drilled, the spring raises the drill-shanks and spreads them to the required diameter.

The drills are thus spread apart, so as to be of greater diameter than the exterior of the casing. The drill-rods are then lifted up and allowed to fall, the weight acting upon the drill-points and cutting away the bottom in the usual way, giving a diameter large enough to allow the casing to pass down freely. The shoulders on the block come in contact with the shoulders on the cutting tool, which are very near to the points of the drills, so that only the very thick metal intervenes between the points of the drills and the shoulders.

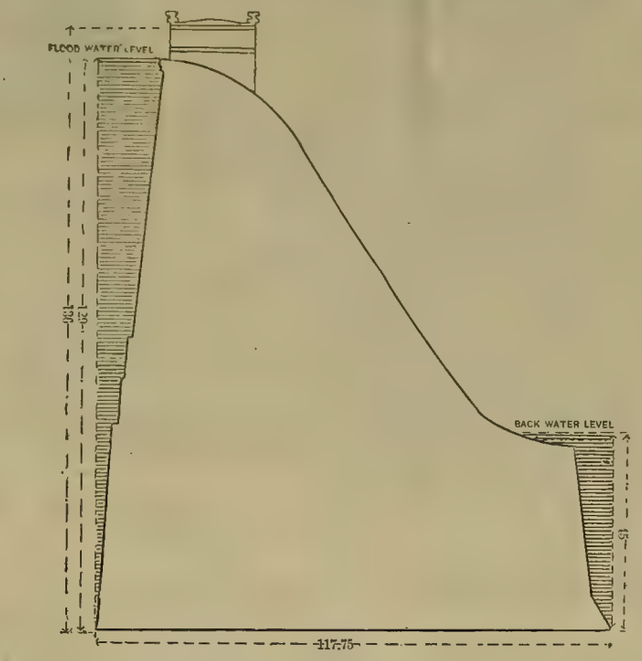
It will be seen that the blows applied through the shoulders at this point act more directly upon the points of the drills than if they were applied at the upper ends, and by this construction the jar and strain is taken off from the thin elastic portions of the drill-shanks.

When it is necessary to withdraw the drills from the well, by drawing up the rods, the friction of the drill-shanks on the casing is sufficient to compress the spring until the spear-head is again brought into the concavities, when the shanks will close up sufficiently to allow the drills to be drawn up through the well-tube or casing again. The patent for this device was recently obtained through the MINING AND SCIENTIFIC PRESS Patent Agency by J. E. Day and a half-interest has been assigned to Joseph Pracy of this city. Any further information concerning it may be obtained by addressing the inventor, No. 109 Mission street.

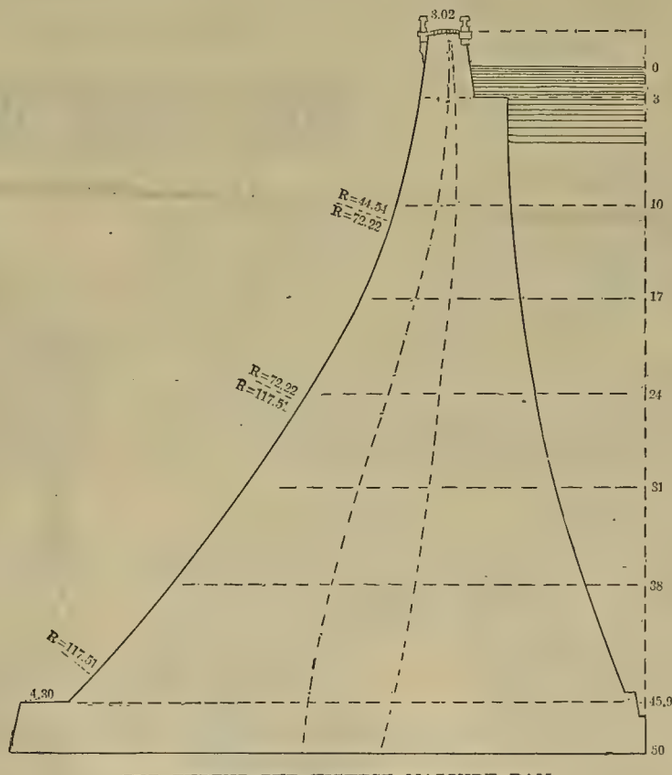
Two Notable Dams.

Now that the subject of reservoir dams is attracting attention, it will be of interest to learn some facts connected with the Furens and Vyrnwy dams; one, the highest masonry dam, and the other, a more modern form designed to allow the water to pass over it in case of sudden floods.

The Furens dam, a section of which is shown herewith, was completed in 1868 in the valley of the Furens river, France, in order to protect the town of Saint Etienne from inundations. The greatest depth of water in the reservoir is 164 feet, the total storage capacity being 422,625,000 gallons. The inlet from the reservoir consists of two cast-iron pipes passing through a lateral tunnel. In constructing a dam exceeding in hight any then existing, the engineers took every precaution for strength. As the gorge to be closed was very narrow, the dam was made curvilinear, the radius being 328 38 feet. This is the first French dam that was made curvilinear in form. The profile was based on the type of M. Delocre. The greatest hight of the dam above foundation is 187.72 feet on the down-stream side, but up-stream it is only 170.6 feet. Great pains were taken in all details of construction. Before excavating foundation a new permanent channel was made for the river, and two lateral tunnels were excavated for outlet pipes. By these means and a coffer-dam the foundation was kept perfectly dry.



THE VYRNWY DAM AND WASTE WEIR.



THE FURENS—THE HIGHEST MASONRY DAM.

All loose or seamy portions of the foundation rock were removed, and where the surface of the rock was smooth, it was roughened. The whole wall, including the facing, was built of rubble masonry, the last stones being selected for the faces. The stones varied in size from two to seven cubic feet. The masonry was carried up about five feet high at a time over the whole wall, in order to prevent unequal settling. Cut stones were placed in the front face in quincunx order.

The thickness of the dam at highest level where water is stored (146 feet) is 20.9 feet. Above this there is a guard-wall, and on top are two parapets.

The Furens dam is the highest reservoir-wall of the present time, and "the first masonry dam which has been built in accordance with correct scientific principles." Its construction was in every respect a perfect success.

The Vyrnwy dam was commenced in 1882, and forms the large storage reservoir on the Vyrnwy river for the water-supply of Liverpool. It is 1350 feet long on top, the plan being straight. Its maximum hight above foundation is 136 feet. The profile adopted (as the cut shows) differs from all others in not being designed simply to resist the water pressure, but also to form a waste weir. The front face of the wall is made, therefore, to conform to the curve described by the water in overflowing and to deflect it into the basin in front of the dam. This dam is built of Cyclopean rubble, and the blocks are shaped roughly in the quarry. So many large dams have been destroyed by an overflow, that this newest one was designed to obviate danger from that source. The cuts and description we take from the recently published valuable work on "Masonry Dams" by E. Wegmann, published by John Wiley & Son.

MECHANICS' FAIR.—Two new boilers will replace the old ones at the Mechanics' Institute Fair building. Director Dow of the Committee on Power and Machinery reported in favor of accepting the bid of the Union Iron Works. The successful bidders will erect two separate boilers, of the latest improved make, for $6250, the two to have a combined capacity of 350-horse power. The new boilers will be in place and ready for work on the opening of the next fair, on August 27th. William Cameron, the agent for the exposition, states that the preparations for the fair are progressing in a most satisfactory manner. The display of machinery will be much larger than ever before. Already over 140 applications have been made for space on the floor of the pavilion, which will cover more than 60,000 square feet of room.

IRON AND STEEL MILLS.—A dispatch from Baltimore says: A syndicate of leading English iron and steel men have made heavy purchases of mineral lands near Cumberland Gap, on the line between Kentucky and Tennessee. A new town will be built under the name of Middlesborough, Ky., where immense steel and iron mills will be erected. It is to be known as the American Association (Limited). Over $4,000,000 in cash has already been paid out, and upward of 60,000 acres of mineral land purchased. Over $7,000,000 more is pledged for the new enterprise.

THE OIL STEAMER W. L. Hardinson was burned at the wharf at Ventura on Tuesday; loss, $8000. This steamer was constructed with tanks for transporting oil in bulk to San Francisco from Southern California ports. The vessel belonged to the Mission Transfer Co.

THE United States Mint at Carson City, Nev., will resume coinage operations on the 1st of July, after a suspension of four years. Up to April 1, 1885, the mint had coined a total of $35,735.813, including $16,596,845 in gold and the remainder in silver.

THE AMERICAN PHARMACEUTICAL ASSOCIATION is in session in this city. Several hundred delegates have come from the East. The papers read at the meetings will be published in the journal of the association.

ASSESSMENT NOTICE.

Gray Eagle Mining Company.—Location of principal place of business, San Francisco, California.

Location of works, Placer County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 15th day of May, 1889, an assessment, No. 13, of Five Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, 327 Pine St., Room 9, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of June, 1889, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 16th day of July, 1889, to pay the delinquent assessment, together with the costs of advertising and expenses of sale, By order of the Board of Directors.

O. H. BOGART, Secretary.

OFFICE—327 Pine St., Room 9, San Francisco, California.

POSTPONEMENT.

The delinquent day of above assessment has been postponed until Tuesday, the 2d day of July, and the day of sale until Tuesday, the 23d day of July, 1889. By order of the Board of Directors.

O. H. BOGART, Secretary.

DIVIDEND NOTICE.

THE GERMAN SAVINGS & LOAN SOCIETY

526 California Street.

For the half year ending June 30, 1889, a dividend has been declared at the rate of five and one-tenth (5 1-10) per cent per annum on Term Deposits, and four and one-quarter (4¼) per cent per annum on Ordinary Deposits. Payable on and after Monday, July 1, 1889.

GEO. TOURNY, Secretary.

SAN FRANCISCO SAVINGS UNION,

532 California St., Cor. Webb.

Branch, 1700 Market St., Cor. Polk.

For the half year ending with the 30 h of June, 1889, a dividend has been declared at the rate of five and one-tenth (5 1-10) per cent per annum on term deposits, and four and one-quarter (4¼) per cent per annum on ordinary deposits, free of taxes, payable on and after Monday, July 1, 1889. LOVELL WHITE, Cashier.

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THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at $1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No 1, 32 ft.; No. 2, 9½ ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Leller, Superintendent. Divided into 300,000 shares at $1 each. Property comprises two locations. Ore assays $7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

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Smith & Drew took out Tuesday, in their dry wash diggings, in addition to 5 ozs. of fine gold, a nugget weighing 22 ozs. The machine used was Freeman's Dry Process Separator.—*Utah Daily Union, May 10, 1889.*

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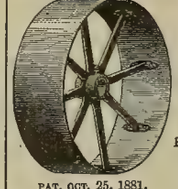

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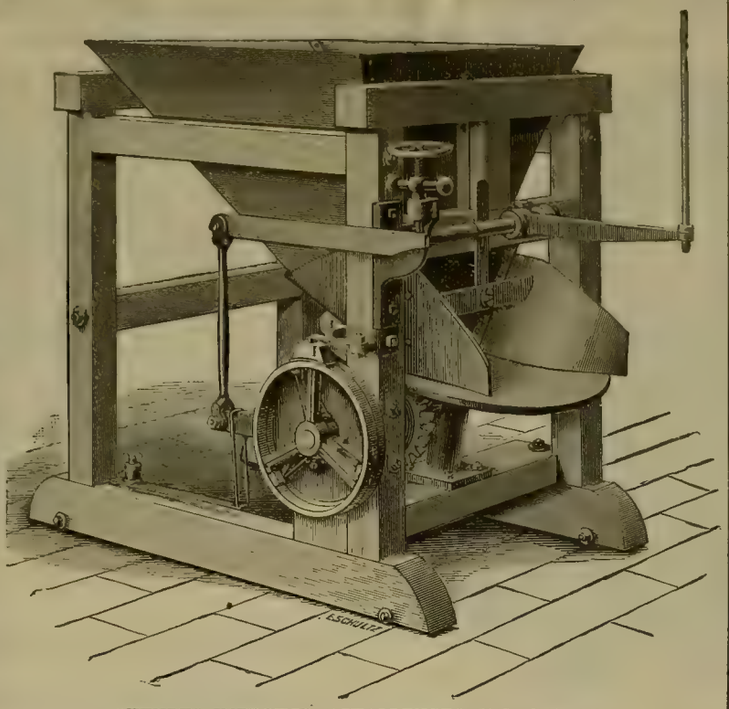

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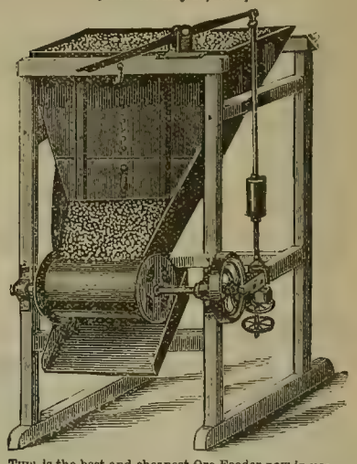
[Patented May 28, 1882.]



THIS is the best and cheapest Ore Feeder now in use.
It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.
In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.
Golden State and Miners' Iron Works,
Sole Manufacturers,
227 First Street, San Francisco, Cal.

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AIR COMPRESSORS
For Working
Rock Drills, Coal Cutters, Hoisting Engines and Water Pumps in Mines and Tunnels, Sinking Caissons, Etc., Etc.
SEND FOR CATALOGUE No. 6.
Clayton Air Compressor Works,
43 DEY ST., NEW YORK.

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Ores, Mining, and Commission,
420 Montgomery St., S. F.
Ships under advances to smelting works in Boston, New York, Baltimore and Liverpool.
Twenty-one years' experience in Shipping Ores and Managing Mines.
Solicits Consignments of Copper Produce and Management of Mining Matters.
All business conducted on Cash Basis.
Purchase and shipment of Mining Supplies A SPECIALTY.
Sales of Developed Copper Mines undertaken.
Business Manager of UNION COPPER MINE, Copperopolis, Cal.; NEWTON COPPER MINE, Amador Co., Cal.

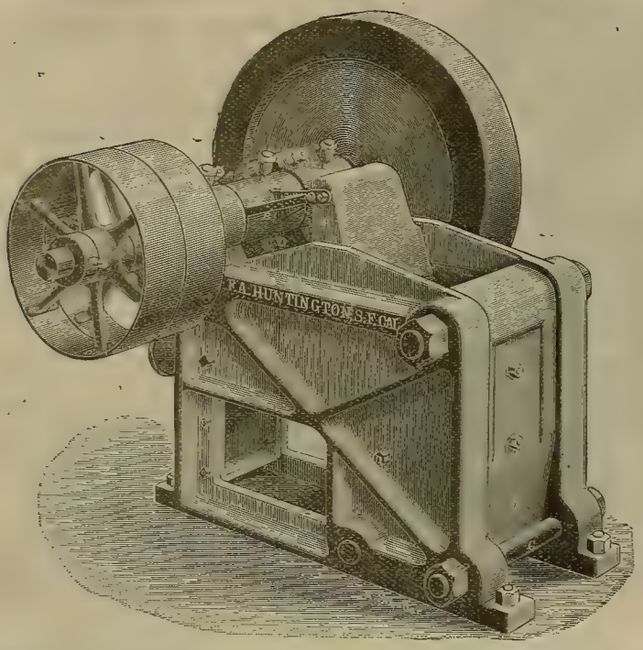
Engraving Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.

F. A. HUNTINGTON,

MANUFACTURER AND DEALER IN

STEAM ENGINES AND MINING MACHINERY OF EVERY DESCRIPTION.

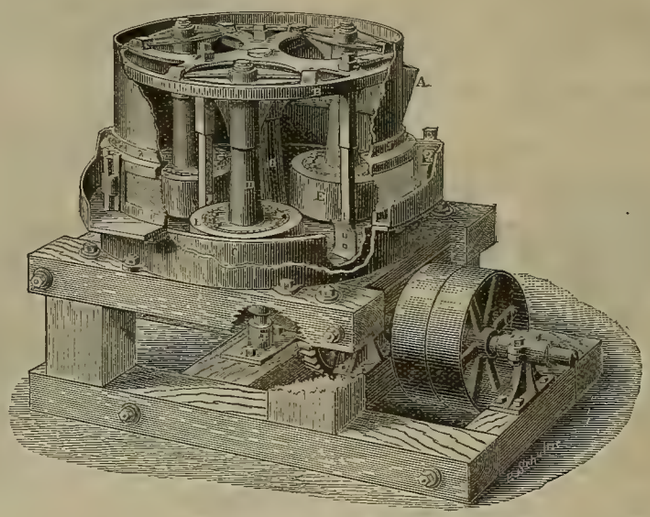
PRINCIPAL OFFICE, 45 FREMONT STREET, SAN FRANCISCO.



Huntington's Improved Rock-Breaker.

The main features of this machine are strength, ease of adjustment and simplicity of construction.

The movable jaw *A* is worked by the eccentric *B* and is pivoted at the bottom. The stationary jaw *D* is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt *C*. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt *C* and the jaw *D*. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



F. A. HUNTINGTON'S
Centrifugal Roller Quartz Mill.

The following will explain the above cut:

The ore and water being fed into the mill at the hopper *A*, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

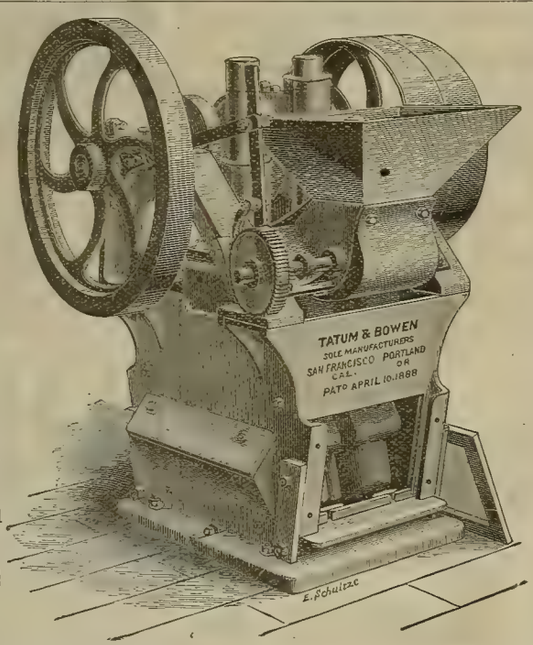
The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet crushing and gold saving it has no equal.

I claim especial merit in that feature of this system *which prevents* ALL FLOURING of gold and quicksilver, and the consequent loss of gold that attends stamp milling.

For the economical working of ore that contains sulphurets, I particularly claim the adaption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.

—THE—

PERFECTED DOUBLE Economic Quartz Mill.



Attached to each Mill is an effective

Automatic Ore Feeder.

THE CRUSHING is done by the rapid rocking movement in OPPOSITE DIRECTIONS of two heavy castings, the bottoms of which are slightly circular in form, and each provided with four shoes.

The Mill is a closer Gold-Saver and catches a larger percentage of the Clean-up in the Battery than any other Mill.

It costs less, in proportion to what it will do, than any other mill. There are no working parts to buy for it, no matter how long it is used, except shoes and dies. Capacity of Mill, 6 to 10 tons per day. Weight of Mill, complete, 6400 pounds.

We manufacture, to go with the Mill, an

IMPROVED ROCK BREAKER.

Power required for Mill and Rock Breaker, 6 H. P. SEND FOR CIRCULAR. Address:

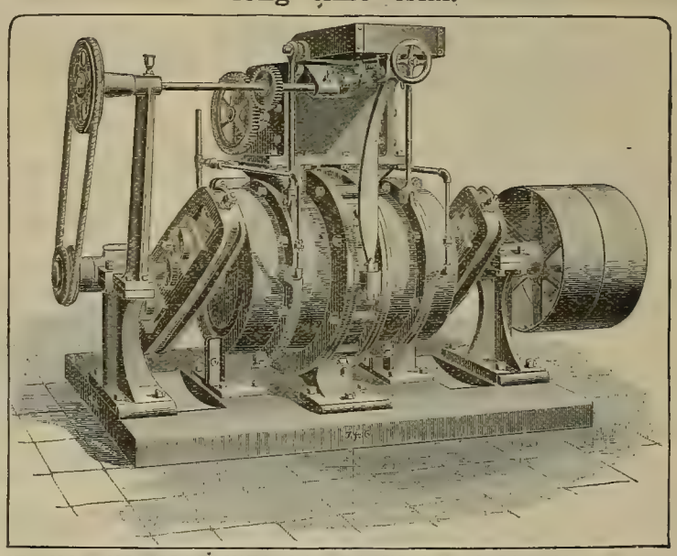
TATUM & BOWEN,

34 and 36 FREMONT ST., SAN FRANCISCO, CAL.,
AND PORTLAND, OREGON.

MANUFACTURERS OF MINING AND SAW MILL MACHINERY.

FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; has been thoroughly tested; we guarantee its work as represented, and we will give long time trial.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

FRISBEE-LUCOP MILL COMPANY.

GIDEON FRISBEE, Manager, - - - 59 & 61 First Street, San Francisco
HOOKER & LAWRENCE, Gen'l Ag'ts, 145 Broadway, New York.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING JUNE 18, 1889.

405,337. — AMALGAMATOR — Jos. Behm, West Point, Cal.

405,393. — MACHINE FOR AFFIXING POSTAGE STAMPS — L. J. Bone, S. F.

405,532. — ADVERTISING — J. A. Christy, Los Angeles, Cal.

405,537. — STAPLE-DRIVER — E. M. Dean, Alta, Cal.

405,253. — VEGETABLE COOKER — F. W. & E. Gaines, Colfax, W. T.

405,358. — SUPPORT FOR BEAMS OR GIRDERS — P. H. Jackson, S. F.

405,512. — SASH HOLDER — R. P. Waddell, Alameda, Cal.

405,513. — SAFETY RAILWAY SWITCH — J. H. Wait, Junction City, Ogn.

405,642. — SURGICAL INSTRUMENT — I. N. Woodle, Albany, Ogn.

The following brief list by telegraph, for June 25th, will appear more complete on receipt of mail advices:

California—Percy L. Davis, San Francisco, store service apparatus; Henry E. Freyshlag, San Jose, fishing net; Gotlardo Guobbini, Point Reyes, gate; Peter H. Jackson, San Francisco, frame for illuminating tiles; Viola Moore, San Francisco, music stand and portfolio; Winfield S. Odle, Los Angeles, portable extension ladder; Ernest L. Ransome, San Francisco, finishing concrete and artificial stone surface; Henry Root, San Francisco, machine for making wire rope; Hamlet Sutcliffe, Oakland, fire gate.

Oregon—Jesse M. Keith, Albany, machine for building wire and picket fence.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

AMALGAMATOR.—Joseph Behm, West Point, Calaveras county. No. 405,337. Dated June 18, 1889. This invention relates to an apparatus for more perfectly amalgamating and saving gold and silver together with mercury or other precious or valuable metal which is capable of amalgamation. It consists of a tub or tank having the interior lined with silver or copper plates, a means for introducing the pulp and conveying it into said tank, and a series of vertically-reciprocating inverted funnel-shaped plungers of silvered or coppered plates. The invention is intended to thoroughly agitate pulp which has already been reduced to a proper degree of fineness to prevent it from settling to the bottom of the tank, and to bring all parts of it intimately and repeatedly into contact with the amalgamated surfaces by which means the greatest amount of the precious metals may be saved.

SUPPORT FOR BEAMS OR GIRDERS.—P. H. Jackson, S. F. No. 405,358. Dated June 18, 1889. This is an improvement on a previous patent by the same inventor. It consists in such a construction that he is enabled to dispense with holes (which it was formerly necessary to make) through the beams and diaphragms, and by this construction is avoided the time and expense of handling and transporting these heavy beams from the rolling-mill or place of manufacture to the place where they are to be punched to prepare them for being put together.

COMPRESSING NATURAL GAS.—The contract for the two large duplex gas compressors and boilers for the Kentucky Rock Gas Company was placed with the Clayton Air-Compressor Works, No. 43 Dey street, New York. These compressors have a capacity of 2,000,000 cubic feet per day and are to compress the natural gas at the wells to a pressure of 200 pounds per square inch and force it a distance of 32 miles to Louisville for light and power purposes. The Clayton air compressors are practically the only ones adapted for compressing natural gas, and that they are eminently suitable for this purpose has been demonstrated by their performance at the natural-gas fields of Bradford and Wellsville.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, *or beyond the time he intends to pay for it*, let him not fail to write us *direct* to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

THE volume of water in the Carson river has shrunk rapidly during the past few days, but the flow is still more than sufficient to operate to their full capacity the stamp-mills along its course.

A First-Class Type-writing Machine for $50.

One of the best machines in the market, with the late improvements and in perfect order. Regular price, $85. Call at or address the office of this paper.

The Jenisch and Loehnert Ball-Mill.

(*Continued from page 473.*)

machine amounts to not quite ten cents per ton pulverized material. With gold quartz the wear is much less.

The machine is said to be capable of crushing 30 to 50 cwt. of gold quartz per hour by wet process, and by dry process 10 to 14 cwt. per hour. Over 250 of these mills have been put in use on the continent of Europe since June, 1887. B. & E. Albert, who pulverize all of the basic slag from Krupp's factory, use 17 of the mills. Over 65 of them are working in the Portland cement works, in Germany, Russia, Switzerland, Norway, Sweden and England. They are working also successfully in gold quartz in the mines of Hungary, Chili and Bolivia. They have been found also useful in pulverizing, arsenic, asphaltum, sulphur phosphates, gypsum, fire-clay, lime, etc.

At the present exhibition of mining appliances in Berlin, these mills attracted great attention, and 13 were sold in the first part of May. Mr. Robert Mack of Oakland, Alameda Co., Cal., has obtained the sole control of the sale of this mill for North America, and is about to arrange for its introduction on the Pacific Coast.

Gold in River Channels.

A New Theory of Its Deposition.

EDITORS PRESS:—During a recent visit to the drift-mining districts near Laporte and Gibsonville, in Plumas and Sierra counties, I made certain discoveries which suggested a new theory as to the deposits of heavy gold and worn quartz bowlders lying invariably beneath lava ridges, which to my mind must displace the ancient-river theory so long held in California. This theory was foreshadowed in my second annual report as State Mineralogist, 1882, folio 98.

I have in preparation a paper which it is my intention to publish in the MINING PRESS with illustrations, giving my reasons for so thinking. I send you this preliminary notice to secure priority.

The substance of my theory is briefly as follows:

The channels are lake-beds scooped out by glaciers that in course of time retired to mountains of greater altitude and continued their work during a long period on a larger scale, and finally became extinct.

The bedrock at this locality being soft clay slates, mica schists and argillaceous shales filled with small quartz veins containing gold, were reduced to mud and washed away, leaving the harder quartz in rounded bowlders with the coarse gold in the lake-bed, which was still filled with water. Rivers like the Rhone in Switzerland, brought down from the still active but distant glaciers crushed quartz, and for many centuries deposited it in the lake, covering the bottom with what our miners call "pipe clay." The lake and the low mountain-tops were subsequently covered by an overflow of volcanic mud, the so-called lava. Modern rivers which still flow in their channels cut down through the lava, the gravel deposits, and deep in the soft bedrock. That portion between the rivers protected by the lava became rounded ridges, and a portion still flat as a floor remaining on the summits of the mountains are "table mountains." The channels so called are the intact lake-beds and the present drift mines. The new river channels are the placer mines of the forty-niners and the hydraulic mines of past history.

It is my opinion that the contents of the channels came from a small area, and were not brought from a distance, as generally supposed. The blue quartz which imparts a general character to these deposits I found in place near Gibsonville, as I did also all the bowlder rocks common to the deposits.

That there were numerous lakes of this character I am prepared to believe, but on reducing the Lake of Geneva to the same scale as my map, I find it to extend from Pilot peak to Nevada City, and to cover most of the important drift and placer mines between those two points.

Assuming that such a lake existed, I have named it Lake Trask, from the first State Geologist of California, who made this subject a special study and nearly discovered the facts to which I alluded. HENRY G. HANKS.

718 Montgomery St.

Practical Treatise on Hydraulic Mining.

BY AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, $5, post-paid. For sale by DEWEY & Co., Publishers, 220 Market St., San Francisco.

Huntington Hopkins Co.

REMOVAL TO THEIR NEW BUILDING.

For several days the MINING AND SCIENTIFIC PRESS windows have overlooked an interesting and busy scene in the removal of the immense hardware stock of the Huntington Hopkins Co., from their former place of business at the junction of Market, Bush and Front streets, to their handsome and commodious new building on Fremont street, between Market and Mission, Nos. 18 to 24 inclusive. The new building has a frontage of 93 feet on Fremont street, and in hight is five stories and basement, extending back 137½ feet, where it joins the rear of an older four-story brick structure, also owned by the company, and having a frontage of 137½ feet on First street by a depth of 137½ feet. The two buildings are connected by a paved court, roofed with glass and iron, and make a total depth of 275 feet. This arrangement permits of a double driveway through the entire premises, thereby enabling heavy trucks entering from either street to load and unload and pass through without turning.

The new Fremont-street building presents an imposing front and reflects much credit upon the taste of the architect. It is very substantially constructed of granite, brick, iron and steel.

The interior of the building has been fitted with a special view to the requirements of an immense business, nothing having been omitted that would contribute to this end. Five hydraulic ram elevators and two hand elevators are in constant service, raising and lowering goods between the basement and the floors above.

Well-lighted and commodious offices are situated at the rear of the main salesroom, which is on the ground floor of the Fremont-street front. In this great salesroom, while containing many shelf goods may be seen conveniently arranged samples of nearly every line of hardware, etc., that the house carries. These consist of a great variety of agricultural implements, miners', blacksmiths' and carpenters' tools, and extensive line of builders' hardware, the best grades of cutlery and sporting goods of all kinds. In heavier goods there is constantly on hand a large stock of bar, bundle, sheet and plate iron and steel, wrought and cast-iron pipe, plumbers', blacksmiths', milling, mining and railroad supplies. The company gives employment to 90 men—salesmen, accountants, correspondents, porters, etc., in the San Francisco house alone. A history of this great business enterprise, from its establishment by C. P. Huntington in Sacramento forty years ago to the present time, would fairly illustrate the commercial progress of the Pacific Coast, as embodied in its own energy and successful achievements.

For many years the original house at Sacramento, as well as the business in San Francisco, has been conducted under the firm name of Huntington, Hopkins & Co., but on February 23, 1888, it was incorporated under the name of the Huntington, Hopkins Company, the officers of the corporation being Albert Gallatin, president, Charles Miller, vice-president, W. R. S. Foye, secretary, and Collis P. Huntington, treasurer.

Notwithstanding the immense business transactions of the company, which extend over the entire Pacific Slope from the Isthmus of Panama to Alaska, a visitor to the establishment will not fail to be impressed by the perfect order with which the details are conducted and the absolute discipline and system which prevail. An unsurpassed record of 40 years for integrity and straightforward business methods has earned for this house an enviable reputation, which does credit to the city and State alike.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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R. G. BAILEY—San Francisco.
W. E. BECK—San Francisco.
WM. H. COOK—Fresno and Santa Cruz Cos.
W. W. THROCKLDS—Central California.
H. G. PARSONS—Southern California.
GEO WILSON—Sacramento Co.
FRANK S. CHAPIN—Colusa and Lake Cos.
E. H. SCHAEFFLE—Calaveras and Tuolumne Cos.
DR. W. F. DRAKE—Sonora, Cal.
CHAS. DUGAN—Stanislaus Co.
A. F. JEWETT—Tulare Co.
CHAS. F. BLACKBURN—Idaho.
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Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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Situation Wanted.

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ORE CARS, WATER & ORE BUCKETS,

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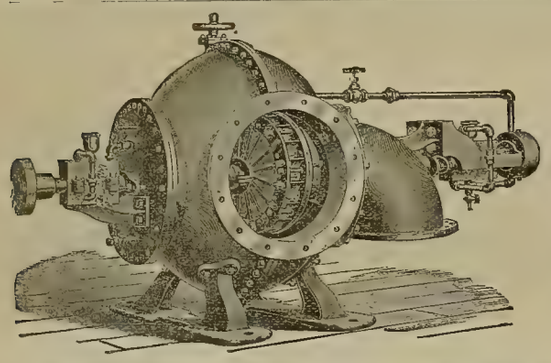

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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

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Springfield, Ohio, or 110 Liberty St., New York.

FRASER & CHALMERS, General Agents, Chicago, Ill., and Denver, Col.

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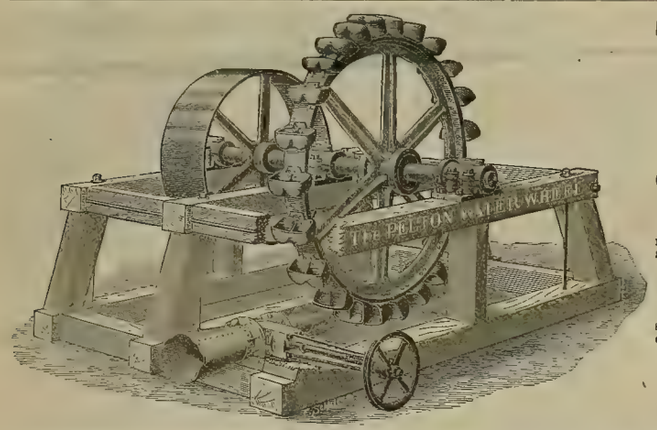

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Highest Efficiency of any Wheel in the World.

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Over 600 in use on the Pacific Coast alone, aggregating upwards of 50,000 Horse Power.

It is not only most economical of water, but the most simple and reliable power for Quartz Mills, Compressors, Hoisting, Pumping, or any other purpose where water power can be used.

ELECTRIC TRANSMISSION.

Power from these Wheels can be transmitted long distances with small loss, and it is now being extensively used in this way in all parts of the country for producing both light and power.

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Successors to CHAS. CALLAHAN
IMPORTERS AND DEALERS IN
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We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

☞ Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

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Nevada Metallurgical Works.
NO. 28 STEVENSON STREET,
Near First and Market Streets, S. F.
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Ores worked by any Process.
Ores Sampled.
Assaying in all its Branches.
Analyses of Ores, Minerals, Waters, etc.
Working Tests (practical) Made.
Plans and Specifications furnished for the most suitable Process for Working Ores.
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Mining Engineers and Metallurgists.

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METALLURGICAL WORKS.
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Ores Sampled and Assayed, and Tests made by my Process.
Assaying and Analysis of Ores, Minerals and Waters.
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Practical Instruction given in Treating Ores by improved processes.

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GREAT REDUCTION!
BATTERY SCREENS.
Best and Cheapest in America.
No imitation, no deception, no planished or rotten iron used. Only genuine Russia iron in Quartz Screens. Planished iron screens at nearly half my former rates.
I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

PERFORATED SHEET METAL
For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass, Zinc and other metals punched for all uses.
Inventor and Manufacturer of the celebrated Slot Cut burred and Slot Punched Screens.
Mining Screens a specialty, from No. 1 to 15 (fine).
Orders promptly attended to.
San Francisco Pioneer Screen Works,
21 & 223 First St., San Francisco, Ca.
JOHN W. QUICK, Proprietor.

This paper is printed with Ink Manufactured by Charles Eneu Johnson & Co., 50 South 10th St., Philadelphia. Branch Offices—47 Rose St., New York, and 40 La Salle St., Chicago. Agent for the Pacific Coast Joseph H. Dorety, 529 Commercial St., S. F.

WM. H. TAYLOR, President. R. S. MOORE, Superintendent.

Risdon Iron and Locomotive Works,

S. E. Corner HOWARD and BEALE STREETS, SAN FRANCISCO.

MANUFACTURERS OF ALL KINDS OF

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Mining and Milling Machinery,

ENGINES and BOILERS,

Sheet-Iron and Steel Water Pipe

FOR MINING AND IRRIGATION PURPOSES.

Manufacturers of

Bryan Roller Quartzmill,

Best in the World,

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SAWMILL MACHINERY.

HEINE PATENT SAFETY BOILER

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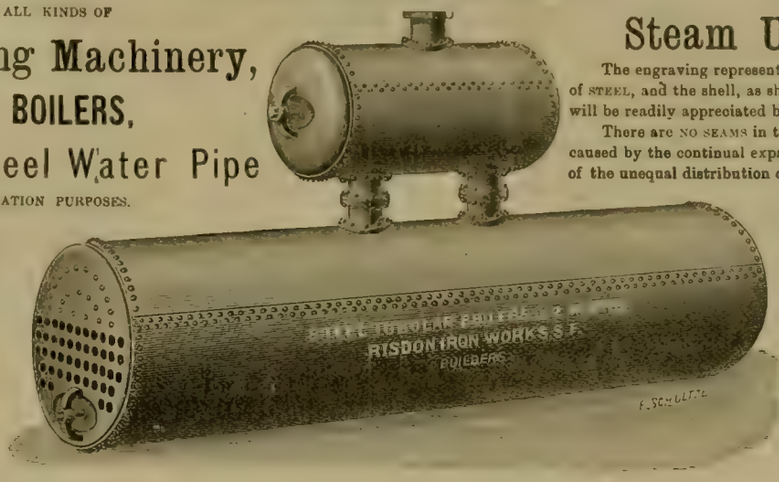
Steel Horse Whim.



STEEL BOILERS IN TWO PLATES.

Steam Users, Attention!

The engraving represents our standard Boilers. These boilers are made of STEEL, and the shell, as shown, being in TWO PIECES, the advantage of this will be readily appreciated by steam users.

There are NO SEAMS in the fire to leak, nor loose rivets to contend with, caused by the continual expansion and contraction of the plate on account of the unequal distribution of the heat under the boiler, the bottom presenting a smooth, even surface which can be easily cleaned. We place a manhole at the back end above the tubes, and one in the front end under the tubes.

The FRONT MANHOLE gives free access to the sheet over the fire, THE VITAL PART OF EVERY BOILER. This point is often overlooked by purchasers, and boilers are bought which have a small hand-hole, and the remaining space filled with tubes which allows absolutely no access for cleaning, and in a short time tubes and sediment are one solid mass, and instead of gain in efficiency by a few feet of tube surface, the result is a positive loss.

SPECIFICATION OF BOILER AND FIXTURES:

1 Boiler, 1 Steam Drum, 1 Breeching, 1 Smokestack, 300 Feet Galvanized Strand for Guys, 1 C. I. Front Complete, 1 Foundation Plate for Front, 1 Set Grate Bars for Coal or Wood, 1 Back Bar Bearer, 1 Ash Cleaning Door and Frame, 1 Back Arch Plate, 1 Set Binder Braces and Bolts for Brickwork, 1 Stand for Back End of Boiler, 1 Steam Gauge for Syphon, 1 Glass Water Gauge Complete with Column and 3 Gauge Cocks, 1 Safty Valve, 1 Feed Valve, 1 Blow-off Valve, 1 Check Valve.

These Boilers are tested to 150 pounds hydrostatic pressure and are intended for a working pressure of 100 pounds.

Boilers of the following Sizes in Two Sheets kept Constantly on Hand ready for Shipment: 60 Inches Diameter x 16 Feet Long; 54 Inches Diameter x 16 Feet Long; 48 Inches Diameter x 16 Feet Long; 42 Inches Diameter x 16 Feet Long.

SEND FOR CIRCULARS.

PACIFIC IRON WORKS

1850. 1888.

—BUILDERS OF—

MINING MACHINERY.

GENERAL OFFICE AND WORKS:

127 First St., San Francisco, Cal., U. S. A.

New York Office, 145 Broadway.

PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 38 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

THE GATES CRUSHER

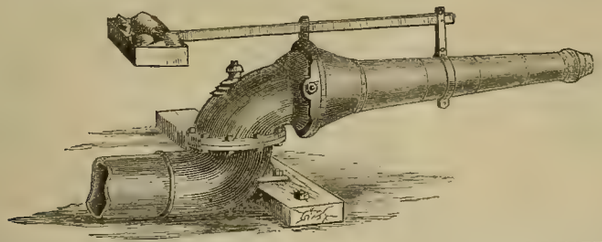
Is beyond all question the most important improvement that has ever been made in this class of mining machinery. It will do more than twice the work with a given amount of wear than any other Crusher made, besides crushing so much finer that for mining uses, the capacity of the mill is greatly increased. It has the same relative superiority for macadamizing purposes, affording the cheapest and most reliable machine for this use.

SEND FOR CIRCULAR.

PACIFIC IRON WORKS,

NO. 127 FIRST STREET, - - - - - SAN FRANCISCO, CAL.

IMPROVED FORM OF HYDRAULIC GIANTS.

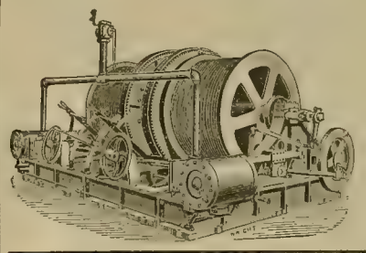


THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture. We guarantee purchasers of this form of Giants against all costs, expenses or damages which may arise from any adverse suits or actions at law. We are further prepared to furnish Single-Jointed Giants when required. Prices, discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent on application.

JOSHUA HENDY MACHINE WORKS, 39 to 51 Fremont St., San Francisco.

HOISTING ENGINES

FOR MINES.



1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

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PARKE, LACY & CO., San Francisco.

New Catalogue for 1889 now ready.

CITY HOTEL.

Sonora, - - - - - - Tuolumne Co., Cal.

HEADQUARTERS FOR MINING AND TRAVELING MEN.

Office of all Stage Lines leading out of Sonora. Fine Bar, Billiard, Reading and Sample Rooms. Everything first-class. Terms reasonable. C. S. FITCH, Proprietor.

"RED FLAX TRADE MARK RED CORD CORD"

SQUARE FLAX PACKING,

Manufactured from strictly first-class Flax and pure lubricants. Superior to all others for Water and Steam. Packs with less friction and makes a tighter joint than any other packing made. ☞ Imitations of inferior quality having been put upon the market, we have been compelled to adopt the above trade-mark, and all of our packing will now have a RED CORD running through the center its entire length. See that you get it and take no other. Sold by all hardware dealers. Price, 50 cents per pound. W. T. Y. SCHENCK, Sole Manufacturer, 222 and 224 Market Street, San Francisco, Cal.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, June 27, 1889.

Trade the past week was dull, but not more so than usually obtains during the mid-summer days. It is very generally claimed that when we are well into next month a gradually increasing trade will set in. Farmers are in the midst of harvest work, and until that is well off their hands trading by them is confined as much as possible. From the mining sections no large trade is looked for for two or three months.

The local money market continues easy. Remittances from the interior are light, but this is always the rule at this season of the year. Merchants and manufacturers' requirements are said to be light; consequently the call for funds from them is small. It is claimed that the call for funds this year to move the wool clip was smaller than usual, due to the free marketing by growers. The fruit crop has required considerable money, but as a rule the bulk was met by interior banks and capitalists. It is generally claimed that the wheat and barley crops will be marketed slow, unless prices advance. If stored, large sums of money will be tied up. The wheat surplus is placed at from 1,100,000 to 1,300,000 tons. This represents a cash valuation at to-day's prices of from $28,000,000 to $35,650,000. To move this, not taking into consideration the 400,000 tons for food and seed, will require large sums of money, and an almost constant drain on our banks will set in, and continue well into August or September, when funds remitted to the interior will begin to set back again.

In next month there will be large disbursements in this city to pay accrued interests and dividends. It is difficult to say how much will be disbursed, but it is generally claimed that it will go to over $2,000,000. This is independent of the sums that will be sent, or have already been sent away to pay interest on railroad and other bonds held at the East and also abroad.

There is still an almost entire absence of any speculative movements. The only thing that approaches such is wheat futures. Local securities are so high that cautious, conservative operators are afraid to invest. Mining stock securities have been so poorly handled by mining-stock pools for outside operators, that outside of chronic dealers no one is taking much interest in them. While this is the case there is no doubt but the work in those mines listed on the two exchanges is closely watched. There are many believers that the unexpected running into a large body of ore may happen at almost any time. As long as this belief exists, mining stocks will be dealt in.

For the week ending June 22, there was loaned on realty in this city $200,775, at from 6 to 7 per cent per annum by the banks and as high as 12 per cent by private individuals.

The steamer hence June 20 for China took out $161,885 in Mexican dollars, $72,000 in silver bullion, $8096 in gold coin and $50 in gold-dust. The same steamer took out for Japan $274,600 in silver bullion.

Exchanges closed to-day lower and weak under a small inquiry.

The imports of treasure by sea the past week are reported to aggregate in coin $21,431, of which $10,766 was Mexican.

SILVER—The European and Eastern markets held steady up to-day, when New York came through at 91⅞c. In our market there has been a continued free inquiry at 92⅛@92⅜c bid, and 92⅝@92¾c paid, with the latest reported sales made at the latter figure. To-day one buyer named 92¾c for silver, another 92½c, while a leading seller says that prices are no lower in this market.

QUICKSILVER—Receipts the past week aggregate 252 flasks and the exports 355 flasks to Mexico. The market is without essential change.

LEAD—The market with us continues very strong, but not quotable higher. At the East there is a good speculative and consumptive demand. English advices report that dealers there expect that if the ruling by the United States Treasury be against Mexican ore, all of the latter will be diverted to England.

BORAX—Concentrated is quoted lower. Eastern advices report a strong market. There were no receipts at this port the past week. The exports aggregate 339,795 lbs. to New York via Panama.

LIME—Receipts the past week aggregate 3355 barrels. The demand continues steady.

TIN—Imports the past week aggregate 8000 bxs. of plate from the East by overland railroad. The market for both pig and tinplate favors buyers. Consumers are said to confine their wants as much as possible. There was exported by sea the past week 2200 lbs. of plate to Mexico and 27,000 lbs. to Victoria, B. C.

COPPER—There was shipped to New York the past week 170,850 lbs. of ore. The market is without change. Lake, at the East, is established at 12c, although it is said that the price can be shaded. The latest statistical position of copper is in favor of holders, as the consumption is growing, the output less and the stocks being reduced.

IRON—The last steamer for Panama took out en route for New York 476,960 lbs. of ore. For pig the market is without particular change to note. Buyers and sellers are still apart. Consumers hold off as much as possible, unless offered inducements to take a round parcel. Several claim that with good prospects for freights on this coast, considerable will be brought here in ballast, and consequently prices cannot advance. On the other hand, sellers claim that the market abroad will more than offset any decline in charters or freights. Eastern advices report a quiet and easier market.

COAL—Imports the past week aggregated as follows: From Tacoma, 4000 tons; Nanaimo, 1914; Coos bay, 1200; Australia, 1570. Total, 8684 tons. There are signs of an increasing call for all kinds, which causes a firmer tone, but no advance. The temporary light receipts, no doubt, have something to do with spot and near-by, but for shipment or distant cargoes, we fail to see any indications of buyers operating, except when offered inducements. The ships on the way from and loading at New Castle, N. S. W., have a registered tonnage as follows: For this port, 45,575 tons; for San Diego, 16,720. Total, 62,295 tons. From Sydney the tonnage is as follows: For this port, 22,377 tons; for San Pedro, 7308; and San Diego, 2438. Total, 32,123 tons.

Eastern Metal Markets.

By Telegraph.

NEW YORK, June 26, 1889.—The following are the closing prices the past week:

	Silver in London	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42 1-16	92	$12 00	$4 00	$20 00
Friday	42	91⅞	12 50	4 00	19 95
Saturday	42	91⅞	12 00	4 00	19 90
Monday	42	91⅞	12 00	4 00	19 95
Tuesday	42	92	12 00	4 02½	19 90
Wednesday	42	92	12 00	4 05	19 90

NEW YORK, June 26.—Refined and powdered California borax is scarce, higher and firm at 9½c. Concentrated is unchanged; 7¾@8¼c. Quicksilver is firm at 65@66c. Recent Rothschild quotation £9 5d. The iron and steel interests are well supported. Rails are strong at $28. Lake copper is nominally $12, but that price, shaded in late German and French bids, is said to have been rejected by mining companies. The London market is stronger. Casting brands sold here at $10¾@11¼. Pig lead has considerably recovered, with a good speculative and consumptive demand. Closing prices were $4@4.05 for the rest of June and July and $4.05@4.07½ for August and September delivery.

San Francisco Metal Market.

WHOLESALE.

THURSDAY June 27, 1889.

ANTIMONY—	13 @ 14
BORAX—Refined	7¼@ 7¾
Powdered	7¼@ 7¾
Concentrated	— @ 6½
COPPER—	
Bolt	26 @ 27
Sheathing	26 @ —
Ingot, retail	16 @ 17
do, wholesale	13 @ 14
Fire Box Sheets	— @ 26
LEAD—Pig	4½@ —
Bar	5 @ —
Sheet	8 @ —
Pipe	7 @ —
Shot, discount 10% on 500 bags	Drop, ₰ bag 1 45 @ —
Buck, ₰ bag	1 65 @ —
Chilled, do	1 85 @ —
STEEL—English, lb	16 @ 20
Canton tool	9½@ —
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Toe Calk	4½@ —
TINPLATE—B. V., steel grade, 14x20, P. S	4 60 @ 4 65
B. V., steel grade, 14x20, spot	4 85 @ 4 90
Charcoal, 14x20	6 25 @ 6 75
do roofing, 14x20	5 12½@ 5 25
Pig tin, spot, ₰ lb	21½@ 22
do, do, prompt shipment	— @ —
QUICKSILVER—By the flask	45 00 @47 50
Flasks, new	@ —
Flasks, old	35 @ —
COKE—Eng., ton, spot, in blk & sks, resptvly	18 00 @20 00
Do, do, to load	13 00 @13 25

IRON—Glengarnock ton	Spot. 27 00 @— —	To Load. 27½@ —
Eglinton, ton	26 00 @— —	26½@ —
American Soft, No. 1, ton	— —@31 00	31½@ —
Oregon Pig, ton	— —@30 00	— @ —
Clay Lane White	— —@24 50	25 @ —
Shotts, No. 1	28 50 @29 00	— @ —
Bar Iron (base price) ₰ lb	2½@ 3	— @ —
Chrome iron ore, ₰ ton	— —@10 00	— @ —

Coal.

TO LOAD.

	Per Ton.		Per Ton.
Australian	$ 6 75 @ 7 00	Cardiff	9 50@10 00
Liverpool Steam	7 25 @ 7 50	Lehigh Lump	16 50@17 00
West Hartley	8 50 @ 9 00	Cumberland bk	16 00@16 50
Scotch Splint	8 00 @ 8 50	Egg, hard	15 50@16 00

SPOT FROM YARD.

Wellington	$ 9 00	Gilman	6 00
Scotch Splint	8 00	Seattle	6 00
West Hartley	9 50	Coos Bay	5 00
Greta	8 00	Cannel	10 00
Westminster Brymbo	8 00	Egg, hard	17 50
Nanaimo	9 00	Cumberland, in sacks	18 00
Sydney	$ 8 00	do, bulk	17 50

Lumber.

Pine, Fir and Spruce.

	RETAIL.	JOBBING.
Rough Pine, merchantable, 40 ft	$19 00	$16 00
41 to 50 ft	20 00	17 00
51 to 60 ft	22 00	19 00
61 to 70 ft	26 00	22 00
1x3, fencing	21 00	18 00
1x4, "	20 00	17 00
1x3, 1x4 and 1x6, odd lengths	18 00	15 00
Second quality	16 00	14 00
Selected	23 00	21 00
Clear, except for flooring	30 00	27 00
Clear for flooring	1 00	.....
Clear V. G. No. 1 flooring	5 00	.....
Firewood	13 00	9 00
Dressed Pine, flooring, No. 1, 1x6	31 00	28 00
No. 1, 1x4	33 00	29 00
No. 1, 1¼x4, 1¼x6, and odd sizes	36 00	32 00
All sizes, No. 2	26 00	23 00
Stepping, No. 1	43 00	34 00
Stepping, No. 2	33 00	24 00
Ship timber and plank, rough	26 00	17 00
Selected, planed 1 side, average 40 ft	28 00	23 00
" " 2 " " "	30 00	25 00
" " 3 " " "	32 00	27 00
" " 4 " " "	34 00	29 00
Deck plank, rough, average 35 ft	34 00	31 00
Dressed, average 35 feet	39 00	34 50
Pickets, rough, B. M	19 00	15 00
½x1½, 4 ft long, ₰ M	5 50	4 00

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Con. California and Virginia, June 23, $72,000; Alice, 17, $20,960; Justice, 20, $3942; Crescent, 19, $5600; Hanauer, 20, $7250; Crescent, 20, $2356; Germania, 20, $25 688; Hanauer, 21, $4850; Germania, 22, $3138; Hanauer, 22, $2400.

THERE are on the Comstock to-day about 400 miners out of employment. There is but slight chance, if any at all, for them to get work within the next three or four months. These are facts which wise men should not fail to heed.—*Virginia Enterprise.*

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS
Andes M Co	Nevada	35	25	Jun 12	July 18	Aug 8	J J Hawkins	309 Montgomery St
Bella Union Quicksilver M Co	Cal	7	20	May 21	June 24	July 15	A Halsey	328 Montgomery St
Best & Belcher M Co	Nevada	43	25	June 6	July 11	Aug 1	L Osborn	309 Montgomery St
Crocker M Co	Arizona	7	10	Jun 14	July 19	Aug 13	A Waterman	309 Montgomery St
Equitable Tunnel & M Co	Utah	34	5	May 14	June 20	July 15	C J Collins	1018 Market St
Eureka Con M Co	Nevada	12	50	Jun 12	July 15	Aug 7	H P Bush	306 Pine St
Gray Eagle M Co	California	13	05	May 15	July 2	July 23	O H Bogart	327 Pine St
Inyo Marble Co	California	5	5	May 14	Jun 24	July 24	G W Luce	205 Front St
Morgan M Co	California	13	15	May 9	Jun 17	July 8	C S Neal	230 Montgomery St
Nevada Queen M Co	Nevada	5	50	June 3	July 9	July 30	H Deas	309 Montgomery St
Original Gold Hill M Co	Nevada	12	25	June 17	July 25	Aug 14	A W Barrows	303 California St
Opir M Co	Nevada	55	50	May 11	Jun 16	July 2	E B Holmes	309 Montgomery St
Pinal Con M Co	Arizona	8	13	May 15	Jun 21	July 12	A Cheminant	328 Montgomery St
Platt & Gilson G M Co	California	1	3 00	June 20	July 22	Aug 7	C Herrman	326 Kearny St
Quartz Mountain M Co	California	21	40	Jun 17	July 22	Aug 15	E Hestres	217 Sansome St
Seg Belcher & Mides Con M Co	Nev	3	25	June 4	July 8	July 23	E B Holmes	309 Montgomery St
Sierra Nevada M Co	Nevada	95	25	June 7	July 11	July 31	E L Parker	309 Montgomery St
Teirakoff M Co	California	2	10	May 18	Jun 18	July 18	W J Gurnett	308 Pine St
Union Con M Co	Nevada	38	25	May 13	Jun 19	July 10	J M Buffington	303 California St
Weldon M Co	Arizona	13	10	May 13	Jun 18	July 9	A Waterman	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Best & Belcher M Co	Nevada	L Osborn	309 Montgomery St	Annual	July 8
Live Oak Drift Gravel M Co	California	J Morizio	328 Montgomery St	Annual	Aug 20
May-flower Gravel M Co	California	J Morizio	228 Montgomery St	Special	July 11
Overman M Co	Nevada	O D Edwards	414 California St	Annual	July 11
Scott Bar M & M Co	California	H Pink	318 Pine St	Annual	July 1
Union Con M Co	Nevada	J M Buffington	303 California St	Annual	July 15

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	50	May 10
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	Apr 26
North Star M Co	California	D A Jennings	401 California St	50	Dec 31
Navajo M Co	California	J W Pew	310 Pine St	10	Apr 1
Idaho M Co	California		Grass Valley	7.50	Mar 5
Pacific Borax, Salt & Soda Co	California	A H Clough	230 Montgomery St	1.00	Mar 11

Mining Share Market.

The market exhibited more activity the past week with freer transactions under steadily advancing prices up to Monday, when a jump of 10 to 25 cents per share took place in the Comstocks. On Tuesday the market began to set off, which continued up to yesterday (Wednesday), when a slight drop under a bear raise took place. In "Pauper alley" there are fewer men of all shades, character and standing waiting for opportunities to make money without work than have been seen for many months past. While this is so on that noted thoroughfare, the "tickers" in the more high-toned places in various parts of the city are less patronized by the slaves to that important instrument. There are various reasons assigned for the falling off in outside interest in stocks, the leading ones being: 1st, the almost constant drag, relieved only by small upward moves, which few benefit by, that has obtained since about the middle of last April; 2d, many devotees to the business being out of the city under assurance that there would not be anything yet awhile; 3d, free losses have driven many to other and more stable business. Those who are left are quite hopeful that with next month there will be a change in the tide for the better. This opinion is based chiefly on the fact that the principal mining magnates are now here; heavy disbursements of money the fore part of July; the Sutro tunnel legally changing hands on July 14th; the natural desire of leading operators to unload, if possible, large lines of stocks owing to the expected demand for money to move the crops; and last, but not least, of favorable reports expected from the mines to favorably influence the market, notwithstanding a growing scarcity of water on the Comstock, the bullion output falling off each week (last week's was only about $140,000), and several more assessments looked for at an early day. In the outside stocks there was more done in some of the Tuscaroras, with Nevada Queen advancing about 100 per cent, but the others only moved up a few cents. These stocks, outside of Commonwealth, one year ago sold many times higher than they are selling for to-day. The shrinkage in their market value is accounted for by too big reports of ore, bullion, expected dividends, etc, but in lieu thereof assessments and similar kind of fare for outside holders. The Quijotoas have shown more life, but then owing to their low prices outsiders handle them rather gingerly. The Bodies held strong with only moderate business. Bodie even advanced slightly, while the Comstocks went down. Their strength, it is claimed by many usually well informed on the streets, is due to a desire of two of the large holders of the stocks to sell out and not net a loss, while there are a few who report a continued favorable change in the mines. The latter report the writer is unable to have verified up to this writing by thoroughly reliable information from the mines.

From the mines the news is of an unimportant character. Comstock advices continue to report the Mexican west crosscut being driven ahead as fast as possible. The same news comes from Yellow Jacket. It now looks as if leading miners' hopes are centered in these two crosscuts cutting within the next few weeks the gold ledges west of the silver-bearing lode that is now being worked. If when the gold-bearing lode is found it proves as rich in mineral as is expected, a general revival in mining interests will follow. About Best and Belcher and Gould and Curry mysterious hints are put out, but not tangible enough to admit of entertainment by the more conservative miners. In the other mines the usual routine work comes to hand, with the more important, if there be any, information held back. The water supply on the river is growing scarcer. From the Tuscarora district our advices are still of the usual order, "ore, bullion," etc., which has grown stale and unprofitable to outside holders of the stock. From the Quijotoa district there is nothing new to report, outside of official information. From the Bodies there is nothing new, so far as obtainable, to report. The usual "driving" business is reported in the official advices. From the Columbus and Eureka districts there is nothing new obtainable outside of official advices.

The stock market opened this morning firm, and held fairly steady under light business up to the noon adjournment. In the afternoon board, the Comstocks were lower, but the outside stocks were steady.

THE Virginia *Enterprise* says that the Combination shaft, on the Comstock, which is 3300 feet deep, has cost $7,000,000, and not a dollar ever came out of it.

GEN. W. H. DIMOND has been appointed superintendent of the U. S. branch mint in this city.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING June 5.		WEEK ENDING June 12		WEEK ENDING June 19.		WEEK ENDING June 26.	
Alpha	1.70	1 85	1 35	1.65	1.10	1.45	1.10	1.25
Alta	1 45	1.55	1.35	1.50	1.25	1.35	1.30	1.60
Andes	.60	.70	.50	.55	.30	.35	35	.50
Argenta	....	....	....	....	....	....	....	....
Belcher	3.95	4.30	3.30	4.05	2.60	3.50	2.75	3.40
Best & Belcher	3.70	3.90	3.00	3.70	2.50	3.25	2.50	3.20
Bullion	.80	.85	.60	.75	.60	.70	.60	.70
Baltimore	....	.2	....	.10	....	....	....	....
Belle Isle	.30	.35	....	.25	....	.20	....	.20
Bodie Con	1.70	1.95	1.25	1.70	1.20	1.30	1.25	1.40
Benton	....	2.70	3.00	3.50	....	3.85	4.00	4.50
Bodie Tunnel	....	....	....	....	....	....	....	....
Bulwer	.45	.50	.30	.40	....	.30	....	.30
Commonwealth	....	5	5	4.60	4.70	4 25	4.50	4.00
Con. Va. & Cal	7⅛	7⅝	7.00	7⅛	6⅝	7⅛	6⅝	7⅛
Challenge	2.85	3 10	2.35	2.85	1 70	2.30	1.80	2.35
Chollar	2 10	2.30	.75	2.50	1.60	2.00	1.60	1.75
Confidence	6.75	7⅜	6	6⅞	5	6	5⅜	6
Con. Imperial	.50	.55	.35	.5	.35	.40	.35	.45
Caledonia	.20	.30	.20	.25	.20	.25	.20	....
Con. Pacific	....	....	....	....	....	....	....	....
Crown Point	3.55	3.80	2.90	3.65	2.25	3.10	2 25	2.75
Crocker	.40	.50	.40	.45	....	.30	.20	.30
Central	....	....	....	....	....	....	....	....
Dudley	....	....	....	....	....	....	....	....
East B. & B	....	....	....	....	....	....	....	....
Eureka Con	2.00	3.00	....	2.50	....	....	....	....
Exchequer	.80	.85	.65	.85	.60	.70	.50	.70
Grand Prize	.80	.85	.80	.90	.70	.80	.70	.75
Gould & Curry	2 50	2.65	2.15	2.60	1.75	2.35	1.75	2.30
Hale & Norcross	3.95	4.05	3.55	3.85	3.50	3.70	3.00	3.45
Holmes	....	....	....	....	....	....	....	....
Independence	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....
Julia	.25	.30	....	.25	....	.20	.20	....
Justice	1.10	1.15	....	1.10	1.15	1.25	1.10	1.45
Kentuck	1.45	1.70	1.20	1.50	1.05	1.15	1.05	1.30
Lady Wash	....	.35	.35	.40	....	.35	.35	.40
Locomotive	....	.10	....	....	....	....	....	....
Mount Wilkes	....	....	....	....	....	....	....	....
Mono	1.60	1.65	1.05	1.35	.95	1.10	1.00	1.05
Mexican	3.45	3.75	3.05	3 70	2.70	3.40	2.70	3.25
Mt. Diablo	....	....	....	....	....	....	....	....
Navajo	....	.10	....	.50	....	....	....	....
North Belle Isle	1.00	1.50	1.05	1.10	1.10	1.10	.95	1.10
Niagara	....	....	....	....	....	....	....	....
Nev. Queen	.90	1.50	1.00	1.05	.80	.90	.55	1.10
North G. & O	....	....	....	....	....	....	....	....
Occidental	1.55	1.65	1.45	1.60	1.25	1.40	1.35	1.50
Ophir	4.40	4.10	4.35	4.60	4.00	4.75	4.05	4.75
Overman	1 30	1.45	1.25	1.50	.95	1.35	1.00	1.15
Potosi	2.10	2.30	1.85	2.15	1.50	1.95	1.45	1.70
Peerless	.55	.60	....	.50	.25	.40	.25	.45
Per	.20	.25	.20	.25	.15	.20	.15	.25
P. Sheridan	....	....	....	....	....	....	....	....
Silver Star	....	....	....	....	....	....	....	....
Savage	2.50	2.65	2.05	2.50	1 80	2.30	1.80	2.15
S. B. & M	2.75	3.05	2.55	2 95	1.50	2.60	1.50	1.80
Sierra Nevada	2.60	2.85	2.20	2.75	1.75	2.35	1.75	2.25
Silver Hill	.40	.50	.40	.45	.40	.45	.40	.45
Silver King	....	....	....	....	....	....	....	....
Scorpion	.20	.25	.20	.25	.15	.20	.15	.20
St. Louis	....	....	....	....	....	....	....	....
Syndicate	....	....	....	....	....	....	....	....
Union Con	3.40	3.65	2.80	3.50	2.75	3.40	2.75	3.15
Utah	1.10	1.15	.90	1.10	.80	.95	.80	1.00
Yellow Jacket	3.80	4.00	3.15	3.80	2.70	3.15	2.70	3.15
....	....	....	....	....	....	....	....	....

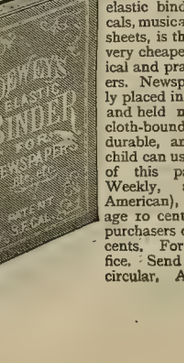
Sales at San Francisco Stock Exchange.

THURSDAY, June 27, 9:30 A.M.

50	Kentuck		1.14
250	Mexican		3.00
400	New York		.50c
400	Overman		1.10
350	Ophir		4.50
175	Potosi		1.60
50	S. B. & M		1.70
200	Scorpion		.20c
200	Sierra Nevada		2.05
350	Union		2.95
300	W Comstock		.35c
50	Yellow Jacket		2.85

50	Alta	1.45	
800	Alpha	1.35	
210	B. & Belcher	2.95	
180	Challenge	2.00	
100	Con Va & Cal	7.50	
150	Chollar	1.60	
100	Crocker	.35c	
200	Crown Point	2 50	
50	Commonwealth	4.05	
500	Grand Prize	.65c	
500	Gould & Curry	2.05	
650	Justice	1.40	

THE San Francisco supervisors have passed an order requiring all cable-car companies to provide suitable devices for guards on all dummies after August 1st.



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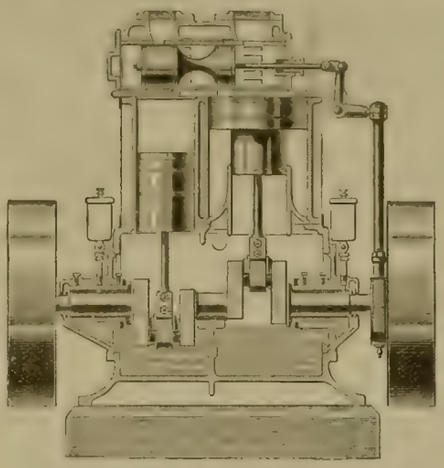

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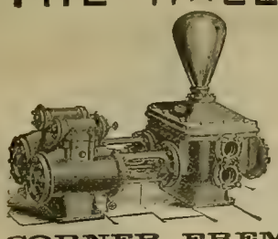

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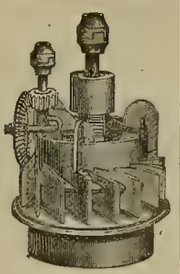

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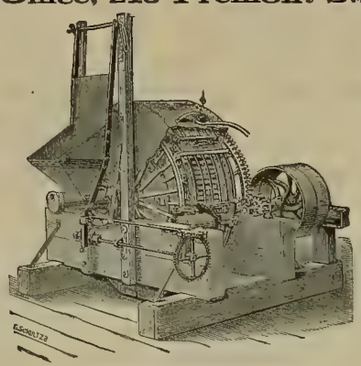

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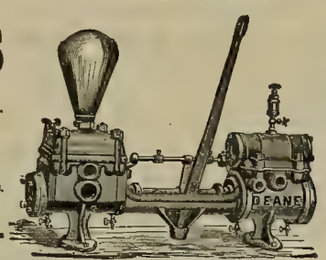

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COAL MINES OF THE WESTERN COAST.
A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for $2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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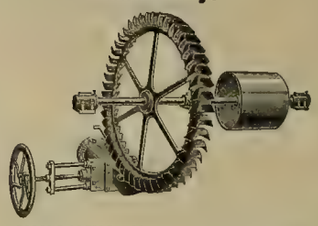

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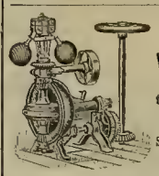

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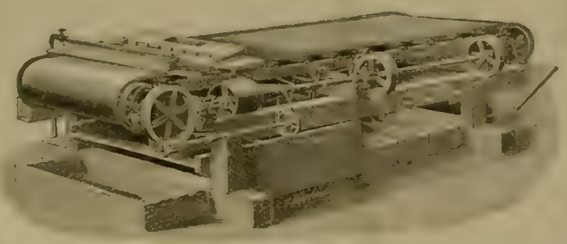

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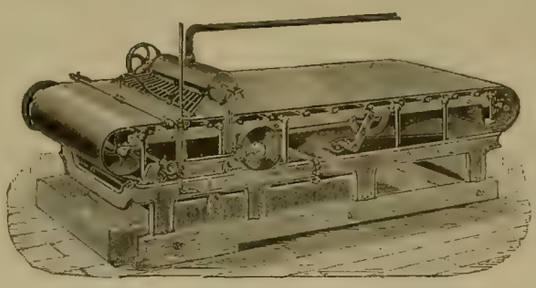

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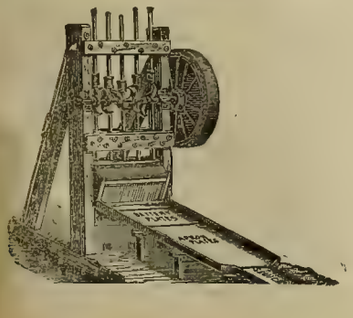

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INDEX TO VOL. LVIII.

—OF THE—

Mining and Scientific Press.

From January to June, 1889.

A

Academy of Sciences, 24, 61, 128, 137, 161, 247, 424, 438, 465
Acorn and Oak.....128, 133
*Aerial Planes.....1
Æolian Harp.....187
Air.....318
Air Compressors.....167
Air for Fuel.....458
Alaska Coal.....236
Alaska Forests.....92
Alaska Placers.....55
Alaska Mines.....97
Alaska Officials.....188
Alaska Silver.....435
Alcohol.....359
Aliens, Importing.....112
Aliens and Mineral Land..134, 167, 468.
Allanite.....454
Altoona Quicksilver Mine.....54
Alum in Boilers.....190
Aluminium Rolling-Mill...206
Amador Mines.....22
Amalgam on Plates.....440
Animals' Sense.....458
Antimony, Dakota.....202
Apollo, Mines at.....202
*Artesian Wells..53, 60, 61, 93, 277.
Asbestos.....137
*Astoria.....481
Astronomical Society..112, 314, 315.
Astronomical Affairs.113, 162
Asian R.....117
Assaying Gold and Silver Ores.....114
Assayer, Every Man His Own.....401, 42
Asphaltum, Utah.....93
Asphyxiation.....97
Atlas Iron Works.....208
Augers.....187, 424
Australian Balloting.....112
Axles.....458

B

Balance-Wheel.....11
Band Sawmill.....284
Beaver Copper Mines.....276
Beaver's Tail.....76
Bearings, Frictionless.....110
Beet Sugar.....345
Belt Speed.....190
Bicycle Locomotive.....119
Bird Trailing.....59
Bimetallism in England...453
Black Sand Lode.....374
Black Metal District.....58
Black Walnut.....284
Blooms and Billets.....204
Blowpipe, Electric.....163
Boils.....77
*Boiler for the Australia..382
Boilers.....190, 405
Boodle.....
Boomerang.....313
Bolted Flour.....379
Boys, What to do With....315
Brazing.....186
Brick Residences.....151
*Bright, John.....201
Bright's Disease.....319
British Columbia Mines.21, 160
Buildings, Portable.....92
Bug in Ear.....43
Bullion Product of 1888....78
Bullion Shipments..16, 24, 48, 66, 86, 106, 122, 137, 156, 176, 196, 205, 234, 254, 267, 304, 328, 345, 365, 388, 408, 428, 448, 468
Bulls Metal.....142

C

Cable R. R. Guards...365, 424
Cable R. R. Water-Power.360
Calaveras Mines.....22, 276
*Calculating Machine, Re-sembles.....341
*Camera, Gibbs.....21, 2
Canal Across Scotland.....339
Canal of Mars.....226
Canal of Manchester.....207
Canal of Panama.....23, 117
Canal, Swedish.....339
Cancer Cures.....77
Cancer and Climate.....245
Cancer Quackery.....59
Cancer Malady.....399
*Candlestick, Miners'.....145
Cantilever Bridg.....151
Car Axle.....284
Car Cables.....300
*Car Dumping Frame.....413
Car Rim and Rust.....
*Carburetor, Dykes.....41
Carbonic Acid, Liquid....358
Carpets.....395, 479
Castor Bean.....27
Celestial Distances.....
Celery for Rheumatism....224
Cellular Clothing.....419
Celluloid.....339, 395
Cement for Belts.....42
Cement, New.....97
Chaudron, The Cruiser, 92 263, 333, 394.
*Chili Mill.....303
Chinese Certificates.....365
Chinese in Lower California.....394, 440
*Chinatown Scenes.....163
Chrome in Califia, 79, 189, 475
*Church, Unitarian....129, 133
Cigarette Smoking.....97
Circular Saws.....116
Claims and Prospects.....39
Clay Selvage.....24
*Cleanup Barrel.....441
Cleaning Up a Mill.....241
Cloud Measurements.....244
Clothes, Cleaning.....441
*Coal Boring.....55
Coal, Pacific Coast....81, 296
Coal, Weight.....151
Coffee.....137, 150, 281
Cold, Curing.....151
Colora in Nature.....150, 418
*Comets.....395
Comstock Bullion.....
Comstock Lodes.....282
Comstock Mining Deals, 231, 403.
Comstock Ores.....73
Comstock Yield.....162
Como, Nevada.....314
Concentrates, Shipping ...340
Concentrator, Jones.....
Concentrator Mistakes....364
Concentrator, Victor.....182
Concentrating and Dry Crushing.....54
Conemaugh Disaster (See Johnstown)
*Conemaugh Val. Scenes..421
Copper Assay.....38
Copper Castings.....158
Copper Industry, New.....166
Copper Syndicate.....148, 275
Copper Situation, 208, 340, 369
Copper Tubes.....9
Copper, Uses for.....398

*Illustrated.

Copper in 1888.....80
Coral Islands.....338
Corn-Cob Pipes.....187
*Corona.....25
Cotton in Australia.....1
Cotton Crop.....10
Cotton Manufacture.....10
Cotton States.....101
Countershaft, Adjustable.378
Crucible Steel.....336
Cutlery, Sheffield.....26
Cyclones.....96

D

Dams.....440
*Dam, Dale Dyke.....461
*Dam, English.....461
*Dam, Furens.....481
*Dam, Puente.....461
*Dam, Vornay.....481
Dams, Reservoir.....460
*Dams Which Have Burst, 460 461, 462.
*Date Palm.....113, 223
Debris Controversy.....380
Debris Commission, State. 41
Debris Commissioner, U. S., 97 114, 434, 460.
Debris Injunction.....188, 380
Diatoms.....132
Diamonds.....264
Dilic Mine.....193, 202
Digestion.....117
Diphtheria.....209
*Divoll Bonanza.....355
*Dome for Observatory, 260 263.
*Dorer Mine Pictures...71, 91
Downieville Mines.....161
Drainage and Soil's.....318
Drapery Glass.....117
Dredging at San Diego....173
Drift Mining.....78
*Drill, Daunt'ess.....55
Drill, Electric.....166
*Dry Process, Freeman (See Freeman).
Dry Crushing and Concentrating.....50
Dust Explosions.....116, 438
Duplicate Parts.....76
Dynamite Guns.....149

E

*Earthquake.....264, 380
Earthquakes and Mines ..358
Eastern Nevada.....233
Eating, Philosophy of.....265
Eclipse of Jan. 1st, 8, 9, 10, 62
Eiffel Tower.....7
Elastic Foundation.....318
Elastic Sandstone.....114
Electric Blowpipe.....163
Electric Currents.....319
Electric Drill.....166
Electric Felling of Trees ..379
Electric Light Poles.....203
*Electric Mine Hoist..111, 114
Electric Motor, Brush.....21
Electric Power and Coal...13
Electric Power.....7, 193, 479
*Electric Power on Comstock, 201, 208, 209, 210.
Electric Power at Big Bend, 60, 135.
Electric Postal R. R.....265
Electric Progress.....379
Electric R. R.'s...114, 146, 147
Electric R. R., Sprague.146, 240
Electric R. R. for Portland 267
Electric Welding.....319, 478
Electrical Society..93, 146, 147 168, 223, 282.
Electrical Theories 319
Electricity and Heat.....265
Electricity at Portland.....42
Electricity and Lands 27
Electricity and Steel.....439
Electricity, What it is.....280
Electro-antidence.....399
Embroidery Machine 76
Emeralds, Tower Cal.....13
Engineering Development.458
*Eureka, Cal.....3
Eureka District.....54
Evolution in Mechanics...318
Expe ts Not Discoverers...434
Expo ition, Detroit .413, 420
Eyes, Tired.....265

F

Feather-Bone.....27
Feet.....353
Finger-Nails.....339
Fires in Old Rome.....319
*Fire Balls.....395
Fish Commission.....23
Fish Gills.....376
Fish by Electricity.....206
Flintlock Guns.....7
Food, J. C. Pacific.....134
Flowers.....42, 43
Flour Gold.....217
Flour, Fine.....141
Flour-Mills.....343, 442
Flour Patent.....442
Flour Trust.....101
Fly-Wheels.....438
Forests, Nation's.....113
Forestry in California....92
Foremen.....190
Fox Coupling.....213
Foundry Notes 114, 153, 208 282, 303, 382, 413, 460.
Foundry Practice.....96
*Freeman's Dry Process.1, 145
*Fresno.....374, 375
Fresno Mines.....161
Fresno Timber.....249
Frozen Ground, Picking....163
Fungus in Mines.....3
*Furnace, Dobrianszky.....149
Furnace, Hartsfeld.....137
*Fu nace, Lash 433, 445
*Furnace, Wartsilia...127, 137

G

Gas and Boilers.....405
Gas Companies.....378
Geodetic Survey.....163
Ginger, Wild.....277
Girder Manufacture.....167
Glace Fruits.....339
Glass, Writing on.....97
Gold, Australian.....40
Gold, California.....40, 475
*Gold-Mill.....433
Gold in Utah.....435
Gravel Channel Theory ..435
Golden Treasure Mine....364
Government Surveys.....277
Graphite Lubricati n.....320
Grass Valley Mines.....39
Grease one 24
*Grinding Soft Ore.....247
Grub Gulch District.....162
Guano 125
Gypsum as Sand.....338

H

Hainsworth Gun 6
Harqua-Hala Mines 22
*Harrison, President.....169
*Hauling Engines for Mines.....61
Health Items..7, 27, 43, 59, 77 97, 117, 133, 151, 167, 187, 207 227, 245, 265, 281, 301, 319, 339 359, 379, 398, 418, 439, 458.
Health of State....77, 151, 207 301, 379, 458, 479.
Health and Morals.....439
Heart Beats.....133
Heart Neuralgia.....117
Hemp Plant.....97
Hoist for Mines.....1
*Hoisting Whim, Common Sense.....282
*Hoisting Whim, Davis....314
Horses, Fasting.....151
Horse-Power.....226
Horse shoe Manufacture..398
Honduras Mines 434
Hot Air from Cold.....3 1
*Hot Ore-Feeder 223
Hydrogen Gas.....26
*Hydrogen Amalgamator .373
Hypochondriacs, Medical . 7

I

Ice Ex
Ice as
Idaho, Centra
Idaho Mine Fire .420, 440
Incline Planes, Trucks for.368
*Incline Tramways.....395
India-rubber Substitute...458
Industrial Notes, 10, 23, 100 170, 248, 342.
Industrial Notes from Los Angeles 315
Industry in Asia.....378
Infant Mortality 43
Infectious Diseases.....43
*Ingot Melting 37
Injectors 405
Intellect and Emotion 297
Invention, Age of 358
Inventions, Small.....339
Inventors' Rewards 241
Ione Valley.....474
Iridium.....418
Iron for Boilers.....42
Iron, Cuban.....3
Iron Fiber.....
Iron from Ore 134
Iron-Foundry Progress.....300
Iron and Fracture.....338
Iron Industry.....398
Iron Mountain, Taylor's ..6
Iron on Pacific Coast..100, 262
Iron, Puget Sound.....161
*Iron R. R. Tie, 137, 244, 297 308.
Iron Trade, European.....264
Iron, Utah.....
Iron, Working.....76, 458
Irrigation District.....112
Irrigation work, Gov'nment 112, 385.

J

Japanese Coal 93
Japanese Mines.....480
Japanese R. R.....43
Johnstown Disaster...421, 447
Journal Healing.....226

K

Kern County.....193
Kern Mines.....72
Klamath River.....333

L

Lakes of S. Joaquin Valley 474, 475.
Lager Beer 415
Lakes, Gre t.....378
Lake Co. Mines.....91
Land Law, New.....281
Leaching Ores (See also Through Lixiviation), 2, 16, 240, 261, 276, 296, 334, 374.
Lead in 1888 .....81, 296
Lead Production 296
Lead Tariff.....340
Leaves 3
Leg slature of 1889.....33
Legislative, 4, 62, 82, 100, 119 137, 153, 176, 193, 262.
Legislative Committe s.....55
Lick Observatory 297
Lignite, California 227
Life, Length of.....167, 281
Light and Electricity 206
Light Without Heat.....300
Lightning 413
Lime in Alkali Lands ..158, 295
*Limekilns, Perpetual, 295, 296
Liquor, Origin of 399
Liquids and Fat.....439
Lithology of Wall Rocks ..168
Locomotive, Electric Cal....13
Locomotives, Compound..200
*Locomo ive, Mine 91
Locomotives.....166, 378, 264
Lode, Discovery 394
Los Angeles Base Line, 163 223
Los Burros Mines 99
*Lower Ca ifornia Mine..163 181, 183, 193, 228, 362, 394, 440
Lower Cal., Geology of.....362
Lubricating Oils.....11

M

Machinery at Night.....206
Machinery in Russia.....338
Magne s 24
Magn tic Variat on at S. F.40
Magne ium, Metallic.....96
Mangan se Ores.....320
Manganese Steel.....150
Manure from Slag.....132
Marine Engines.....282
Maritime Protection.....246
Maxim Gun.....406
Meat, Dried 243
Meat, Preserving 339
Mechani s' Ass'ns 320
Mechanics' Fair.....137, 481
Metals, Rare.....96
*Meteors.....395, 424
Meteoric Stone 338
Meteorological Lecture....320
Mexican Lead Ores.....414
Mexican Mines.....182, 229
Mexican Mines and Miners, 302, 321, 340, 361, 362 382, 400.
Mexican Mine Labor 148
*Mexican Mining Dist's. .341
Mexico, Unexplored.....43
Microbe of Magnet.....390
Microscope.....132
Mill, Displacing a Stamp..275
Mind Cure.....27, 339
Miners, American.....393
Miners' Association.....213
Miners' Licenses.....321
Miners and Paris Expo....296
Mineral Claims, Surface Ground of 246
Mineral Products of U. S.. 44
Mineral Land Titles.....92
Mineral lands and R. R. Grants.....134, 182, 223
Mineralogist's Report. 40
Mining Bureau, 38, 40, 188 262, 302, 340, 485.
Mining Bureau Appropriations.....262, 334
Mining Bureau Trustees..340
Mining Discoveries.....34
Mining Directors' Liability.162
Mining, Economical.....454
Mining Laws, Bad.....339
Mining Review, Annual, 78 9, 80, 81
Mining Reports, Nautical.395
Mining Share Directory, (see 12 h Page Weekly)
Mining Share Market (See 12th Page Weekly).
Min'g Stocks (See 12th Page Weekly).

Mining Stockbrokers.....60
MINING AND SCIENTIFIC PRESS.....161, 360, 480
Mining and State Fair..203, 380
Mint Report.....163
Modeling in Clay.....237
Mohave County.....261
*Moon.....12
Montana Gold Mines.....54
Montana Bullion Product. 72
*Mossbrae Falls.....241
Moths and Gnats.....128, 479
Motion and Heat.....186
Motor, New Needed.....358
Mummies.....425

N

Nails, Care of.....187
Nahi, The Late Arthur....247
Nati nal Iron Wo ks.....153
Natural Soap.....315
Natural Gas.....151
*Neuebaumer Mine.....441
*Neptune and Satellites ..280
Nevada Mines, Dist rict, 127, 137
Nevada City Mines.....222
Nevada Mines at.....244
Nitrate Deposits.....23
Nitroglycerine Cannon....222
Noise and Nervousness....43
Northern Counties of Cal., 373 374, 414, 454, 465.
North Star Mine.....394

O

*Observatory Dome...260, 262
Oil Fuel for Mining Plants, 24
Oil in Contra County.....
Oil on Waters.....26
Oil from Wood.....7
*Oil-r, Smith's Automatic, 25
Ontario Mine.....374
Oolite Marble.....206
*Ore Crusher, Blake's, 303, 304
Ore Crusher, Gu enberger's 63
*Ore Crushing, Fine..321, 342
*Ore-Cooling Apparatus..263
*Ore Mill, Bal.....473
Ore Feeder, Johnson's.....232
Ore, Grinding 247
Oro Bella Mines.....434
Oxygen 166
Ozocerite.....247

P

Pacific Power Co.'s Engine.460
Paper Buildings.....414
Paper, Spitting.....7
Paralysis.....244
Paris Exposition.....296
Patents, Foreign & American 60
Patents, Four Hundred Thousand.....262
Patents, U. S.....168
Patents, English.....132
*Patents, Notices of Recent (See Table of Contents), 1, 16 29, 40, 45, 63, 82, 102, 122, 137 145, 153, 173, 196, 205, 229, 231 243, 263, 282, 287, 325, 345 385, 405, 425, 445, 465.
Pendulum 358
Pe a d'Or'lle.....107
Perceptive Faculties.....338
Petroleum and Human Body 27
Petroleum as Medicine....117
Petroleum, Origin of 78
Phosphorescen e 398
Ph tographs, Underground 71
Photographs, Fading.....187
Photographic Processes....162
Photographing Rifle Balls, 76
Pianos 77, 151
Pig-Iron Market.....1
Pig-Iron Production.....6
Pine Grove 521
Pipe Lines.....
Pipe Works, Smith's.....153
Plastering Staging 245
Plate, Hardening 280
Platinum and Mercury....132
Playing Cards 207
Plumas Mines.....276
Plumas Mines.....161
*Pneumatic Locomotive. 91
Pneumatic Motor.....43
Pneumonia 27
*Pocket Mines 355
Pocket for Mechanics....332
Postal Tube 43
Potter Ridge District.....162
Powder Manufacture, Cal ,146
Power, Waste 27
Precipitating Vats.....135
Preserving Meat.....243
*Pr spector, The Old, 373, 380
Proxies for Mining Elections 91, 320
*Pump, Buffalo.....413
Pulverizer, Dodge.....101, 275
Pumping, Gold 474
Puzzle, The "13-14-15" 414
Pyrometers.....186

Q

Quar'z, Rusty 2
Quicksilver in Cal.....79, 202
Quicksilver in Trinity Co.. 54

R

Rails across America.....98
Railway Building.....187, 374
Railroads, Cal.....434
*Railroad Tie, Iron, 137, 244 297, 308.
Rattlesnakes.....379
*Reamer, Dy's.....181
Rebuilding District..314, 394
Redwoods 422
*Redwood Houses.....3
Ref ma Mine 373
*Relief Chart, Pac. Coast, 161
Rock Brakes.....23
*Retort for Amalgam.....
Richmond Cons. Mine.....222
River and Harbor Commission 240, 359
*Riverside 454, 455
Road Making.....222
Rocks, Raising.....240
Ropes.....301, 399
*Rope Transmission 321
Ruby City Mines.....222, 454
Rural Views.....415
Russia Iron.....6

S

*Sacramento River.....401
*Salmon River Mines.....283
*Salt, California.....275
Salt Deposits.....2
Salt, Experiments with....206
Salt in England.....114
Salt Palace 7
Salmon Fisheries.....100
*Samoun Hurricane....282, 333
Sand Drifts.....339
Sand, Peculiar 320
San Diego Notes 469
*Santa Clara District.....181
Saws, Band 284
Sawdust Fuel.....284
Sawmill Machinery 284
Scott, Reception to I. M.. 445
Screw Manufacture.....42
Seattle Fire.....435
Severage, W. P. Stanford. 62
Self-Mending Snakes.....296
Separatio s.....222
Settling Vat.....189
Shasta Mines.....208
Shaving.....43, 458
*Shot Towers 132
Side Lines and Boundaries, 246
Signal Rocket.....132
Silicon in Iron.....154
Silver King.....39, 374
Silver in Michigan.....415
Silver in Refining by Electricity.....399
Silver Facts.....48
Sirocco.....6
Sleeping Cars.....319
Sluices, Removing Concentrates and Sediment from.229
Smoke Suppression.....132
*Soft Ore, Mining 115
*Sonora, Tuolumne Co....353
Soap, History of.....301
Solders.....365
Southern Cal. Mines.....222
Sound and Light.....76
Spontaneous Combustion, 166
Star Movements.....378
Star Mine.....340
Steam, Dry.....
Steam Launch Building...208
Steam Machinery.....374
Steam Pressure.....398
Steam Pipe Radiation.....42
Steamer Tonnage.....231
Steel Castings.....206
Steel Mills.....460
Steel Shafts.....264
Steel Ships.....244
Steel Spikes.....116
Stetho scope 280
Storage Batteries.....305
Storms, Law of.....150
Stoves, American.....244
Stumps, Firing.....163
Strasbourg Clock.....402
Sugar in Alcohol.....7
Sulphur in California.....98
Sulphurets and Gold.....202
Sun and Skulls 227
Sunlight and Trees.....116
Sunset Rays 264
Swedish Iron Hook, G. W. Moliere.....445
Chicken Brooder, L. O. Byce.....45
Chisel, T. H. Palmer.....445
Clark Escapement, F. Gundorph 425
Coated Sheet Metal Plate, J. P. Culver.....263
Coin Adjuster, G. McLaughlin.....196
Cola-Actuated Receptacle, E. J. Jones.....465
Collar Stuffing Machine, G. E. Hoyt.....122
Collar Stuffing Machine, C. Ewing.....465
Combination Tool, H. W. Kinkead.....367
Concentrator, J. A. Jones. 1
Concentrator, J. A. Johnson.....243
Concentr's, F. Sletcher, 229, 231
Cu Extractor, G. Edwards 29, 45
Corset, L. James.....465
Cough Mixture, A. M. Poe. 29
Cultivator, H. H. Taylor.. 82
Cutting Apparatus, Clark & Ashlev.....122
Dental Engine, I. G. Leek .153
Dental Engine, W. A. Knowles.....16
Dress Form, W. A. Johnson.....153
Drier, A. J. Hatch.....82
Drill Support, G. E. Foster.102
Dried Fruit Cleaner, J. Harrell 29, 45
Dumping Wagon, L. Busse.465
Dynamo Armature, J. A. Hayes.....205
Eccentric, Variable, D. L. Remington.....345
Electric Belt, S. Colling... 1
Electric R. R., B. Jenning's.....
Electric R. R., F. M Speed..405
Electric R. R. Track Alarm, T. Taylor.....305
Electric Time Piece, Carranza & Vinocur.....287
Electro Medical Apparatus, J. J. Lewin.....287
Elevator Safety, H. O. Hooper.....173
Elevator Safety, P. B. Sullivan 102, 385
Engine, A. H. Straub.....445
Engine, Compound Cabinet, E. W. Hamlin.....205
Excavator, I. T. Lambing. 405
Feedwater Purifier, A. Hess.....45
Fence Machine, G. W. Johnson.....205
Fencing, E. Hawes 243
Fin for Vessels, G. W. Napier.....263
Fire Arm, L. W Gay.....365
Fire-Arm, J. H. & S. H. Redfield.....425
Fire Alarm, A. Watson...16
Fire Ladder Extension, J. W Tully 445
Fly-Catcher, A. Arents ...345
Fly-Trap, J. E Packard...445
Folding Vehicle, J. McBoyle.....445
Fog-Horn, F. Basto.....173
Goods Packers for Woodchoppers, A. L. Stevens.....205
Fruit-Box, J. G. Letellier..173
Fruit Drier, F. Altman....287
Fruit Drier Fan, J. W. Cas-sidy 231
Fruit Grader, V. Rattan ..231
Fruit Pitter, Briggs & Cavallaro 137
Fruit Preserving, W. R. Baker.....287
Fruit Stoner, Briggs & Leach.....445
Furnace, J. P. Oliver. 29
Gang Edger, H. C. Robb..231
Gang Plow, W. Holloway. 45
Gang Plow, E. H. Farmer.325
Gas Apparatus, J. A. McCollum 29
Gate, J. Albers 45
Gate, Hyde & Dotterrer....465
Gate, W. O. Pierce.....173
Gauge for Grinding Drills, A. P. Brewer.....385
Gearing, Bevel, C. Whitford.....287
Girder Support, P. H. Jackson 285
Grain Drier, L. Borland...385
Grain Cleaner, H. Bryan..231
Grain Separator, M. N. Laufenberg 231
Grease Extractor, W. D. Nelson.....29
Grinding Mortar, G. W. White 231
Grinding Pan, P. Hinkle..263
Guard for Fish Nets, J. Myers.....102
Hair Cutter, J. W. Eisenhuth.....365
Hame Tug, G. W. Moliere. 65
Hand Bag, F. Emerle.....425
Hand Guard for Rock Drills. B. Giovanni.....45
Handle, Hinged, J. Gerdine.....405
Harness Snap, E. B. Knapp.....
Harrow and Cultivator, S. W. Kilpatrick 242
Harrow, A. C. Brown.....196
Harvester, J. N. Miller....16
Harvester, J. Draper...173
Hay Fork, W. H. Lander..102
Hay Unloader, W. G. Hunter.....137
Hay Unloader, W. N. White.....173
Hay Stacker, T. H. Palm..425
Header Attachment for Harvester, H. Bryan ...465
Hip Rein Support, A. Kempkey.....153
Horse Collar, W. Crosby .231
Horse Checking Device, W. P. Smith.....231
Hoisting Apparatus, H. Kennedy.....173
Hot Air Blast, W. O. Mills..102
Hydrostatic Scale, F. Bat-ter.....385
Insulator for Electric R. R, B. Jennings 365
Key, J. F. Dandmann....173
Ladder, Extension (2), H. T. Hayes.....82
Lamp-Shade Protector, G. A. Tank.....243, 263
Lid-Raiser, J. S. Anderson..102
Lightning Conductor for Wire Fences, F. E. Wood..287
Lifting Machine, J. G. Kearney.....122, 137
Lime Kiln, Oil Burning, Clark & Mapel 82
Liniment, J. A. Achard...287
Lock, H. C. Frost.....425
Mail-Bag Fastening, J. Jacobs.....196
Mail-Pouch, C. W. Miller.287
Mandrel Driving Machine, J. Richards.....325
Medical Compound, Leverage & Curry.....263
Micrometer Gage, J. Richards.....425
Motion, Converting, J. Demond.....63
Motor, H. C. Olsen.....345
Mower, Redfield & Hansbro 2
Nail, A S. Wall.....231
Necktie Fastener J. Reidl..445
Nippers, J. Sponseller....173
Nozzle, Hose, Hicks.....285
Nut Lock, B. Marshall...287
Nut Lock, C. O. Vineyard .425
Oiler, F. W. & O. E. Traves.365
Oiling Wheels, Device for, F. H. Harris.....445
Oil Feed for Lamps, C. Sieghold.....29
Ointment, C. V. Sutherland.....287
Ore Concentrator, J. H. Pemberton 305
Ore Crusher, G. E. Ames..243
Ore Feeder, J. H. Hendy..122
Ore Feeder, G. Johnson. 282, 287
Ore-Mill, E. Derbec.....385
Ore-Mill, J. Mackenzie....325
Ore - Pulverizer, M. B. Dodge.....325
Ore-Separator E. Derbec..102
Ore-Separator, E. L. Giroux.....137
Ore-Washer, G. Blasdel.137
Packing, J. T. Smith.....173
Paddle-Wheel, Feathering, H. F. W. Sohst 385
Paint-Oil, A. Sommer.....102
Pan, M. P. Boss.....196
Parallel Ruler, Phelps & Ellis.....263
Pavement, J. E. Knoche..153
Pen, H. Beichling.....425
Photographic Paper, F. H. Rogers.....345
Pile, St. Martin.....29
Pile Covering, Anderson & Elias.....45
Pile Protector, G. M. Barondes.....385
Pinch Bar, P. C. Forster.385
Pipe-Wrench, C. H. French 16
Piston for Engines, W. J. Thomas 465
Plane, H. Fry.....153
Planing Machine, M. Stixrud.....231
Plow, J. W. Paterson.....173
Plow, Reversible, J. A. Cole.....63
Plow and Seeder, H. M. Kingsbury.....385
Plug for Sinks, W. B. Smith 325
Pneumatic Alarm for R. R., T. Taylor.....305
Pool Register, E. R. Robbins.....153
Pop Safety Valve, F. A. Miller.....45, 63
Postage Stamp Affixer, L. J. Borie 483
Propeller, E. Lotz.....305
Pulverizer and Amalgamator, E. Derbec.....45
Railway Signal, G. Provost 385
Railway Vehicle, G. W. Brown.....263
Raisin Stemmer, C. L. North 45, 63
Reel and Sprinkler, R. Wiley.....231
Road Engine, R. R. Doane.153
Rocking Chair, L. C. Gunn.263
Roller Bearing (3), R. W. Holder 18, 205, 325
Safety Car-Heating Stove, Locke & Thayer.....305
Safety Gate for R. R. Cars, W. N. Brown.....385
Sash Fastener, C. H. Foster.....
Sash Holder, R. P. Waddell485
Saw, W. T. Wilson.....153
Saw-Handle, M. Bennett..137
Saw-Setter, A. W. Logan..132
Saw-Swager, T. B. Hite....445
Sawmill Set Works, W. A. Campbell 325
Sawmill Set Works, F. W. Cook.....176
Scraper, Denehy & Childs.38
School Desk (2), C. B. Towle.405
Screw Driver, J. H. Adamson.....63
Separator, Finch & Cross..243
Sewing Machine Shuttle, C. H. Benoit.....122
Sewer Trap, Cohn & Mc-Kenzie.....385
Sheet Metal Lath Machine, J. Weichart.....305
Ship's Windlass Indicator, D. H. Rivers 465
Shipping Receipt, D. K. Howe.....205
Shirt Wristband, W. E. Howell.....153
Sifter, J. D. Quinn.....102
Slate, Artificial, C. Brown 203
Sleigh F. J. Mette.....405
Slot-Making Attachment for Bolt-Heading Machines, S. Uren.... 425, 445
Snatch Block, A. Uren....385
Spring Gate, E. Y. Knapp.385
Stack Propeller, J. A. Robb 305, 375
Staple Driver, E. M. Dean.485
Step-Ladder, J. A. N ill..405
Step Vehicles, M. Mc-Marsh.....325
Strap Loop, A. C. Reeves..345
Strap Fastener for Trunks, C. Sparks.....365
Stretcher Bar, P. Schmidt. 465
Sulky Plow, G. W. Haines. 82
Sulphate of Silver, Preparing, F. Gutzkow.....325
Surface Condenser, E. W. Tucker.....405
Surgical Instrument, I. N. Woodle.....485
Swaging Device, J. Taylor 325
Switch, R. R. Safety, J. H. Wait 485
Table-Cover Fastener, Knapp & Johnson 257
Telegraph for R. R. Trains, F. J. Crouch.....345
Tensile Strain Testing Machine, S. Jump.....425
Tensional Soundboard, C. S. Weber.....34
Track Cleaner, G. W. Cook. 37
Trade-Mark, C. Nusbagak Canning Co.....345
Vapor Stove, C. S. Drake..287
Valve, S. N. Knight.....425
Valve, Steam J. H. Gheen.335
Valve Gear for Compound Eng ne, J. C. H. Stat.....44
Vegetable Cooker, F. W. & E. Gaines.....485
Vehicle Seat, J. A. West.. 63
Vehicle, H. Are berg.....445
Lifting Machine, J. G. Kearney.....122, 137
Ventilator, P. Abrahamson.....63
Ventilating R. R. Cars, Murray & Harrison.....102
Veterinary Remedy, B. M. Jones.....63
Vineyard Cultivator, C. Rebman.....29
Wall for Houses, W. R. Ray.....205
Wall Protector, Robbins & Broad.....365
Water Meter, F. Gutzkow.243
Water Motor, C. R Hunt.385
Water-Wheel, E. Derbec..102
Waterwheel Tub, W. G. Dodd.305
Well Crib, W. H. Williscraft 243
*Well-Boring Apparatus, J. E. Day.....405, 481
Wheel-Cutter, F. E. Lux...205
Wheel Rim, Hicks.....102
Wheelbarrow, J. Dumpy...173
Windmill, G. W. Haines..231
Windmill, G. P. Thurston.325
Windmill, F. E. Kendall..153
Wire Splicer and Cutter, Carey Wubbeke.....29
Wrench, J. Tomlinson....196
Wrench for Saw Teeth, F. W. Cook.....325
Wrist Protector, C. L. Stewart.....405
Writing Desk, Combined, H. L. Keith.....305
Wooden Boxes, E. Densmore.....385

INCORPORATIONS.

Abner Doble Co 290
Alameda Sugar Co.....176
Alaska Gold Exploring Co.290
Alki Coos. M. Co.....176
Atlas Iron Works.....408

California Architectural Publishing Co.....86
California Casket Co.....234
California Fruit Pitting Co.290
California Stone Co.....45
California St. Cable R. R. Co.....345
California Lead Bath Amalgamating Co.....448
Carbon Paint Co.....234
Chilcat Packing Co.....66
Central Mill & Lumber Co.290
Colley Mill & Lumber Co..102
Coffin Combination Pruneh & Ticket Co.....388

Dykes Automatic Gas Machine Co.....388

Elk Creek R. R. Co.....254
Eureka Manufacturing Co.345

Fruto & Round Valley Wagon-Road Co.....86
Fox Platform & Coupling Co.....
Garfield M. Co.....254
Geo. Kelly Co.....176
Globe Dry Ore Concentrator Co.....84
Glacier Fishing Co.....45
Golden Gate Salmon Co....102
Granberg & Bowen Co.....137
Grandee Journal Bearing Co.....388
Guarantee Loan & Trust Co.....365
Hartman G. M. Co.....446
Harqua Hala M. Co.....290
Honey Lake Water Co.....448
Hutchinson Sugar Plantation Co.....345
Kenal Coal Co.....290
Keith Electrical Co.....290
Las Animas Land & Water Co.....405
La Favorita Raisin Vineyard Co.....290
Manzanar M. Co.....66
Mexican Colorado River Land Co.....290
Mt. Diablo Wine Co.....102
Morton-Brown Cutter Bar Co.....137
Mutual Gas & Fuel Co.....176
Nevada & Cal. M. & Trading Co.....365
N. C. Carnall Co.....137
Nimitic M. Co.....254
Oakland Cable M. Co.....176
Obed Chart Co.....137
Occidental Beet Sugar Co.290
Oregon & California Lumber Co.....290
Pacific Belt & Truss Co....448
Pacific Coal Co.....66
Pacific Coast Syrup Co....365
Pacific Contracting Co....290
Pacific Carriage Co.....428
Pacific Coast Woodworking Co.....405
Pacific Development Syndicate.....345
Pacific Stone Co.....45
Pacific Writing Telegraph Co.....328
Palace Bathing Co.....137
Parke & Lacy Co.....102, 114
Prince of Wales Peking Co. 45
Port Carolina Palos Verdes Mineral & Development Co.....290
Radam's Microbe Killing Co.....408
Rattlesnake M. Co.....345
Redwood MTrs Ass'n.....176
Rio Bravo Vineyard Co....365
Santa Cruz M. Co.....176
San Francisco Street R. R. Co.....254
San Francisco Polyclinic Society.....86
Shenandoah M. Co.....88
Skagit Cumberland Coal Co.....176
Stonewall Extension Co....428
Sunset Telephone Telegraph Co.....328
Storey County M. Co.....428
Tioga District M. Co.....448
Tyro M. Co.....176
U. S. Brewery Co.....137
Valley Lumber Co.....137
Western Basket Mfg Co....45
Western Cable Co.....290
Western Union Iron Works 290
West Coast Steamship Co.176
Woodbridge Canal Co.....328

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